

GERBERT HENGELAAR

The proactive incumbent: Holy grail or hidden gem?

Investigating whether the Dutch electricity sector can overcome the incumbent's curse and lead the sustainability transition



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**Een proactieve rol voor het gevestigde grootbedrijf:
heilige graal of verborgen potentie**

Onderzoek naar de mogelijkheden voor de Nederlandse elektriciteitssector om de "incumbent's curse" te overwinnen en de duurzaamheidstransitie te leiden

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Preface

Utrecht, August 2017

Seven years have passed since I took the first steps towards this thesis. Many Fridays, Saturdays and holidays have been spent researching and writing to arrive at the product in your hands today. It fills me with joy that even after such a period of study the relevance of the topic of business' contribution to the societal grand challenges and its urgency is acknowledged more broadly today than it was in 2010. Although we have made steps in limiting climate change, they can hardly be qualified as more than some promising first steps. For the incumbents in the electricity sector, but certainly in other sectors, the hard part of the change process is yet to come. Beyond climate change, the impact of business on inequality and inclusive growth might yet be the next game-changing societal issue, requiring transformative action by the business community and society at large. But beyond the practical relevance of the matter, the fact that I have been able to deliver this thesis and look back on the process as a rewarding journey, underlines for me a deeper calling present in this academic work. In this preface, I would like to bear witness to the intellectual context in which this thesis took shape and acknowledge the inspiration and cooperation of many in developing this thesis.

Intellectual roots

It was somewhere halfway during my study period at the University of Twente that I started a journey to investigate my professional calling. Unfortunately, it was not primarily the curriculum of my study of Industrial Engineering and Management that guided me, as it only marginally challenged my personal leadership and devoted not much attention to the societal responsibility of business. Without a doubt, it strongly energized me when I eventually did discover relevant perspectives to let my Christian values and personal talents and knowledge come together. In this process the conversations at the local Christian student union C.S.V. Alpha, the conferences of IFES, and the lectures on Christian philosophy by Prof. Dr. Jan Hoogland deserve credit as the context in which the right questions as well as the first answers emerged. I discovered ways to connect the radical transformation of will, mind, and action Jesus portrays in the Sermon on the Mount (Matt. 5-7) to business and academic realities. The challenge of Christ to always seek service to the weak and vulnerable in the society (Matt. 25), has been an important motto which still guides my professional contribution today.

There are a few key individuals who deserve to be mentioned for their intellectual inspiration in that process of connecting values and talents. Inspired by the strong respect my father has for the work of Prof. Dr. Abraham Kuiper, I discovered the long-lasting tradition of academics and practitioners who have studied how biblical values and the Christian

worldview can shape each sphere in society. From my mother's family, I probably inherited a few academic genes. The academic work of my grandfather, Prof. Dr. Hans Rookmaaker, on how art can and should witness to how faith engages with contemporary culture and questions, was an important inspiration as well in this respect. Although I never met him in person, even today I come across many people who have been inspired by his books but even more by intensive personal engagement with him. His example provides me with inspiration of how deep the impact of academic work and societal engagement by academics can be. It is remarkable to see that the importance of mindset in shaping business behavior, which has emerged as central theme in my research and this thesis, comes close to the connection between worldview and practice to which both Kuyper and Rookmaaker have drawn attention.

From the community of economic and business scientists a few deserve credit for their intellectual inspiration which led me towards sustainability as a topic of study. The books by Prof. Dr. Bob Goudzwaard, of which I found several in the bookcase of my parents, develop a strong case on how Christian values and other ideologies shape economics and point to the relevance of sustainability for economics before many others discovered it. More recently, the second thesis of Prof. Dr. Johan Graafland eloquently showed how economic science and theology can meet each other to shed light on contemporary issues. In the process of discovering the hopeful developments in business sustainability research, reading the book "Capitalism at the Crossroads" by Prof. Dr. Stuart Hart played a pivotal role, as well as the Harvard Business Review articles by Prof. Dr. Michael Porter. Further down the road, many academics influenced and contributed to my work as the references in this thesis bear witness, and I will mention a few important ones later on.

The story of this thesis starts within the logistics firm TNT. The charismatic sustainability leadership of CEO Peter Bakker was an important reason to choose this company as employer in the first place. Under Peter's leadership the company developed a remarkable example of strategic philanthropy in its partnership with the World Food Program, the impact of which goes even beyond the direct work of TNT, due to the many corporations that followed TNT's example. From my time within TNT I can attest to the positive energy and purpose this engagement created for the company. At the same time, the company was running a program called "Planet Me," by which it attempted to strongly reduce the carbon footprint of the company. My observation from within, that the company, notwithstanding the large ambition and proactive mindset of its leadership, struggled to go much faster than its competitors in transforming its core business was an important spark for my academic quest into the role of incumbents in transitions, and the possibilities and limitations of proactive leadership. It underlines the company's commitment to sustainability and professional development, that they provided me space and time to start this research project.

The journey of combining research with four consecutive jobs would not have been successful without the context the Partnership Research Centre provides for external PhDs. I am glad that among others Prof. Dr. Rob van Tulder saw the strong positive contribution external PhDs can make to business science. He has created a context in which external PhDs can inspire and help each other as peers and has been strong in creating the flexibility and space within the academic ecosystem of the Erasmus University that is much needed when combining research with other vocations. I would like to express the hope that the current attempt by the Rotterdam School of Management to provide a more structured program for part-time PhDs will not rule out the flexibility required by external PhDs. And I also hope that this thesis underlines that external PhDs can make a valuable contribution, which might not be fully conventional, but nevertheless attests to high standards of academic rigor and relevance.

Personal acknowledgements

Without doubt the first and foremost to acknowledge in terms of direct contribution to my academic endeavor is my promotor, Prof. Dr. Rob van Tulder. I enjoyed the many conversations with you and am thankful for the time you freed, besides the many other projects you run, to contribute to my research. Rob, you have taught me a lot in terms of building on earlier literature and making empirical investigations systematic and robust. But even more I respect your ability to embrace the contribution of different schools of thinking, theories, methods and to engage a broad range of relevant societal and business issues. At a time in which top business scientists have increasingly become hyper-specialized in specific theoretical and empirical niches, this broad approach is - from my point of view - highly relevant and beneficial. You have shown me that relevance and rigor should not be sacrificed to each other, but both can be achieved at the same time.

Furthermore, I would like to acknowledge several other academics in Rotterdam with whom I worked directly during my research. First among them is, of course, my co-supervisor Dr. Koen Dittich. Koen, you are an example of an academic researcher who in a practical way approaches highly relevant issues and your pragmatic input and suggestions have been very helpful in the final years of completing this thesis. Second, Rick Bosman MSc should be mentioned here. Working with you on regime and discourse dynamics has certainly enriched my thesis. My conversations with you and also Prof. Dr. Derk Loorbach have contributed greatly to developing the broad, multi-level approach on what happens within and behind transitions and helped to connect my research to transition literature in a relevant way. Furthermore, the Researchers Inc. community of the Partnership Resource Centre should be recognized here. Beyond the concrete knowledge transferred in the sessions, being part of a community among whom many are external researchers has helped me maintain momentum.

From among them I would like to specifically mention Anne van Lakerveld and Andrea da Rosa with whom I worked more closely, especially in the first years of developing this thesis.

The role of my consecutive employers deserves special attention. Although one could point at the very positive spin-off a research engagement also has for the employer, at times it puts substantial limitations on the availability of an employee. I owe many thanks to the various employers who have each in their way valued the relevance of this research and provided practical flexibility which has enabled me to finish this project. Among the first to mention specifically at TNT are Rose Verdurmen, who positively embraced my idea to start this research, and Wim Schalk and Marius Penninks, who supported the start of this project as well. This thesis could only be finished because my current employers at Next2Company, Jan Smit and Peter Kustermans, have provided the opportunity to take a half-year leave to make the decisive step in finishing this research and also several more shorter periods of leave to make the many final revisions to arrive at this manuscript.

From the electricity sector, my interviewees and informants made a crucial contribution to triangulate and enrich the empirical perspective on energy transition. Also, because of the richness of many of these conversations, I have carefully protected the confidentiality I promised them and therefore cannot mention their names here. My thankfulness for their willingness to share their time and thoughts remains undiminished.

Another important contribution to acknowledge is the work of my editor Alida Sewell. Without your strong dedication and attention to all the different details this thesis would have been much less readable and accessible.

Before arriving at the people in my direct personal sphere, I would finally like to thank the members of the doctoral committee for engaging with my research, acknowledging the academic quality and providing final suggestions. I certainly look forward to relevant discussions during the defense.

Without doubt, this journey would not have been successful without the mental support and inspiration from my friends, among whom I want to mention a few specifically. Mark, you have been a most loyal friend and our conversations help to provide the right perspective to many matters in my life. Bert, you been a friend and mentor for many years and have always challenged and helped me to find the practical relevance of the Christian faith. Marijn and Simon Frans, the conversations with you, which often delved into sustainability matters, at many times sparked new enthusiasm and insights.

My parents and our family have provided a fruitful context in which to develop my academic qualities, but also continue to support and inspire me. Your loving upbringing, mother and

father, and your warm support to develop my intellectual talents, are the foundation from which I work today. The way you live your personal vocations provides me with a strong example of actively discerning the relevance of the intersection between faith and society. Your strong and warm involvement, as well as that of my sisters Marieke and Dieke, with our lives today, and specifically my academic endeavors, means a lot to me.

The loving support of my wife has been without equal. Joselyn, I thank you for this. You have missed me at many moments when I was working on this book and have shown flexibility and provided support at many other moments. You have greatly helped me by acknowledging the role this intellectual work has in my personal calling with words, but even more in your continuous and reliable support in many practical ways. Without doubt, of equal value are also the questions you sometimes posed, which kept me from making work an idol or making the wrong sacrifices. Your unconditional love provides me with a safe space in which the positive and negative realities in my life can be fully embraced. I am looking forward to the coming years, when together raising Joëlle will be a new sustainability adventure of yet another kind. But before all, I hope we may love and live together for many more years.

Finally, there is One who deserves thanks above all others, also at this place. Science for me is nothing more and nothing less than finding order and knowledge engrained in creation by God in a wonderful way and attempting to apply this knowledge as a good steward. It is a sign of sin in its purest form that our economic system is destroying many aspects of the same creation at such a rapid pace. The knowledge that there is a deep, ongoing process of redemption provides hope in which practical quests for knowledge or sustainability make sense. I am deeply thankful for the loving foundation as well as the personal growth, which following Jesus means to me and that has made an invaluable contribution to arriving at this thesis as well.

Hope for this thesis

I would like to express the hope that this thesis contributes to more proactive sustainability leadership in business. Beyond the intellectual challenge a PhD research provided for me, my calling in doing this research has always been to contribute to a more positive impact in society by business. I hope that this thesis inspires many to follow the example of leaders such as Jeroen de Haas and Peter Bakker or support them in their efforts. And I trust that it will provide useful knowledge for the ones who aspire to do so.

Gerbert Hengelaar

Chapter 1 – Introduction

1.1 BACKGROUND: THE POLARIZED DEBATE ON INCUMBENTS IN TRANSITIONS

The global community feels a strong sense of urgency to pursue a much more sustainable economic system. The combination of climate change, resource depletion, population growth, and increasing consumption in emerging economies creates the need for radical change in the backbone of our economic system (Sachs 2008, Pollard et al. 2010, Hart 2010). The Paris Agreement signals a broad support across societal actors, from both public and private sectors, to take action on climate change as a central issue. The Marrakech Conference Action Proclamation formulates it as follows: “Our climate is warming at an alarming and unprecedented rate and we have an urgent duty to respond. (...) Indeed, this year, we have seen extraordinary momentum on climate change worldwide, and in many multilateral fora. This momentum is irreversible – it is being driven not only by governments, but by science, business, and global action of all types at all levels” (UNFCCC 2016).

Although the business community acknowledges the urgency of changing the economic system, it still struggles with the daunting effort needed. BlackRock, the world’s largest asset manager, recently published a report titled “Adapting portfolios to climate change” and concluded: “We believe all investors should incorporate climate change awareness into their investment processes” (BlackRock 2015). While many firms have also acknowledged the need to innovate in this respect, in many cases firms struggle to get beyond the pilot stage or focus mostly on incremental solutions (Lacy et al. 2013). A recent survey by Bain & Company showed that of the sustainability-related change efforts only 2% achieved or exceeded the expectations set (Bain & Company 2016). The very low success percentage of specifically sustainability-related change effort compares to an already minimal 12% of change efforts in general.

A lack of change can eventually disrupt a sector, as can be seen in today’s energy sector. An executive of RWE, one of the major European energy incumbents, recently acknowledged that the energy transition is a realistic threat to the firm’s survival: “The massive erosion of wholesale prices caused by the growth of German photovoltaics constitutes a serious problem for RWE which may even threaten the company’s survival” (Beckman 2013). In chapter five it is shown that many more signs of disruption could be observed in the electricity sector in the past few years. Even if most of the incumbent firms do survive, the disruptive dynamics did already induce a large negative financial impact.

Therefore, understanding how firms can contribute and be part of a transition towards a new, sustainable ecosystem is of key business and societal relevance today.

Incumbents are a category of specific interest both because of their large vested interest as well as their potential power to lead change. Innovation literature commonly defines incumbents based on their established nature: “firms that manufactured and sold products belonging to the product generation that preceded the radical product innovation” (Chandy, Tellis 2000, Henderson 1993, Mitchell 1991, Mitchell, Singh 1993). However, this established nature in many cases also implies a struggle with radical changes emerging in the market. Furthermore, large incumbent firms are typically known for continuous incremental innovation, while small entrepreneurial firms function as agents of more radical change (Schumpeter 1950). Transition literature stresses a similar perspective, because they portray incumbents as central actors in the current regime favoring stability or incremental change and as such often resist more radical change emerging from niches (Geels 2004, Unruh 2000, Smink, Hekkert & Negro 2013). From these definitions, the incumbent is the opposite of the challenger and new entrant. The role of incumbents in eras of discontinuous, radical (technological) change has been studied extensively. Schumpeter laid the foundation for this research in his work on creative destruction (Schumpeter 1934, Schumpeter 1950). The inertia of incumbents as well as the unique advantages they have over new entrants have been noted in Schumpeter’s work (Tripsas 1997). These contrasting findings can be seen throughout important contributions in this field of literature. One stream of literature demonstrates the consistent failure of incumbents in the face of radical innovation, due to a lack of willingness to cannibalize their current business as well as internal rigidities (Cooper, Schendel 1976, Tushman, Anderson 1986, Henderson, Clark 1990, Christensen 1993, Leonard-Barton 1992, Chandy, Tellis 1998). Others show how their scale, scope, and complementary assets can be an advantage in the face of discontinuous change (Chandy, Tellis 2000, Chandler 1990, Teece 1986, Srivastava, Shervani & Fahey 1998, Danneels 2004, Hockerts 2010).

The role of incumbents in sustainability transitions is highly contested in the public debate. As the quotes in table 1.1 illustrate, both sides use rather strong language to express their position. Those who are positive about the role of incumbents argue that we need incumbents to ensure a stable energy system and scale up new technologies, and combine this with a narrative that in the “new economy” business will lead the way, as “green” has become a source of competitive edge. In doing so, they often subtly accuse their adversaries of old thinking. Beyond the direct attack, they utilize pleas for specific policy measures and technologies well aligned with their position and eloquently posit these as optimal solutions to reach policy goals and minimize societal costs (see also Smink et al. 2015). Those who are negative about the role of incumbents emphasize the fact that the new trends are a clear

threat to incumbents and stress their tendency to slow down change with covert lobbying activities. They apply equally strong discursive weapons and picture incumbents as stuck in old thinking, unable to grasp the ongoing revolution. These arguments are reinforced by illustrating that actual behavior of incumbents (such as constructing new coal power plants) is in contrast to their positive vision and public promises.

Table 1.1 - Illustrative quotes of the positive and negative discourses on the role of incumbents.

Negative	Positive
<p>Q1 Jonker, Radboud University: The idea that "coal farmers" such as Nuon and Essent will help us to obtain green energy is absurd. If they would aspire to that, the consequence would be for them to liquidate their business (11_0175).</p>	<p>Q9 Terium, RWE: Including the investment in two enormous offshore-installations, these two new offshore wind farms require €3,2 bn¹ investment. This exceeds the investments in sustainable energy production of all smaller Dutch energy suppliers in the past years (11_0435).</p>
<p>Q2 Wagendorp, Volkskrant: Even if you win in terms of arguments, you will eventually fail to beat their lobbies and vested interest as they are generously supported by a "united lobby party" i.e. the CDA (11_0281).</p>	<p>Q10 de Rijk, WISE: As advocates of local, decentralized, clean generation we have neglected the limitations of this development. There are alternatives to the hundreds of local energy cooperatives. The "energy giants" should also generate more and more clean electricity (12_0362).</p>
<p>Q3 Rotmans, Erasmus University: The new order already collides with the old order. The current power brokers already barricade themselves. (..) The battle will be fierce; it is Darwinism in its purest form. Eventually the smartest will survive, not the most likeable actors (12_0375).</p>	<p>Q11 Krouwel, Ver Fed Duurzame Decentrale Energie NL: The large firms can share knowledge which local actors lack, which eliminates the need to reinvent the wheel continuously. This also provides for an opportunity for the large firms to remain relevant, as their future earnings might be affected (12_0328).</p>
<p>Q4 Koornstra, entrepreneur: Jeroen van de Veer [former CEO Shell] writes in his report on energy: sustainable energy is too expensive and this can only be overcome by investing in innovation instead of exploitation. His advice nearly completely ignores the emerging global revolution in sustainable energy generation (11_0233).</p>	<p>Q12 VNO-NCW: Protesting against flying is old thinking. New thinking implies engaging with KLM to consult on options to limit environmental impact of flying, such as utilizing biofuels (11_0359).</p>

¹ This thesis follows European custom of using decimal commas, and full stops to mark off the thousands, i.e. the opposite of usage elsewhere.

Negative	Positive
<p>Q5 Vendrik, Groenlinks: At the same time, he states that Nuon and Essent can't be excused. "Whereas they should bet on more clean energy, they spoil the market by building only coal power plants" (10_0127).</p>	<p>Q13 Jurjus, Energie-NL: "It is unfortunate, because hasty investments in sustainable energy threaten the supply, security, and affordability of electricity. This will result in outages," says André Jurjus. "In the current transition stage towards a sustainable energy system, we cannot do without coal power." The EU energy suppliers have signed a pledge to aspire to a completely CO neutral energy supply by 2050 (10_0442).</p>
<p>Q6 Nabuurs, ex-KEMA: believes that a decentralized energy supply will emerge in any case, but not directly from the energy suppliers. The new order forms a threat to them. A broad collaboration from many people is needed to put pressure on the suppliers to adapt (12_0321).</p>	<p>Q14 Jurjus, Energie-NL: Jurjus believes that a firm with a steady revenue stream will also have more opportunities to invest, for example, in sustainability. "Grey does not necessarily drive away green" (10_0442).</p>
<p>Q7 Wit, SN&M: The emergence of much renewable energy forms a structural threat to the earning model of the coal- and gas companies. More solar and wind power result in lower electricity prices, which puts pressure on the profit margins of conventional power generation (13_0380).</p>	<p>Q15 Verhagen, ministry EL&I: These are only some of the ideas the business community proposed to minister Verhagen (Economic Affairs, Agriculture & Innovation). The principle is simple: Verhagen eases the rules, businesses and local authorities pull out their wallets to invest (11_0327).</p>
<p>Q8 Cools (Strategy&), Nillesen (PWC), Pollitt (University of Cambridge): Traditional energy suppliers should fundamentally re-evaluate their role. (...) These developments have been noted by actors like Eon, RWE, GDF, Eneco, and Vattenfall, but not everybody acknowledges the need and urgency to drastically change course (14_0150).</p>	<p>Q16 Atsma, ministry I&M: I have confidence in the business community. Everybody over there is convinced of the necessity to implement the sustainability agenda. This provides for an important competitive advantage. "I strongly believe in the ability of the business community. This is where it should happen. I do not support utilizing the whip to force them" (11_0159).</p>

The scientific literature shows similar divergent positions on how firms deal with sustainability issues. CSR (Corporate Social Responsibility) research has studied the behavior of firms with respect to societal issues for a long time (Garriga, Melé 2004, De Bakker, Groenewegen & Den Hond 2005, Aguinis, Glavas 2012). In doing so, CSR research has tended to focus on large firms, which are often incumbents. Only recently has the research explicitly addressed the different dynamic of CSR in SMEs (small and medium size enterprises, Baden, Harwood & Woodward 2011, Fassin, Van Rossem & Buelens 2011, Russo, Perrini 2010, von Weltzien Hoivik, Melé 2009). After decades of CSR research there is still a strong controversy on how to perceive the role of the firm in solving complex societal issues. On the one hand, some authors hail business power to innovate and develop scalable solutions (Hart 2010, Porter, Kramer 2011, Nidumolu, Prahalad & Rangaswami

2009). In contrast, others stress that especially incumbents use their economic and political power to resist the needed change and that CSR often represents superficial reactions to legitimize unsustainable pathways (Banerjee 2008, Prieto-Carrón et al. 2006, Frankental 2001, Font et al. 2012).

This thesis contributes to this debate by developing a more sophisticated perspective on how incumbents can contribute to sustainability transitions, by building on the concept of pro-activeness. In doing so, it acknowledges that both the positive and negative perspectives are rooted in reality. Improving the understanding of when, how, and why which perspective applies can, however, help to prevent that the polarized debate results in a lack of action and much needed progress in practice. As will be outlined across this thesis, different ideal types of incumbents' strategies can be distinguished based on integrating several perspectives from earlier literature. This provides insight into which outcomes can be attributed to which strategies and how proactive strategies can be implemented and supported in practice.

1.2 THEORETICAL FRAMEWORK: INTEGRATING THREE THEORETICAL PERSPECTIVES TO INCREASE INSIGHT

CSR literature has developed helpful frameworks to distinguish between different kind of strategies of incumbents based on their pro-activeness, but they need to be improved. From the late seventies on, this literature acknowledges that firms respond differently to societal issues (Carroll 1979, Wartick, Cochran 1985) and adopts the notion of pro-activeness to characterize these differences. This led to a broad range of contributions which define stage models of pro-activeness (Maon, Lindgreen & Swaen 2010, Hart 1995, Roome 1992, Hunt, Auster 1990, see chapter 2 for a more complete overview). Secondly, the concept of pro-activeness has been used in empirical studies which document a general tendency of firms to develop from reactive to active approaches. These studies demonstrate that this often has a positive influence on financial performance (Dixon-Fowler et al. 2013, Torugsa, O'Donohue & Hecker 2013, Sharma, Vredenburg 1998, Aragón-Correa et al. 2008, González-Benito, González-Benito 2005, Lee, Rhee 2007, Zailani et al. 2012). Yet, this literature has also been criticized for a weak operationalization of the pro-activeness concept (Kolk, Mauser 2002, Schaefer, Harvey 1998, Ghobadian et al. 1998). The theoretical contribution of this thesis focuses on an effort to respond to that call. It does so with two focus points. First, the thesis builds on the proposition that differences in mindset explain differences on the behavioral level and as such elaborates on earlier work about mindset and motives for CSR (Bansal, Roth 2000, Valente 2012, Van Marrewijk, Werre 2003). Second, it proposes a more dynamic operationalization, especially building on the distinction between radical and incremental innovation (Garcia, Calantone 2002, Linton 2009).

The impact of incumbents' CSR behavior and the existence of proactive incumbents requires more empirical research. CSR literature to date has mostly studied financial outcomes of firms' CSR strategies (Dixon-Fowler et al. 2013, Torugsa, O'Donohue & Hecker 2013, Sharma, Vredenburg 1998, Aragón-Correa et al. 2008, González-Benito, González-Benito 2005, Lee, Rhee 2007, Zailani et al. 2012), but left the question whether these behaviors actually contribute to solving the societal issues largely unanswered (with some notable exceptions, see section 2.4.4 for an overview). Considering the urgent challenges mentioned in the previous section, as well as the co-dependence of the incumbent's survival on solving these issues, this thesis attempts to shed more light on the impact question. Important in this attempt is the distinction between active and proactive behaviors. Most empirical literature is focused on documenting a shift from compliance-oriented, reactive behavior towards voluntary, active approaches. Probably also because of the highly desirable nature of such an approach, many theoretical stage models assume a proactive stage beyond these (re)active approaches (Maon, Lindgreen & Swaen 2010, Valente 2012, Van Marrewijk, Werre 2003). Empirical research, however, has not yet convincingly documented the proactive stage (Hart, Dowell 2011), which gives support for those who claim that this is another holy grail comparable to the highly contested positive relationship between CSR and CFP (Corporate Financial Performance) (Kelly 2004, Orlitzky 2011, Pereira-Moliner et al. 2015). One case presented in this thesis involves an incumbent that has adopted a strategy that can be characterized as proactive and allows for comparison with two other incumbents with (re)active strategies. The thesis provides evidence that the proactive incumbent is more like a hidden gem and deserves broader attention in research and practice.

To understand the societal impact of incumbents, transition studies can contribute to the multi-level framework. Transition studies have focused on radical change from the societal perspective and have recently focused mainly on sustainability transitions (Markard, Raven & Truffer 2012, Kemp, Schot & Hoogma 1998, Rip, Kemp 1998, Rotmans, Kemp & Van Asselt 2001, Geels 2002, Smith, Stirling & Berkhout 2005). They conceptualize transitions as "socio-technical transitions" stressing that technological and institutional changes evolve concurrently (Geels, Schot 2010, Kemp 1994). This dual focus is helpful with respect to incumbents as they have relevant impact by implementing new technologies (or broader innovations) and also having a crucial role in co-shaping the institutional context. A central framework in this literature is the multi-level framework, which defines landscape, regime, and niche as interconnected levels which are relevant to understand transitions (Geels 2002, Geels 2005, Van den Ende, Kemp 1999). Chapter three will illustrate that this framework is helpful to understand how incumbent behavior co-evolves with societal change and its influence is bidirectional.

Within the transitions literature the need to understand actor agency further is broadly recognized (Markard, Raven & Truffer 2012, Farla et al. 2012, Geels 2011, Markard, Truffer 2008). Past studies mostly focused on holistic patterns and processes with less focus on agency (Geels, Schot 2007, de Haan, Rotmans 2011) or investigated mainly on niche level processes (Schot, Geels 2008). In most of these studies there is an explicit or implicit assumption that incumbents, as part of the regime, mainly resist radical change by selecting incremental paths and maintaining current institutions (Geels 2004, Unruh 2000, Smink, Hekkert & Negro 2013, Lawrence, Suddaby & Leca 2009). More recently, other authors have also emphasized that this perspective is too deterministic and a more sophisticated understanding of regime actors and incumbents is needed (Stenzel, Frenzel 2008, Karltorp, Sandén 2012, Van der Vleuten, Högselius 2012). This thesis aims to add to this recent development by further conceptualizing the agency by incumbents and connecting insights from business literature to transition literature.

Table 1.2 - This thesis integrates and adds to three streams of literature.

Theory	Relevant concepts	Key debates	Contributions of this thesis
CSR theory	<ul style="list-style-type: none"> - ideal types of CSR strategies - linking mindset and behavior typologies 	<ul style="list-style-type: none"> - robust operationalization of pro-activeness - CSR behavior vs. “solving” societal issues - proactive strategies: holy grail or hidden gem 	<ul style="list-style-type: none"> - improved operationalization with focus on underlying mindset and incumbent firms - from CFP to impact - empirical evidence of proactive ideal type
Transition theory	<ul style="list-style-type: none"> - multi-level framework - patterns in transitions 	<ul style="list-style-type: none"> - agency of actors in transitions - possibility of regime to contribute to change 	<ul style="list-style-type: none"> - understanding agency by incumbents - challenging the deterministic view on regime's ability to change
Innovation theory	<ul style="list-style-type: none"> - radical vs. incremental innovation - (radical) innovation antecedents & dynamic capabilities 	<ul style="list-style-type: none"> - incumbent's curse vs. incumbent's leverage - differences market/technology based vs. societal/sustainability driven innovation 	<ul style="list-style-type: none"> - conceptualizing sustainability transitions as specific type of radical innovation

Innovation literature shows that incumbents can overcome their struggle with radical innovation and has developed considerable knowledge on what makes them do so. Following the dualistic perspective of the foundational contributions of Schumpeter (Schumpeter 1934, Schumpeter 1950, Tripsas 1997), the radical- and discontinuous-change

literature points to contrasting findings with regard to incumbents facing radical change (Danneels 2004). On one side, the literature has extensively shown that radical change is a potentially fatal struggle for incumbents, who suffer from both mental and physical lock-in in the face of such change (Cooper, Schendel 1976, Tushman, Anderson 1986, Henderson, Clark 1990, Christensen 1993, Leonard-Barton 1992, Chandy, Tellis 1998). This struggle has gained broad attention strikingly characterized as “incumbent’s curse” (Chandy, Tellis 2000). In contrast, other researchers show that incumbents do, on other occasions, successfully lead processes of radical change and that their assets and scale provide for strong leverage in this respect (Chandy, Tellis 2000, Chandler 1990, Teece 1986, Srivastava, Shervani & Fahey 1998, Danneels 2004, Hockerts 2010). Their decades-long research on radical innovation on firm level resulted in a considerable base of knowledge. These studies show that firms can successfully pursue radical change using their dynamic capabilities and complementary assets (Tripsas 1997, Hockerts 2010, Hill, Rothaermel 2003, Kim, Min 2015, Teece, Pisano & Shuen 1997, Ambrosini, Bowman 2009). Furthermore, this literature provides for criteria to distinguish incremental from radical innovation (Garcia, Calantone 2002, Linton 2009), which are useful to operationalize the pro-activeness framework from CSR literature as will be illustrated in chapter 3.

While sustainability transitions fit the focus of this literature stream on radical change, this thesis argues that these transitions are a distinct instance that require a specific focus. This distinct nature is related to the societal nature of sustainability transitions. Earlier studies in this literature focused mainly on cases of technological change via market-based processes (especially in the high tech industries, Henderson 1993, Christensen 1993, Danneels 2004), but sustainability transitions require and induce institutional change with a broader scope and involve interaction between multiple societal spheres (Nidumolu, Prahalad & Rangaswami 2009, van Tulder et al. 2014, Senge et al. 2007, Schaltegger, Wagner 2011). This also results in the engagement of a broader set of societal actors and a complex interaction between (often ambiguous) public and private roles. Therefore, investigating this specific instance of radical innovation and integrating insights from CSR and transitions literature is a relevant addition to this stream in the literature.

1.3 CASE STUDY: DUTCH ELECTRICITY SECTOR AS A CASE WITH BROADER RELEVANCE

The Dutch Electricity sector makes for a strong case to elaborate theory on pro-activeness of incumbents in sustainability transitions. Building on the principles of theoretical case selection (Eriksson, Kovalainen 2008, Eisenhardt 1989), the sector fits the relevant criteria to contribute to the knowledge gaps signaled in previous literature. First, it is a case of a sustainability transition in an accelerating phase, in contrast to many transitions which are

still in the, often lengthy, pre-development phase (Rotmans, Kemp & Van Asselt 2001). Second, in this sector, there are three incumbents who are comparable in many respects. Nevertheless they show different strategies, including the incumbent that largely resembles the proactive ideal type. Finally, as they share their context, the differences can be attributed to factors other than contextual influence. This makes it a good case to study the role of agency by incumbents and learn more about the relevance of proactive incumbents.

The Electricity sector is also considered to be an example of what many other sectors are likely to experience in the next decades. Reducing the use of fossil energy is central in mitigating climate change. “Greenhouse-gas emissions from the energy sector represent roughly two-thirds of all anthropogenic greenhouse-gas emissions” (IEA 2015). Within the energy sector, the Electricity sector is considered to be the most promising area for considerable improvement on the midterm horizon, as solutions are available to utilize the large potential of solar, wind, hydro, and biomass renewable energy sources. Already today the share of renewable electricity is 2,5-3x higher than the total share of renewable energy (see table 1.3). In the next decade, this share is likely to triple. That this rapid growth strongly impacts the dynamic in the sector was already clear from the example provided in section 1.1 and is more extensively elaborated in chapter 5. For other sectors, such as mobility, logistics, and the industrial use of fossil resources in e.g. the chemical industry, the process of replacing fossil fuels with renewable or low carbon alternatives is far less advanced. The mobility sector, for example, is still expected to depend for 91% on fossil fuels in 2020 (author analysis based on ECN et al. 2016). The aviation industry even officially agreed to massively apply compensation due to a perceived lack of alternatives (Nagtegaal 2016). In a broader perspective, other sectors are also likely to be impacted by depleting resources and are expected to face a transition towards bio-based alternatives and/or circular supply chains (Ellen MacArthur Foundation 2014). As such, the lessons from the Electricity sector, where change is already accelerating and strongly impacting business performance, are considered to have implications for many sectors which face similar challenges in the next decades.

Table 1.3 - Growth in renewable electricity has accelerated much faster than average (source ECN et al. 2016, projection from 2020).

	2000	2005	2010	2015	2020	2025	2030	2035
Renewable energy	1,6%	2,5%	3,9%	5,8%	12,2%	15,9%	17,2%	19,1%
Renewable electricity	3,3%	7,4%	9,5%	12,4%	36,6%	41,0%	44,1%	51,5%

1.4 RESEARCH QUESTIONS AND THESIS OUTLINE

The aim of this thesis is to shed light on the incumbent’s role in navigating through sustainability transitions. It does so by integrating three theoretical perspectives and

applying them to an enlightening case. It focuses on whether and how incumbents can contribute, as well as what difference their contribution makes in the light of the progress of the transition. The central perspective in this thesis is to investigate whether pro-activeness of the mindset (of its leadership) can explain incumbents' behavior and its outcomes in the context of sustainability transitions. Following from the previous discussion the central research question therefore is:

How can the pro-activeness of incumbents in sustainability transitions be explained and what is the impact of their contribution on the transition?

To answer this question, the thesis starts by taking stock of the current literature and, based on this survey, formulating an improved conceptualization of pro-activeness of incumbents in sustainability transitions. This results in the following sub questions:

- *What are the strengths and weaknesses of the literature on pro-activeness of CSR strategies of firms?*
- *How can pro-activeness be operationalized further in the context of incumbents in sustainability transitions by incorporating insights from the innovation and transitions literature?*

Second, it investigates how pro-activeness influences behavior and how this eventually induces outcomes both in terms of impact on the transition and financial performance of the incumbent. In terms of behavior, it focuses on both innovation with which incumbents reshape their own products and processes, but also on how incumbents influence their institutional context with context creating behavior. This dual focus recognizes the important role of incumbents in the scale of their own operation but also their central role in maintaining and shaping institutions, around which much of the controversial debate circles. To improve the validity of the analysis context, the position and capabilities of the incumbent are considered as rival explanations of the antecedents of incumbents' behavior. This results in the following sub-questions:

- *How do contextual factors shape the behavior of incumbents in sustainability transitions?*
- *How can the context creating behavior of incumbents and its outcomes be explained?*
- *What are the best explanations of innovation behavior by incumbents and its outcomes?*

The thesis continues first with two theoretical chapters. Chapter 2 presents a systematic survey of the literature on pro-activeness of CSR strategies. This results in an appreciation

of the status quo and directions for further research. Chapter 3 attempts to implement the findings from the literature survey and combine this with concepts from the transitions and innovation literature to develop a conceptual framework to study incumbents in sustainability transitions. This chapter also translates the research questions into eight propositions to guide the empirical investigation. Chapter 4 outlines a systematic, multi-method, longitudinal, embedded case study methodology, in order to be able to make an integral appreciation of how incumbents behave and interact with sustainability transitions. At the end of this chapter, section 4.9 is especially relevant, as it shows how the different propositions relate to the empirical chapters. Utilizing the rich dataset developed, the subsequent three empirical chapters focus on three specific perspectives. Chapter 5 investigates the contextual influence on incumbents. This also provides a comprehensive introduction to the turbulent transition dynamics in which the Electricity sector incumbents operate and shows that this results in disruptive influences on their business model. The second part of this chapter zooms in on how interaction with the incumbents' mindset adds understanding to how incumbents perceive and react to their context. Chapter 6 continues to investigate the counter-wise dynamic: how incumbents shape their context with context creating behavior. It does so by investigating how incumbents, as part of broader advocacy coalitions, influenced the Energy Agreement as a central policy framework in the Dutch energy transition. The third empirical chapter investigates the firm-level dynamic by systematically exploring the incumbent's mindset and position, how this influenced innovation behavior and impacted the financial performance. In the final chapter, the propositions function as a framework to draw conclusions from the theoretical and empirical endeavors in this thesis. From these conclusions implications for further research and practitioners are investigated.

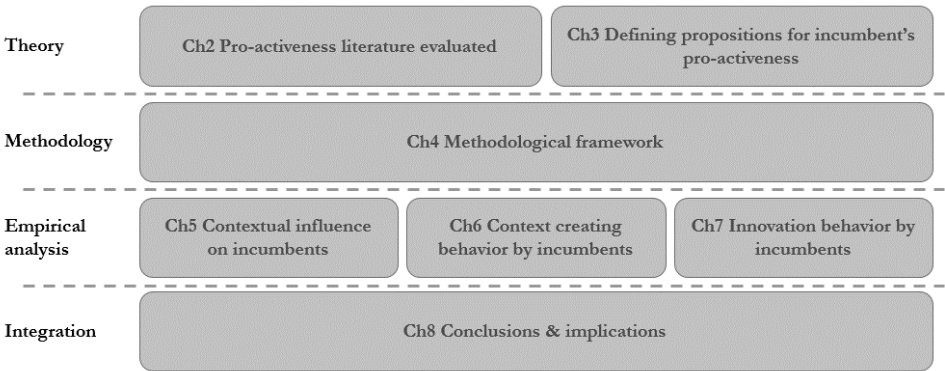


Figure 1.1 - The chapter structure of this thesis.

1.5 DECLARATION OF CONTRIBUTION

In this section, I declare my contribution to the different chapters of this dissertation and acknowledge the contribution of others where relevant.

Chapters 1 and 8 were independently written by the author and afterwards improved with feedback from Prof. Dr. Rob van Tulder (supervisor) and Dr. Koen Dittrich (co-supervisor).

Chapter 2 is based on a systematic literature review executed by the author. The first versions of this chapter were also independently written by the author. Prof. Dr. van Tulder contributed with suggestions to condense the paper, structure the paper around propositions, and sharpen the wording, especially in the introduction and implications.

Chapter 3 is largely based on two systematic literature surveys and a pilot case study executed autonomously by the author. The first versions of this chapter were also independently written by the author. Dr. Koen Dittrich contributed with suggestions to condense the paper, link it to the innovation literature and sharpen the wording especially in the introduction and propositions. Some feedback from Prof. Dr. van Tulder was also integrated during the process.

Chapter 4 is based on a review of methodological literature and of methodologies used in key papers, executed by the author. This resulted in a case study protocol, which was later condensed to this chapter by the author. When developing the protocol, Prof. Dr. Derk Loorbach, Prof. Dr. Jan van den Ende and Dr. Koen Dittrich were consulted and their feedback was used to improve the protocol. Feedback from Prof. Dr. Rob van Tulder on the protocol and the chapter was integrated at several points in the process.

Chapter 5 is primarily based on media analysis and interview data collected and analyzed independently by the author. The chapter was written autonomously by the author, although some feedback from Prof. Dr. Rob van Tulder, Prof. Dr. Derk Loorbach, and Dr. Koen Dittrich was integrated during the process.

Chapter 6 is based on the same datasets as Chapter 5 and preparatory coding by the author. For this chapter Rick Bosman MSc contributed in co-developing the analytical coding framework and dual coding a pilot sample of the dataset. Afterwards the author completed the analytical coding and data analysis. The chapter was written by the author and improved with the help of feedback from Rick Bosman.

Chapter 7 is primarily based on corporate report and interview data collected and prepared by the author. Dr. Koen Dittrich contributed in co-developing the analytical coding framework for mindset and behavior data and dual coding a pilot sample of the dataset.

Afterwards the author completed the analytical coding and data analysis. The chapter was written by the author and improved with the help of feedback from Dr. Dittrich.

Part I – Theoretical foundations

Chapter 2 - What lies beyond Compliance? – Why Proactive CSR strategies require further investigation

Co-author Prof. Dr. R. van Tulder

2.1 INTRODUCTION – HISTORY AND RELEVANCE OF THE CONCEPT OF PRO-ACTIVENESS

Strategic management research contains an established body of knowledge on the concept of ‘pro-activeness’ or ‘proactivity’.² The concept is mostly used to indicate the attempt to lead rather than to follow or react to competitors (Miles, Snow 1978), to be opportunity-seeking, forward looking, and acting in anticipation of (market) changes (Lumpkin et al. 2013), or also as just the opposite of reactivity.

Proactive corporate social responsibility (CSR) strategies need to go beyond the competitive environment of firms. They relate to their societal and environmental performance as well. In this context, the discourse becomes more ambiguous. On the one hand, companies that embrace an explicit proactive CSR strategy are in the media positively portrayed as “not simply saying to be green or sustainable, but actually backing up statements with actions” (Hincha-Ownby 2011). Pro-activeness is considered the ideological opposite of ‘window-dressing.’ On the other hand, pro-activeness is also considered to be one of the most abused or meaningless concepts in the sustainability discourse. In 2012, in the Netherlands for instance, the word ‘proactive’ was considered the most meaningless word of the year in Dutch advertisement campaigns. The Webeconomy ‘bullshit generator’ even included the word as an adjective in its list.

For several decades, CSR researchers have been studying changing levels of pro-activeness in the approach of business involvement towards societal issues. Already in 1979 Carroll posited that one of the key dimensions of corporate social performance is the social responsiveness defined on a spectrum from ‘reaction’ towards ‘proaction’ (Carroll 1979). His view on proaction was that companies have a philosophy to ‘do much’ on social issues – in comparison to other companies in the same sector. CSR researchers have since then focused on mapping various pathways towards higher levels of social performance by defining stages and searching for what drives firms to become more proactive (Hart 1995, Roome 1992, Van Marrewijk, Werre 2003). Others focused on the question whether

² In the literature, the terms pro-activeness and proactivity are often used interchangeably or as synonyms, although not always acknowledged as such. The authors have a slight preference for the term ‘pro-activeness’ so this is used consistently to refer to one of them across the chapter irrespective of word used in the referenced source.

increasing pro-activeness leads to improved economic, social, and environmental performance (Dixon-Fowler et al. 2013, Torugsa, O'Donohue & Hecker 2013, Sharma, Vredenburg 1998, Aragón-Correa et al. 2008, González-Benito, González-Benito 2005, Lee, Rhee 2007, Zailani et al. 2012). Pro-activeness has undoubtedly achieved an established position as central concept in CSR research, but its elaboration remains rather ambiguous, as is further elaborated in this chapter.

There are two schools in the research on proactive CSR strategies. The first, dominant school focuses on the value added of proactive approaches for companies mainly in terms of financial performance induced by active CSR strategies. This approach considers pro-activeness as part of a transition beyond a reactive approach of corporate social responsibility/responsiveness which could realize a “win-win” in economic and environmental performance (Hart 1995, Hart 1997, Porter, van der Linde 1995, Burke, Logsdon 1996, Aragón-Correa 1998, Aragón-Correa, Sharma 2003). The focus on proactive CSR strategies draws attention to the difference between compliance-based reactive strategies and voluntary, active strategies. Stage models were developed, while empirical research was employed to explore both drivers and results of alleged proactive CSR strategies (Sharma 2000, Murillo-Luna, Garcés-Ayerbe & Rivera-Torres 2008, Vastag, Kerekes & Rondinelli 1996, Molina-Azorín et al. 2009, Torugsa, O'Donohue & Hecker 2012).

A second school values proactive strategies of companies from a societal point of view. It asks whether companies can effectively enhance radical societal change or solve societal problems. Interconnected crises in the social, economic and ecological system require businesses to move beyond an active stage and a stand-alone strategy towards new levels of pro-activeness and to precipitate radical change at system level (Sachs 2008, Pollard et al. 2010, Stern 2006). The occurrence of a number of parallel trends gives rise to the need to make a radical change in the business model (Hart 2010, WBCSD 2015), which requires different types of leadership (Haanaes et al. 2011a, Haanaes et al. 2011b), circular value chains (Bocken et al. 2014), and radically different (shared) value propositions (Porter, Kramer 2011) often in partnerships with non-market actors (Austin, Seitanidi 2014). The extent to which these approaches can be considered impactful, however, remains open for debate (cf. Crane, Seitanidi 2014).

These two schools-of-thought contain strong parallels with the (CSR) impact evaluation literature in which one tradition primarily looks at the *performance* and value added of the strategy to the initiating company, whereas the second tradition primarily considers the *impact* on the societal issue of the corporate strategy (Cf. White 2009, Van Tulder et al. 2016). Pro-activeness in an ‘impact-oriented’ scientific discourse is linked to leadership and radical systemic change, rather than the gradual incremental change that is largely related to

the performance-based discourse. This distinction is especially relevant in eras of radical change, in which the survival of the firm depends on its co-evolution with the system towards a new equilibrium (Porter, Kramer 2011, de Haan, Rotmans 2011, Turnheim, Geels 2012, Porter, Kramer 2006).

Systemic change is more difficult to plan or organize than gradual change. Even CEOs who are convinced that leadership can actually bring competitive advantage in which sustainability is a route to new waves of growth and innovation, “see business caught in a cycle of ‘pilot paralysis’- individual, small-scale projects, programs and business units with an incremental impact on sustainability metrics—and while they see a role for business in promoting sustainable development, their responsibilities to the more traditional fundamentals of business success, and to the expectations of markets and stakeholders, are preventing greater scale, speed and impact.” (Lacy et al. 2013). Understanding whether and how businesses overcome this “pilot paralysis” and arrive at the stage of proactive or transformational leadership with regard to sustainability challenges can therefore be considered especially important in theory as well as practice. In transformation thinking this can be related to the search for ‘tipping points’ (Van Tulder et al. 2014).

Current CSR-stages literature is not particularly helpful in this respect. Most studies are either theoretically general, anecdotal, or prescriptive, while almost all presuppose linear and evolutionary transition trajectories to ever higher levels of sustainability. Few studies provide sharp delineations between active and proactive strategies, basically leaving the question what lies beyond reactive compliance conceptually and theoretically open. Most stages’ models assume that there is a proactive ‘leadership’ stage beyond an active approach to CSR, without empirical evidence and without specifics as to what this leadership might entail or induce. The proactive approach towards societal issues received additional qualifications as “integrated” (Slawinski, Bansal 2012), “strategic” (Vastag, Kerekes & Rondinelli 1996), “holistic” (Van Marrewijk, Werre 2003), “transforming” (Maon, Lindgreen & Swaen 2010), “sustainable development focus” (Hart 1995), “developing new business models” (Nidumolu, Prahalad & Rangaswami 2009) or “sustaincentric” [sic] (Valente 2012). Each of these concepts suggest radical change, but rarely define the antecedents of it. So, there are theoretical as well as empirical gaps to be filled.

Despite their limitations, existing efforts nevertheless provide a good starting point for a further classification of the antecedents of transition processes towards radical systemic change, to which proactive strategies are supposed to contribute (Hart, Dowell 2011). A systematic review of research on CSR stages should therefore lead to a more robust classification of CSR transition trajectories, an understanding of their basic antecedents, and a better understanding of what distinguishes proactive CSR strategies from reactive as well as active stages. The change from one stage to another thereby does not present linear

trajectories and dynamics. The identification of tipping points explains the dynamics better than gradual, evolutionary stages models. The aim of this chapter is to come to a more robust classification of stages of transition beyond the stage of compliance, which should better delineate what pro-activeness actually entails for both the performance and the impact approach to corporate responsibility strategies.

The remainder of this chapter is structured in five parts. Section 2 delineates how the concept of pro-activeness is used in the CSR literature. Although rapidly adopted, it remains fragmented and ambiguous. Section 3 considers the most important dimensions of the concept as operationalized in the literature. Section 4 considers to what extent gained empirical insights on pro-activeness – even when ambiguously founded - can help in developing a more robust approach that distinguishes proactive CSR strategies from other strategies and stages. Four propositions on pro-activeness are then presented. The final part (section 5) presents a synthesis of this exercise in the form of an upgraded stages’ model in which logical and relevant dimensions of CSR transition trajectories are brought together.

2.2 DELINEATING PRO-ACTIVENESS – CONGRUENCE AND OPEN QUESTIONS

In 2016, a systematic literature was performed to search through Scopus combined with additional snowball methods.³ Scopus is one of the broadest databases currently available (Gavel, Iselid 2008) and has been successfully used in other systematic reviews (Markard, Raven & Truffer 2012, Jahangirian et al. 2012, Verain et al. 2012).

There is growing attention in the literature for the concept of pro-activeness with a first peak in the second half of the 1990s, and an ever-expanding literature since the mid-2000s. From the late 1990s onwards, studies have been increasingly oriented at empirical validation. Since 2010 almost all publications (77%) have been empirical. The concept of pro-activeness has become mainstream (witnessing a large number of top journals) and managerial (witnessing considerable representation in practitioners’ journals).

The early roots of the concept lie in both general management (Miles et al. 1978) and the CSR literature (Carroll, 1979). Whereas in general/strategic management pro-activeness has become primarily related to relative leadership in the sector in search of new opportunities and markets, the CSR frame of the proactive concept became defined as “voluntary activity,” exceeding legal requirements and opposed to reactive or compliance oriented (e.g.

³ For space reasons, an explanation of this method as well as a much more detailed analysis of the literature was left out of this chapter. It can be obtained from the authors.

Aragón-Correa, A. Rubio-López 2007, Economy, Lieberthal 2007). Based on this distinction, many authors started studying the drivers of companies to move beyond compliance and the relationship this move has with the financial performance of the company (Murillo-Luna, Garcés-Ayerbe & Rivera-Torres 2008, Bansal, Roth 2000, Jeswani, Wehrmeyer & Mulugetta 2008). Soon a number of authors started to fine-tune this typology to include more ideal types or stages (Maon, Lindgreen & Swaen 2010, Roome 1992, Hunt, Auster 1990). Implicit or explicit assumptions were coined on the motives of companies to move through a development path to arrive in the ‘final’ proactive or leadership stage.

The “beyond compliance” orientation became primarily connected with the Resource-Based View literature, which argues that the journey towards more proactiveness results in, and is based on, specific knowledge and competencies which are difficult to copy and therefore create a competitive advantage and improved financial performance (Nidumolu, Prahalad & Rangaswami 2009, Hart, Dowell 2011, Hart 1995, Aragon-Correa, Sharma 2003). A wealth of empirical articles tested the hypothesis and investigated which resources should be considered (Sharma, Vredenburg 1998, Aragón-Correa et al. 2008, González-Benito, González-Benito 2005, Sharma, Aragón-Correa & Rueda-Manzanares 2007, Torugsa, O'Donohue & Hecker 2013, Molina-Azorín et al. 2009, Claver-Cortés et al. 2007, Torugsa, O'Donohue & Hecker 2012, Sambasivan, Bah & Ho 2013, Primc, Cater 2015).

Stakeholder theory and institutional theory have been used to explain the external antecedents of pro-activeness (Buisse, Verbeke 2003, Lee 2011, Vazquez-Brust et al. 2010). Contingency theory was additionally used to define mediating variables (Sharma, Aragón-Correa & Rueda-Manzanares 2007, Aragón-Correa, Martín-Tapia & Hurtado-Torres 2013), while the concept of contextual fit (Azzone, Bertele 1994) and strategic groups were used to explain the clusters arising when alleged proactive behavioral patterns were analyzed (Claver-Cortés et al. 2007, Toppinen et al. 2012).

Earlier reviews (Maon, Lindgreen & Swaen 2010, Kolk, Mauser 2002) reiterated that the literature paid particular attention to the different stages or ideal types of pro-activeness that can be distinguished. This mirrors the managerial demand for clear ‘how-to’ models in which managers want to know at which step of the transition they are in order to be called ‘best-practice’ or ‘best-in-class.’ Table 2.1 summarizes the most influential models in the relevant scientific CSR literature, which are cited more than 100 times or received more than 5 citations per year for the papers published since 2006 (according to Scopus, February 2016).⁴ Early efforts discussed pro-activeness under the header of ‘corporate social

⁴ Note that publications before 2000 are not always included in the Scopus database. In these cases, the Google Scholar citation count was used. This score includes many more different sources. The

responsiveness' as one of the three dimensions of corporate social responsibility. They generally distinguish four generic stages: reactive, defensive, accommodative and proactive (Carroll 1979, Wartick, Cochran 1985). In the 1990s several stages' models were developed to document corporate environmental strategies. The most cited variants (Hunt and Auster, 1990, Berry and Rondinelli, 1998, Roome, 1992) in essence still emulated the four generic stages from the earlier models, however with new names and operationalizations for the environment. Hart (1995) and Shrivastava (1995) chose to define three different ideal types of (pro)active strategies without considering the (re/in)active stage.

Throughout the 2000s the influence of stages' models remained. Van Marrewijk and Werre (2003) developed a six-stage model based on a theory of underlying values systems. Zadek (2004) defined "stages of organizational learning." Others linked their stages' models more to functional areas of management: communication and corporate citizenship (Mirvis and Googins, 2006), supply chain management (Van Tulder et al. , 2009), innovation (Van Tulder, Van Wijk & Kolk 2009, Nidumolu et al., 2009, Klewitz & Hansen, 2014) and HRM practices (Jabbour et al., 2010).

Taking all leading models together, there is considerable congruence regarding the underlying definitions and specific logic of stages, as Maon et al. (2010) already suggested in an earlier overview study. Most models start with a stage in which the firm does not respond to societal issues at all or only in a dismissive way. Most models then include one or two reactive stages, which most of the times are named compliance-seeking or legalistic. Next, one or two active or accommodative stages are defined. Most studies qualify these stages as profit-driven or efficiency-focused, stressing that companies start to recognize that active behavior could create a win-win situation for themselves and thus create a strategic and competitive advantage in their sector. Some recognize that there also could be active behavior mainly driven by ethical concerns when designating a separate "caring" stage (Van Marrewijk, Werre 2003) or "concerned citizen" stage (Hunt, Auster 1990). Mixing up moral and strategic motives, however, leads to confusion of terms and motives, which can be witnessed in practice when company leaders define an active approach to CSR as the ultimate sign of moral leadership. Caring CSR strategies are more usually found with family-owned enterprises, but ultimately their behavior depends on the implementation of this moral stance in actual strategies. A reactive strategy can also be morally legitimized. The realization of an active strategy thus goes beyond the moral motivation/intention, which should be considered as the confrontation between deliberate, non-realized and emergent strategies (Mintzberg et al. 1998).

average number of citations is 2,5-3,5 higher than through Scopus. In case of doubt double threshold were used values to ensure a fair comparison.

Table 2.1 - Most influential CSR Stages models (>100 citation in Scopus or >=2006 & >= 5 citations / year, Feb 2016)⁵ – part 1/3

Authors	Carroll	Wartick & Cochran	Hunt & Auster	Roome	Hart	Shrivastava
Year	1979	1985	1990	1992	1995	1995
Journal	Academy of Management Review	Academy of Management Review	Sloan Management Review	Business Strategy and the Environment	Academy of Management Review	Academy of Management Review
Citations	7687*	1755*	839*	230	4001*	1335*
Concept name	Philosophy of social responsiveness	Corporate social responsiveness	Developmental stages of corporate environmental management programs	Environmental strategy stages	Environmental strategies	Sustainable competitive strategies
Inactive			Beginner	Non-compliance		
Reactive & compliance	Reaction	Reactive	Fire fighter	Compliance		
	Defensive	Defensive				
Active	Accommodation	Accommodative	Concerned citizen		Pollution prevention	Least cost
				Commercial & environmental excellence	Product stewardship	Differentiation
<i>Active/proactive</i>						Niche player
Proactive	Proaction	Proactive	Proactivist	Leading edge		Sustainable development

⁵ (*: Google scholar citation count).

Table 2.1 - Most influential CSR Stages' models (>100 citation in Scopus or >=2006 & >= 5 citations / year, Feb 2016)⁶ – part 2/3

Authors	Hart	Berry & Rondinelli	van Marwijk & Werre	Zadek	Mirvis&Googins	van Tulder et al.
Year	1997	1998	2003	2004	2006	2009
Journal	Harvard Business Review	Academy of Management Executive	Journal of Business Ethics	Harvard Business Review	California Management Review	Journal of Business Ethics
Citations	1994*	264	121	132	88	44
Concept name	Stages of environmental strategy	Stages of Corporate Environmental Management	Levels of corporate sustainability	Stages of Organizational Learning in Corporate responsibility	Stages of Corporate Citizenship	CSR Supply Chain Strategies
Inactive		Unprepared	Pre-Corporate Sustainability			Inactive
Reactive & compliance		Reactive	Compliance-driven	Defensive	Elementary	Reactive
Active	Pollution prevention Product stewardship		Profit-driven	Compliance	Engaged	Active
<i>Active/proactive</i>		Proactive (sustainable business mode)	Caring	Managerial	Innovative	
Proactive	Clean technology		Synergistic	Strategic	Integrated	Proactive
				Civil	Transforming	

⁶ (*: Google scholar citation count).

Table 2.1 - Most influential CSR Stages' models (>100 citation in Scopus or >=2006 & >= 5 citations / year, Feb 2016)⁷ – part 3/3

Authors	2009	2010	2014
	Nidumolu et al.	Jabbour et al.	Klewitz & Hansen
Year	2009	2010	2014
Journal	Harvard Business Review	International Journal of Human Resource Management	Journal of Cleaner Production
Citations	314	32	23
Concept name	Stages on the path to becoming sustainable	Stages in the development of Environmental Management	Strategic Sustainability Behavior of SMEs
Inactive			Resistant
Reactive & compliance	Viewing compliance as opportunity	Functional specialization	Reactive
Active	Making value chains more sustainable	Internal integration	Anticipatory
<i>Active/ proactive</i>	Defining Sustainable products and services	External integration	Innovation-based
Proactive	Developing new business models		
	Creating next practice platforms		Sustainability-rooted

⁷ (*: Google scholar citation count).

Finally, all models consider one or two stages beyond active behavior⁸. In delineating the proactive stage, two qualifications exist in literature. One is on strategic behavior (performance based) which extends the profit-driven (resource-based) behavior with a long-term mindset (e.g. Zadek 2004 or Maon, Lindgreen & Swaen 2010). The other presents the impact-driven ideal type which is, for example, mentioned under the terms holistic (Van Marrewijk, Werre 2003), transforming (Mirvis, Googins 2006), or leadership (Roome 1992). After considering a number of models, Maon et al. (2010) eventually defined seven ‘stages’ along three ‘phases’: reluctance, cultural grasp, and cultural embedment.

An earlier review by Kolk & Mauser (2002) called attention to the subtle difference between continuum models and typologies. A continuum model presents a linear classification scheme identifying developments over time and suggests a path dependency. Typologies consist of conceptually-derived, interrelated sets of ideal types which represent different behavior patterns. Ideal types are not mutually exclusive, while a pathway assumes that a company is somewhere on the pathway towards the final stage – whatever that may be. In practice, the different classifications get mixed up. This is understandable: exact distinctions between the two types are not easy to make, as the segmentation of articles in the review shows. The second-best quoted stages model of Hart (1995) for instance defines three stages: pollution prevention, product stewardship, and clean technology or sustainable development. These stages can also be called ‘ideal types’ or ‘archetypes,’ since product stewardship is a different type of behavior from clean technology with another focus: product vs. technology. The two are not really distinct linear classifications or transition schemes, even if they are framed in the context of a path dependency view. Hart (1995) argues, however, that the three strategies develop in parallel, while they accelerate and facilitate each other along the stages. But in case the relative weight of each dimension changes over time, they should be characterized as qualitatively different stages. So, most typologies become meaningful if they can be combined with some form of transition stages. A synthesis is needed.

A complementary view suggests pathways with a non-linear sequence of stages. This was first articulated by Ghobadian et al. (1998), who identified three stages that explain nonstandard evolution paths: (1) the restrained stage, (2) a speculative stage and (3) a conditional stage in which the company actively pursues environmental strategies, but does so only in a specific application. Not many studies defined non-linear pathways or stages’ models, which seems at odds with some of the practices of managers, by which they not only

⁸ Figure 2.1 contains a pro-activeness selection bias. Many stages’ models in the CSR literature stop at an ‘active’ approach, or use more ambiguous concepts without trying to define what lies beyond reactive/compliance.

move upwards from one stage to another, take fundamentally different pathways, or can even strategically retreat or stall progress in interaction with others.

A potentially relevant - but arguably poorly studied - aspect is therefore the transition dynamic from one stage to another. The ambiguity in stages' models is not particularly conducive for filling this gap in the literature. Most authors define transition processes as (gradual and evolutionary) 'learning processes' (Nidumolu, Prahalad & Rangaswami 2009, Zadek 2004, Gottschalk 2013). Several authors mention sustained external pressure as driver of change, which could translate into, for example, new legislation or development of trademarks (Immink et al. 2013, Dillard 2009, Berry, Rondinelli 1998, Klewitz, Hansen 2014). Others have studied crisis situations as drivers or triggers of transitions (Maon, Lindgreen & Swaen 2010, Mirvis, Googins 2006). They also mention that leapfrogging in a non-linear fashion could be possible on such occasions (Mirvis, Googins 2006, Reidenbach, Robin 1991). External stimuli explain the transition from passive to reactive – extrinsically motivated - strategies. In some cases, organizations have been using this experience as a basis to develop a strategy and consequently start a process of aligning the organization (Klewitz, Hansen 2014, Hansen, Sondergard & Meredith 2002, Heikkurinen 2011, Grosvold, Hoejmosé & Roehrich 2014, Boiral 2006). External triggers have often been at the basis of a process of internal capacity building (Klewitz, Hansen 2014, Hansen, Sondergard & Meredith 2002, Dillard, Layzell 2014). Evolving further was often induced by active dialogue and partnership with other actors, either from the value chain or secondary stakeholders (Van Tulder, Van Wijk & Kolk 2009, Hansen, Sondergard & Meredith 2002, Noci, Verganti 1999, Bianchi, Noci 1998, Dentoni, Bitzer & Pascucci 2016). Finally, two authors assert that such an evolution might trigger a radical re-thinking of the business model to achieve new levels of sustainability and as such induce the transition to a new stage (Klewitz, Hansen 2014, Tilley 1999).

There is the possibility that companies can be in several stages at once, or that subcultures exist (Maon, Lindgreen & Swaen 2010, Mirvis, Googins 2006). This might also explain conflicting findings, such as by Dillard and Layzell (2014), who find an evolution towards a legalistic approach as a final stage in the case of Intel.

To summarize, all the research points to the relevance of defining stages, but face the problem of correct classifications based on proper ideal-types that allow for non-linear and non-evolutionary movements. Moreover, although many nuances exist, the traditional fourfold classification still serves well to synthesize the various models: inactive, reactive, active and proactive.

2.3 OPERATIONALIZING PRO-ACTIVENESS

Zooming in on how pro-activeness actually has been operationalized – in particular compared to ‘active’ CSR strategies, 87 key articles on this topic were selected and compared, of which 49 used a linear scale, while 38 used a typology.

For the linear scaling approach towards pro-activeness, in total 112 distinct indicators could be identified, grouped into nine categories (Table 2.2). The number of indicators used varies from 1 (which uses actual GHG reduction as indicator of proactiveness) to 29. On average, authors introduced 12 indicators to operationalize their pro-activeness scale, which are targeted at specific functional areas (such as marketing or operations) or dimensions of CSR (financial, ethical, social).

On average, authors refer to 4 different categories of indicators. By far the most prevalent category (86%) is targeted at the implementation of a management system to manage environmental (EMS) or corporate responsibility. Thirty-one percent of the scales also use PR related categories as an indication of pro-activeness, which is remarkable considering that PR is often associated with reactive behavior, window-dressing, and generally less advanced implementations of corporate responsibility (Halme, Laurila 2009). The low score of ethics might hint at the understanding in the literature that pro-activeness (in comparison to active, for instance) is more strategic than ethical.

Table 2.2 - Categories used in linear pro-activeness scales.

Category	Examples	% included
EMS	Performance indicators, department, audits	86%
Operations	Energy optimization, recycling	57%
Commitment	Resource commitment, TMT involvement	49%
Purchasing	Supplier evaluation, cooperation	43%
Marketing	Green marketing, green products	41%
R&D & product	Optimize usage impact, substitute materials	41%
PR	Sponsoring, lobbying	31%
Social	Employee participation, equal opportunities	16%
Financial	Cost reduction, productivity focus	8%
Ethics	Code of ethics, misconduct protocol	4%

Counting the most used specific indicator of pro-activeness confirms the dominance of the performance and operational approach of the linear school: the most popular ambition is ‘performance measuring.’ Indicators in this line of thought are best suited to distinguish active from reactive behavior, but not different degrees of active behavior. Most studies – through surveys – ask whether a measure is used, but do not investigate the degree of implementation. The operationalization used by most authors fits the dominant focus in CSR

research on the adoption of behavior that exceeds compliance (the transition from reactive to active) and is less suited to differentiate between active and proactive approaches.

The heavy dependence on implementation indicators of environmental management systems delineates another bias. Environmental management systems are nowadays often legal requirements or cost-efficient technologies and systems already exist. This makes the implementation of EMS increasingly financially feasible. This even applies to corporations with a reactive or even dismissive CSR culture in search of cost reduction and/or legitimacy in the societal discourse.

Thirty-eight articles operationalized pro-activeness primarily as ideal types, typologies, or taxonomies, instead of different positions on the same scale (or path). Typologies comprise between two (e.g. Molina-Azorín et al. 2009, Jabbour 2010) and seven (Maon, Lindgreen & Swaen 2010) different ideal types, which can be clustered in three behavioristic groups: reactive behavior, proactive behavior (clearly exceeding basic active behavior), and intermediate types (mainly active or accommodative). Earlier reviews already noted substantial comparability in the formulation of typologies related to stages (Maon, Lindgreen & Swaen 2010, Kolk, Mauser 2002).

The most often used indicator for the reactive type organization is its legislation or compliance focus (Reidenbach, Robin 1991, Jabbour 2010), either on legislation or on external standards (Grob, McGregor 2005). Another indicator is the adoption of end-of-pipe and pollution control measures (in contrast to clean technology and prevention, Vastag, Kerekes & Rondinelli 1996, Lin 2012). Additional indicators are economic or short term financial focus and primary concern with the firm's benefit (Valente 2012, Reidenbach, Robin 1991). They focus on minimizing the added cost of measures (instead of searching value maximization, Tilley 1999, Asgary, Li 2016). A reactive approach is also likely to lead to a "decoupled," not aligned, or piece-meal approach (Grosvold et al., 2014, Tilley, 1999), which can become evident in limited involvement of the top management team (Jabbour, Santos & Nagano 2010, Borri, Boccaletti 1995). A public affairs approach targeted at the protection of the firm's stake and reputation are mentioned (Reidenbach, Robin 1991, Heikkurinen 2011, Clarkson et al. 2013), as are fines and violations from the well-known KLD dataset used as indicator of a compliance focused approach (Walls, Phan & Berrone 2011).

As organizations move towards the intermediate, active stage, CSR becomes part of strategic decision making; their own policies are formulated and the reward scheme might also be partially aligned (Roome 1992, Grob, McGregor 2005, Jabbour, Santos & Nagano 2010). A general trait often mentioned as indicator is that a substantial number of the employees are trained to become aware of CSR or environmental aspects of the business (Asgary, Li 2016,

Jabbour, Santos & Nagano 2010, Walls, Phan & Berrone 2011, Shrivastava, Busch 2013). This leads to voluntary actions, which also involve some anticipation of potential legislation or customer demand (Roome 1992, Heikkurinen 2011, Grob, McGregor 2005). The more differentiated stage models delineate three intermediate ideal types. Most authors describe efficiency optimization and pollution prevention behavior (Hart 1995, Jabbour 2010, Grob, McGregor 2005, Lin 2012, Jabbour, Santos & Nagano 2010, Shrivastava 1995), operationalized with efficiency-seeking gains in operations, such as “energy use optimization,” “recycling,” and “material reduction.” Product stewardship is also mentioned as an intermediate ideal type, with indicators such as “life cycle analysis and minimization,” “supplier and stakeholder involvement,” and “competitive differentiation focus” (Hart 1995, Jabbour 2010, Lin 2012). Others have operationalized a so-called caring ideal type with indicators such as “values-driven motivation and focus,” “cooperative and open approach to stakeholders” and “clear CSR commitment and awareness” (Van Marrewijk, Werre 2003).

Typology models refer to proactive strategies/stages in a large variety of synonyms ranging from “integrated” (Slawinski, Bansal 2012) to “sustaincentric [sic] approaches” (Valente 2012). Important indicators in this line of research include holistic mindsets, systems thinking, holistic approaches (Maon, Lindgreen & Swaen 2010, Valente 2012, Van Marrewijk, Werre 2003), and anticipative and long-term focus (Reidenbach, Robin 1991, Walls, Phan & Berrone 2011, Molina-Azorín et al. 2009). Another important indicator is a clear embedment of values in the corporate culture or identity (Maon, Lindgreen & Swaen 2010, Valente 2012), and in the corporate strategy (Reidenbach, Robin 1991, Jabbour 2010). A focus on innovation, especially breakthrough innovations, is considered to be aligned with proactive behavior (Nidumolu, Prahalad & Rangaswami 2009, Valente 2012, Azzone, Bertele 1994, Tilley 1999, Chen, Chang & Wu 2012). An additional indicator is broad cooperation, specifically cross-sector partnerships (Slawinski, Bansal 2012, Van Tulder, Van Wijk & Kolk 2009, Klewitz, Hansen 2014, Grob, McGregor 2005). Moving beyond supplier guidelines, proactive companies tend to empower suppliers to co-create by giving them a mandate (Grob, McGregor 2005). Proactive companies create new markets, inspired by the long-term vision (Azzone, Bertele 1994, Heikkurinen 2011). Resource commitment (Maon, Lindgreen & Swaen 2010, Chen, Chang & Wu 2012) and broad implementation (Van Marrewijk, Werre 2003, Grosvold, Hojmosse & Roehrich 2014, Walls, Phan & Berrone 2011) are mentioned as indicators, but with the note that they might be less discriminative to distinguish proactive behavior from intermediate stages, depending on the exact formulation of the indicator (ibid).

A much smaller part of the CSR typology literature has focused on the motivation of the firm and its leaders to become proactive. Groza et al. (2011) distinguish values-driven, stakeholder-driven and strategy-driven attributions. Bansal and Roth find a comparable set:

competitiveness, legitimacy and social responsibility (Bansal, Roth 2000). Competitiveness and strategic motivation are focused on profit and efficiency, customer integration in the process, cost-benefit analysis, and innovation approach. A legitimacy approach is focused on the firm's survival, risks and compliance, in which the relationship with stakeholders (Government and local stakeholders) is considered particularly important. Isomorphic behavior (imitation of standard in sector) is often a characteristic. The stakeholder-driven motivation is operationalized by mentioning the stakeholder demands when attributing motivations. Stakeholder- and legitimacy-motivations are related. The values driven and social responsibility motivations are operationalized comparable with focus on values as driver, societal impact as perspective and concern with giving back. Bansal & Roth also mention an independent approach as characteristic.

Motivation typologies resemble behavioristic typologies: the reactive behavior type is mainly linked to legitimacy motivation; the intermediate type has links with the competitiveness motivation; the values-driven approach most resembles proactive behavior. The empirical work of Bansal and Roth (2000) already showed the impact of motivation on behavior. Therefore, understanding motivations is a crucial factor in understanding the emergence of the different behavioral ideal types and could explain the transition from one stage to another.

2.4 RESEARCHING PRO-ACTIVENESS – FOUR PROPOSITIONS

The overview of literature on CSR pro-activeness contains a number of promising insights and classifications that are needed to fully grasp the nature and extent of pro-activeness as a distinct stage beyond compliance: regarding motivation, stages, integrated types of business models, taking stakeholders into account, and understanding non-linear transition trajectories. These insights have only recently received empirical extension and support. The bulk of recent articles on pro-activeness, fortunately, takes an empirical approach. Ninety-eight empirical studies were selected along the same systematic method (footnote 3). Most studies use a large scale empirical approach. Sixty-one articles use a cluster and/or regression analysis approach (including ANOVA and Structured Equation Modelling (SEM)), based on survey data. Cluster and factor analysis plays a relatively important role in many of these studies. This type of analysis categorizes the behavior data in pro-activeness clusters. This implies, however, that the clusters found in a firm's strategies are not necessarily aligned with the theoretical descriptions of the different strategies. The clusters, however, do hint at different degrees of pro-activeness. Twenty-five studies use a qualitative case study approach. The remaining nine articles use other approaches such as experiments (in the consumer behavior research), or an Operations Research (mathematical) model. The body

of research reveals a variety of selection biases: countries (towards EU/Western world), issues (focus on environmental issues) and sectors (industrial sectors).⁹

The studies in which pro-activeness was studied provide four angles to this topic (Figure 2.1). Of the 98 empirical studies, 1/8 (13) focused on the validation of categorizations. Twenty-nine percent (28) was targeted at the relationship between internal/external drivers and the proactiveness of the firm. An equal share of the studies (28) tried to address the classic question on the relationship between pro-activeness strategy and the firm’s financial performance. Only a few studies (12%, 12) explored the impact question of pro-activeness – however defined. The remaining studies (17) searched for other relationships, for instance, between proactiveness and consumer behavior or disclosure and the firm’s legitimacy.

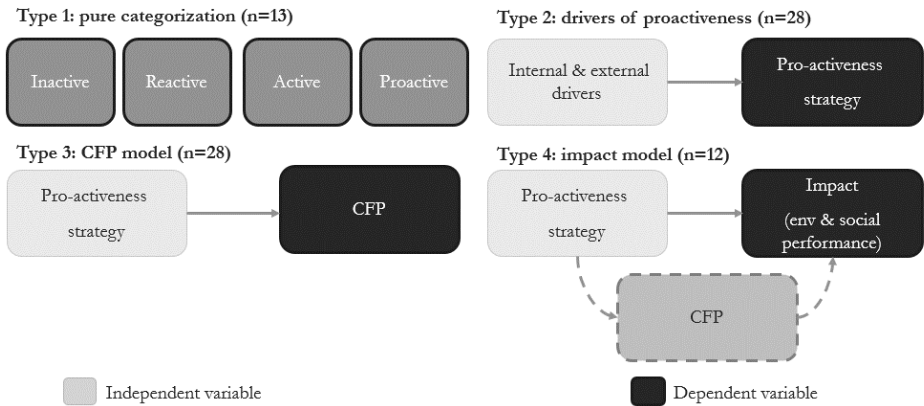


Figure 2.1 - Four streams of empirical testing.

2.4.1 Stream 1: validating categories

Authors have been trying to delineate different groups through cluster or factor analysis (Aragón-Correa 1998, Molina Azorín et al. 2009, Claver-Cortés et al. 2007). But the number and nature of clusters found as well as the spread of the firms over the clusters differ considerably. Most validated operationalizations relate primarily to the simple transition from (in)reactive or passive behavior to (pro)active behavior, but have difficulty in defining

⁹ To be precise: on Western companies and environmental issues. Forty-four percent of the articles use more than two sectors in their sample. Most focus is on manufacturing sectors in which environmental issues are more pronounced. The most studied countries are Spain (18) and the US (12). Only 20 studies (20%) include data from non-Western countries. Seventy percent of the articles focus only on environmental issues in their approach.

more subtle transition stages. One reason why the difference between active and proactive is difficult to define empirically is the relatively small numbers that – defined in any manner – would qualify for that type. The empirical evidence in any case hints at a critical tipping point when most firms are actively implementing environmental or CSR measures beyond pure compliance (this process is aligned with the transition from reactive to active approach in the stage models). Specific groups, however, show different speeds of implementation in the empirical data.

Several authors strongly cautioned against linking empirical findings to theory on the basis of cluster analysis. Studies that tested the models of Hunt and Auster (1990) and Roome (1992), for example, found that the indicators used are difficult to operationalize, whereas the behavior of firms could reflect different stages of pro-activeness as defined by the models at the same time (Kolk, Mauser 2002, Schaefer, Harvey 1998, Hass 1996). Based on these conflicting findings, authors have argued for more advanced models which include non-linearity in the evolution of a firm's behavior (Kolk, Mauser 2002, Schaefer, Harvey 1998, Hass 1996). Recent studies, however, still predominantly use the same activity implementation questionnaires which are not optimally suited to distinguish proactive from active approaches (e.g. Pereira-Moliner et al. 2015, Primc, Cater 2015, Rivera-Torres et al. 2015, Sen, Roy & Pal 2015, O'Donohue, Torugsa 2016, Jiang et al. 2015). This seems largely due to the dominance of the RBV and performance orientation of studies as an inside-out approach to CSR strategies. So, although a firm develops a profitable business model based on high environmental and/or social standards, the underlying societal issue remains unresolved. The effect can even be perverse: one frontrunner company (often a smaller niche player) serves the needs of those customers who want to pay extra for CSR, which takes away the incentive for other (often larger players) to actively invest. The inside-out approach largely ignores the fundamental co-evolution of the firm and society with regard to effectively solving the underlying societal issue. An outside-in focus on the actual resolution of the issue is one of the key traits of the proactive approach (Maon, Lindgreen & Swaen 2010, Valente 2012, Van Marrewijk, Werre 2003, Van Tulder, Van Wijk & Kolk 2009). The limited attention in empirical studies on the interaction with society (outside-in and stakeholder perspective) that is needed to distinguish active from proactive strategies, is also reflected by the finding that substantial gaps between plans/intentions and implementation exist in practice (Schaefer, Harvey 1998, Winn, Angell 2000). Studying planned behavior is therefore insufficient to understand the different stages beyond compliance. The same applies to implemented measures without looking at the impact on the societal issue.

Proposition 1: There exist four distinct ideal types of CSR strategies; they can be linked to stages of CSR engagement, but in a non-linear mode; the distinction between the

effectiveness on firm level and on societal level as well as planned vs. actual behavior is crucial to gain further understanding of the proactive stage.

2.4.2 Stream 2: internal and external drivers

Driver research seeks to provide insight into the antecedents of pro-activeness. It shows that both internal and external factors – in particular in interaction with each other – drive the change towards pro-activeness. Empirically acknowledged internal drivers vary from the firm's culture and mindset, via leadership as mediating factor to even out the positive effect of ecological motivations on pro-activeness. Other studies found a positive effect of the attitude or vision of specifically the manager with regard to CSR, or emphasize the positive effect of the shared nature of the vision, in which a linear versus a cyclical time perspective of the company's operations can lead to different environmental response strategies.

Regarding core capabilities of a company, strategic and manufacturing pro-activeness are found as drivers of environmental proactiveness, next to innovation experience, market orientation, alliance experience, and stakeholder orientation and engagement. Ghobadian et al. (1998) presented a broader set of internal enablers, including technology, human resources, capital availability, and organizational adaptability. Carballo-Penela and Castromán-Diz (2014) also found a positive effect from a good financial performance, but a negative effect from the firm's size, if it was too big to change quickly. Jabbour, Santos & Nagano (2010) found an interconnection between human resource management capacity and the evolution through the stages of CSR development. The endogenous risk related to a firm's profile, defined by the firm's core technology as proxy, also has an influence on the firm's environmental strategy. All internal drivers for pro-activeness that were found relevant in specific empirical studies are summarized in table 2.3.

Empirical studies on the external drivers on pro-activeness have historically concentrated on a number of context variables related to the industry of the company and the issues and stakeholders it is consistently faced with. They range from the exogenous risk of a company included in its total profile, via issue salience and field cohesion to the culture of the home country in the case of multinational enterprises. External drivers on pro-activeness, in particular the impact of 'stakeholder pressure,' have been researched with mixed results.

These mixed findings can be related to the conceptual weakness of the empirical delineation of pro-activeness. Empirical research has paid less attention to the influence of context interaction as it predominantly focuses on internal drivers as antecedents. It is not clear what type of stakeholder pressure leads to what type of company strategy beyond compliance; the nature of the stakeholder relationship has a distinctly different impact on the CSR strategy of companies. Recent evidence in the CSR literature, as well as the growing partnering

Table 2.3 - Empirical evidence for Internal drivers of pro-activeness.

Category	Driver	Sources
Mindset & culture	Mindset	(Valente 2012)
	Culture & identity	(Sharma 2000, Ghobadian et al. 1998)
	Ecological motivation	(Walker, Ni & Huo 2014)
	Owners' values	(Fraj-Andrés et al. 2012)
	Time perspective	(Slawinski, Bansal 2012)
	Socialist ideology	(Jiang et al. 2015)
	Management vision/attitude	(Segarra-Oña et al. 2015, Carballo-Penela, Castromán-Diz 2014)
	Shared vision	(Aragón-Correa et al. 2008)
Capabilities	Strategic pro-activeness	(Aragón-Correa et al. 2008, Sharma, Aragón-Correa & Rueda-Manzanares 2007, Carballo-Penela, Castromán-Diz 2014)
	Manufacturing pro-activeness	(Sharma, Aragón-Correa & Rueda-Manzanares 2007)
	Market orientation	(Cambra-Fierro et al. 2013)
	Innovation experience	(Sharma, Aragón-Correa & Rueda-Manzanares 2007, Lin 2012)
	Alliance experience	(Lin 2012)
	Stakeholder orientation	(Sharma, Aragón-Correa & Rueda-Manzanares 2007)
	Organizational adaptability	(Ghobadian et al. 1998)
	Human resource availability	(Ghobadian et al. 1998)
	Human resource management capacity/alignment	(Jabbour, Santos & Nagano 2010)
Other	Capital availability/financial performance	(Ghobadian et al. 1998, Carballo-Penela, Castromán-Diz 2014)
	Discretionary slack (of managers)	(Sharma 2000)
	Endogenous risk (technology)	(Vastag, Kerekes & Rondinelli 1996)
	Size	<i>Negative:</i> (Carballo-Penela, Castromán-Diz 2014)
Moderating ideology effect	Incentives	<i>Negative:</i> (Jiang et al. 2015)

literature, shows that positive stakeholder engagement – as opposed to stakeholder pressure – is a vital precondition for making the transition from an active to a proactive approach. Negative stakeholder pressure impedes a company from surpassing the tipping point from active to proactive. This is also in line with an earlier finding that assistance from stakeholders or value-chain leading firms is essential to stimulate SMEs in capacity building, in order to develop a proactive CSR approach. A recent finding that publicly listed firms are less likely to develop a proactive approach also underlines the importance of constructive stakeholder engagement (Aharonson, Bort 2015). Table 2.4 summarizes the external drivers of pro-activeness as found in the literature.

On the basis of these empirical findings, it is argued that the internal drivers that prompt a company and its leadership to become more active are not sufficient, by themselves, to reach a stage of pro-activeness.

Proposition 2: A proactive approach is equally triggered by internal as well as external drivers; internal drivers are based on a timely combination of core capabilities, the nature of the industry, values, and mindsets related to leadership; external drivers, which especially differentiate the proactive from active approach, depend in particular on the potential to engage external stakeholders in positive change.

2.4.3 Stream 3: impact on financial performance

Research on the general relationship between social performance (CSP) and financial performance (CFP) has a long history, yielding a mixed picture of studies finding evidence of negative, neutral, and positive relationships (table 2.5 provides references). In line with the RBV, mediating variables have been sought in the interaction between proactive strategies and the formation of organizational capabilities. Of the total 28 empirical articles with a CFP focus in their research design on pro-activeness, 17 find positive evidence, 9 find mixed findings, while 1 finds insignificant evidence.

The studies that found a positive relationship between pro-activeness and CFP (in contrast to reactive, compliance-driven strategies) note capabilities build-up as an important moderator. Positive organizational capabilities include a higher “strategic proactivity” or “SCM proactivity.” The capability to align the internal vision (shared vision) has a positive impact in interaction with proactive CSR strategies. Managing stakeholders and integrating their demands has also been shown to be relevant to achieving financial value creation with proactive CSR. The actual satisfaction of stakeholders proves to be an important mediator of positive results, which provides further evidence of the previously elaborated difference between ‘stakeholder pressure’ and ‘stakeholder engagement.’ Organizational learning and continuous innovation have been found to be relevant capabilities. Potentially, a related

Table 2.4 - Empirical evidence for external drivers of pro-activeness.

Category	Driver	Sources
Stakeholder	Pressure of stakeholders	(Murillo-Luna, Garcés-Ayerbe & Rivera-Torres 2008, Vazquez-Brust et al. 2010, Murillo-Luna, Garcés-Ayerbe & Rivera-Torres 2011) <i>Insignificant:</i> (Carballo-Penela, Castromán-Diz 2014, Garcés-Ayerbe, Rivera-Torres & Murillo-Luna 2012) <i>Negative:</i> (Toppinen et al. 2012, Walker, Ni & Huo 2014)
	Engagement of stakeholders	(Van Tulder et al. 2014, Austin, Seitanidi 2014, Van Tulder, Van Wijk & Kolk 2009, Aragón-Correa et al. 2008, Segarra-Oña et al. 2015)
	Capacity building by stakeholders	(Blanchi, Noci 1998)
	Listed firm/public ownership	<i>Negative:</i> (Aharonson, Bort 2015)
	Regulatory pressure	(Walker, Ni & Huo 2014)
	Other	Exogenous risk (location)
	Market, legal, social	(Ghobadian et al. 1998)
	Home country effect & national culture	(Van Tulder, Van Wijk & Kolk 2009, El Baz et al. 2016)
Moderating ideology effect	Customer response to CSR, industry competition, role of government	(Jiang et al. 2015)

mediator is the participative nature of the organizational structure. For proactive environmental marketing, both relational (customer, supplier, provider and channel relations) and intellectual (knowledge) assets build-up mediates the impact on the financial performance. A differentiated position with regard to quality (as indicated by chain brands and stars in the hotel industry) is also a significant mediator of the effect of proactiveness on the financial performance (Pereira-Moliner et al. 2015). In a more fine-grained view of the performance impact, Sambasivan et al. (2013) show different degrees of positive impact on operational and financial performance, stakeholder satisfaction, as well as organizational learning as outcomes.

The ten studies that present contrasting evidence are often more context-specific (Claver-Cortés et al. 2007, Walls et al. 2011, Husted, Allen 2009, González-Benito, González-Benito 2005, Sen et al. 2015). The effect depends on the complexity of the environment (Primc & Cater, 2015), one's starting position (Kim & Lim, 2015), and the specific indicator and time horizon one is looking for (DiSegni et al., 2015, Delmas et al., 2015).

Following these divergent findings, it is clear that pro-activeness is not a guarantee for positive performance in each setting (Aragón-Correa & Rubio-López, 2007). For instance, in matters of pollution, a more differentiated and context-dependent approach is needed, one that goes beyond incremental prevention strategies (Hart and Dowell, 2011).

An improved conceptualization should relate to the longer term financial performance implications of proactive strategies. As transition research shows, societal transitions often require radical system innovation (Markard, Raven & Truffer 2012, de Haan, Rotmans 2011, Turnheim, Geels 2012, Loorbach, Rotmans 2010). The business case of these innovation processes is often only positive from a long-term perspective, as substantial and risky investments are needed at first. A counterfactual scenario (lack of sufficient innovation, potentially leading to an unresolved societal issue) might be a survival risk for the firm, the regime, or the sector as a whole (Geels 2005, de Haan, Rotmans 2011, Turnheim, Geels 2012). In line with the previously discussed empirical findings, it can therefore be hypothesized that the financial outcomes of proactive strategies will only materialize if they are mediated by the build-up of new mindsets and capabilities. Because of the fundamentally different dynamic these might differ, especially in the inclusion of capabilities needed to cooperate and co-create with other, non-primary stakeholders.

Proposition 3: A proactive strategy produces superior financial performance when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector. A proactive strategy can only be financially viable if mediated by the build-up of specific internal capabilities, mindsets and strategic leadership.

Table 2.5 - Empirical evidence for the influence of pro-activeness on financial performance.

Category	Driver	Sources
Pro-activeness in general	Positive impact of pro-activeness of the CSR or environmental strategy	(Torugsa, O'Donohue & Hecker 2012, Torugsa, O'Donohue & Hecker 2013, Aragón-Correa et al. 2008, Pereira-Moliner et al. 2015, Molina-Azorín et al. 2009, Asgary, Li 2016, Rivera-Torres et al. 2015, O'Donohue, Torugsa 2016, Walker, Ni & Huo 2014, Sharma, Vredenburg 1998, Marín, Rubio & de Maya 2012, Sambasivan, Bah & Ho 2013, Wu et al. 2013, Yang et al. 2013, Reverte, Gómez-Melero & Cegarra-Navarro 2016, Endrikat, Guenther & Hoppe 2014, de Burgos-Jiménez et al. 2013)
	Mixed impact of pro-activeness of the CSR or environmental strategy	(Dixon-Fowler et al. 2013, González-Benito, González-Benito 2005, Claver-Cortés et al. 2007, Primc, Cater 2015, Walls, Phan & Berrone 2011, Sen, Roy & Pal 2015, Kim, Lim 2015, DiSegni, Huly & Akron 2015, Delmas, Nairn-Birch & Lim 2015)
	Evidence of insignificant impact of pro-activeness on CFP	(Husted, Allen 2009)
Organizational capabilities as mediators	Strategic pro-activeness	(Torugsa, O'Donohue & Hecker 2013, Torugsa, O'Donohue & Hecker 2012, Yang et al. 2013) <i>Insignificant:</i> (Reverte, Gómez-Melero & Cegarra-Navarro 2016)
	SCM pro-activeness	(Wu et al. 2013)
	Stakeholder management & integration	(Torugsa, O'Donohue & Hecker 2013, Sharma, Vredenburg 1998, Torugsa, O'Donohue & Hecker 2012)
	Internal vision alignment	(Torugsa, O'Donohue & Hecker 2013, Torugsa, O'Donohue & Hecker 2012)

Category	Driver	Sources
	Stakeholder satisfaction (external)	(Sambasivan, Bah & Ho 2013)
	Organizational learning & intellectual asset build-up	Mediator: (Sharma, Vredenburg 1998, Yang et al. 2013) Output: (Sambasivan, Bah & Ho 2013)
	(Participative) Organizational design	(Rivera-Torres et al. 2015)
	(Continuous) innovation	(Sharma, Vredenburg 1998, Reverte, Gómez-Melero & Cegarra-Navarro 2016)
	Relational assets (customer, supplier, channels, providers, brand)	(Yang et al. 2013)
	Quality differentiation	(Pereira-Moliner et al. 2015)
	HRM practices	(O'Donohue, Torugsa 2016)

2.4.4 Stream 4: societal impact

Most of the studies on the relationship between pro-activeness and financial performance originate in the performance school of CSR. The impact school of CSR considers the relationship of pro-activeness with (social and environmental) impact on the whole sector or society. In fact, it seems logical that this dimension represents the real question of pro-activeness: how can companies align their longer term societal/sustainability interests with their own shorter-term self-interest? Of all research done, twelve empirical studies tried to test this relationship. Nine found positive relationships (Zailani et al. 2012, Grosvold, Hoejmosse & Roehrich 2014, de Marchi, Grandinetti 2013, Mondéjar-Jiménez et al. 2015, Lin, Ho 2016, Chang 2015, Alt, Díez-de-Castro & Lloréns-Montes 2015, Li et al. 2016, Liston-Heyes, Vazquez Brust 2014), and three found insignificant or mixed relationships (Lee, Rhee 2007, Li et al. 2016, Liston-Heyes, Vazquez Brust 2014, Sarkis, Cordeiro 2009, Testa et al. 2015).

The nine studies with evidence of a positive relationship with impact give insight in crucial factors which need to be aligned: customer pressure and regulation (Zailani et al., 2012) and R&D strategies with internal and external stakeholders (De Marchi, Grandinetti 2013). Many societal impact studies make the link through innovation and the related business model change such as process innovation, supply chain transformation, or product design integration (Mondéjar-Jiménez et al. 2015, Chang 2015). Impactful proactive strategies are most likely to emerge in the context of a shared vision – which often develops based on

employee participation in decision making – (Alt, Díez-de-Castro & Lloréns-Montes 2015). The translation of the vision into practice in an aligned and consistent way (“coupling” policy and practice) is also important to achieve societal impact (Grosvold et al., 2014). The opposite can also be considered evidence: a recent study found that reactivism (defined as a combination of compliance and economic focus) has a negative effect on the societal impact (Liston-Heyes, Vazquez Brust 2014). Pro-activeness might also be applied in combination with more reactive strategies. Eloquently framing the ambidexterity debate in the context of pro-activeness, Lin & Ho show that the optimal combination of both is a mediator of the relationship between institutional pressure and societal impact (Lin, Ho 2016).

More mixed evidence studies stress the dependence on context co-evolution (or co-creation) as a critical tipping point for achieving the needed change. Lee & Rhee (2007) investigated the environmental performance of the Korean paper & pulp industry with longitudinal data of a decade. They found that over that time the pro-activeness of the industry as a whole improved, but could not relate this to differences in firm’s level of pro-activeness. Sarkis & Cordeiro (2009) investigated the adoption of new technologies in electricity generation and found over time no simple win-win, but different outcomes depending on the measure or technology implemented. Some measures did concurrently improve environmental and economic efficiency in the sector, but large investments were required. Others only improved either the economical or environmental performance of firms. Testa et al. (2015) show that pro-activeness mainly leads to impact when external pressure and an entrepreneurial attitude occur simultaneously. Cost saving, risk reduction, or focus on footprint reduction correlated with pro-activeness (Testa et al. 2015). Therefore, the societal impact of proactive strategies need to be considered in a longitudinal fashion and with attention to direct and indirect, negative and positive (counterfactual) effects.

A proactive approach is likely to have superior impact on the underlying societal issue especially when judged from a long-term perspective. This relationship is similar to the perspective on the relationship with financial performance discussed before. Perceived from on a shorter time frame, incremental innovations introduced by firms with a “(re)active” approach might realize more results but leave the societal issue unresolved. As the “proactive” firm focuses on what is needed to resolve the issue and takes leadership in realizing this in practice, the long term superior performance should – in fact - be implied in the definition of the ideal type.

Proposition 4: A proactive strategy produces superior impact (on the societal issue) especially when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector.

2.5 CONCLUSION: REMODELING CSR STAGES BEYOND COMPLIANCE

This chapter has taken stock of the theoretical and empirical literature on the concept of pro-activeness in CSR. The pro-activeness literature has achieved maturity in some areas while there are still considerable weaknesses to be considered in other areas (table 2.6). There is strong support for the relevance of the distinction of pro-activeness versus reactivity, but much less understanding of the difference between proactive and active corporate behavior. Furthermore, considerable knowledge has been gathered about the internal drivers of pro-activeness and the positive impact on financial performance. However, the knowledge about the nature of the interaction with external drivers and the impact on social and environmental dimensions is much more limited. As this chapter explains, this has been due to conceptual ambiguity, which consequently has resulted in a scattered empirical landscape. Considerable progress is still possible on operationalization and sample diversity.

This study has shown that there are at least two reasons why the pro-activeness concept remains extremely relevant – despite existing flaws in its elaboration. The first reason is that it has proven its value as a complexity reducing concept. The ideal type clusters large sets of distinct behaviors (e.g. the systematic analysis revealed 112 indicators used in the operationalization, of which most represent specific behaviors). Empirical research consistently finds clusters in behavior and also makes it possible to shed more specific light on what lies exactly behind compliance – by distinguishing between an active and a proactive approach towards CSR. As an additional concept, pro-activeness reduces conceptual complexity. The use of the term by practitioners is evidence of its relevance in the popular discourse; its abuse can only be addressed by coming to a proper delineation of it in the scientific discourse.

The second reason is that focused empirical research on pro-activeness – or what has been defined as such – should reveal underlying mechanisms that can seriously improve our understanding of the antecedents of enhanced CSR beyond compliance. Although most CSR research focusses on behavior, the phenomenon has not been grounded in very insightful conceptualizations of specific motivations, mindsets, and learning mechanisms within the organization and between the organization and its stakeholders. The four propositions derived from the empirical research can help us further in specifying the dynamic characteristics of the phenomenon, not only of the ideal type of pro-activeness but also for a more sophisticated behavioral approach to CSR stages. The use of the concept of pro-activeness over the past thirty years provides us with relevant building blocks for dynamic learning and strategic adjustment processes within organizations. It also illuminates the impact on society along often non-linear processes of transition, in particular when this entails radical change (Nidumolu, Prahalad & Rangaswami 2009, Hart, Dowell 2011). Most theoretical models actually introduced the proactive ideal type of the firm as compared to

Table 2.6 - Strengths and weaknesses of the pro-activeness literature.

	Strengths	Weaknesses
Approach & concepts	<ul style="list-style-type: none"> • Strong body of RBV/CFP literature • Considerable attention in top journals 	<ul style="list-style-type: none"> • Lack of common understanding <ul style="list-style-type: none"> ○ Unit of analysis ○ Scope ○ Definition • Limited insight in transitions and relation between the stages • Less attention for motivation • Limited attention for non-linear behavior (vs. linear paths)
Operationalization	<ul style="list-style-type: none"> • Use of multiple categories of indicators in operationalization 	<ul style="list-style-type: none"> • Operationalization provides less insight in active vs. proactive behavior • Dependence on EMS indicators in operationalization • Typologies use different operationalization and terminology
Empirical evidence general	<ul style="list-style-type: none"> • Increasing empirical validation • Broad sector focus 	<ul style="list-style-type: none"> • Disproportionate focus on Western world & environmental issues • Limited link between empirical clusters of pro-activeness found and theoretical ideal types
Findings	<ul style="list-style-type: none"> • Cluster analysis shows presence of groups • Much evidence of differences between compliance vs. (pro)active approach • Much evidence of internal drivers of proactiveness • Much evidence of CFP impact of proactiveness in interaction with capabilities • Some evidence of positive environmental & social impact in combination with innovation and cooperation 	<ul style="list-style-type: none"> • Lacking evidence of proactive stages (vs. reactive/active) • Less evidence of external drivers of pro-activeness • Limited evidence for other ideal types than eco-efficiency/pollution prevention • Limited evidence regarding the influence on environmental & social impact

the active ideal type in an effort to refer to its true system-level approach, impact-driven mindset, and system-level leadership behavior. An understanding of the actual manifestation of this ideal type is therefore crucial to identify and understand the mechanisms behind the potential business leadership in these sustainability transitions towards radically different business models that require both internal and external alignment processes (see proposition 2). For frontrunner (CSR active) firms, a proactive approach could be a critical success factor for a firm's survival as well as a driver of the creation of new markets.

The empirical literature has documented an increasing adoption and relevance of active CSR behavior, but there is still limited evidence of the existence of proactive behavior – let alone of the conditions for its success. The lack of empirical support is primarily the result of measurement models gauged to the transition from compliance-driven to active approaches, but skeptics could – arguably with reason – conclude that the true proactive firm is an inspirational, but nevertheless theoretical phenomenon. Documenting more evidence of proactive behavior – either through case studies or through quantitative research – therefore remains relevant, both to underline the possibility to distinguish “real” proactive behavior from “less” proactive behavior, as well as to understand what drives the transition towards this stage of CSR. This conclusion will therefore define the outlines of a dynamic stages’ model of CSR in which the main drivers, tipping points, and motives for the transition to more proactive CSR strategies are delineated. This synthesis consists of two related dimensions: focus and leadership.

2.5.1 Focus: from incremental and strategic to radical and societal/systemic

Investigating proactive behavior requires a shift of focus from incremental to more radical innovation, from both business and research. Transitions often require a fundamental redefinition of the corporate purpose and its core capabilities. In the literature on shared value creation, this ambition is further exemplified by the fundamental redefinition of corporate purpose from product-based to outcome- or impact-based. In this transition, footwear and apparel companies (such as Nike) become e.g. health and fitness companies, computer and technology companies (IBM) aim at creating a ‘smarter planet,’ a textbook publishing company (Pearson) aims at improving educational outcomes, health insurance companies (Achmea) become aimed at making people healthier and enhancing their lives. Empirical research on pro-activeness however has focused in its operationalization of the concept mainly on implementing incremental changes that directly improve efficiency, such as “energy efficient practices” or “material usage reduction.”

The second dimension of pro-activeness relates to the way businesses can *create the context* for radical innovation and systems change. Radical change often involves concurrent change

of technological and institutional structures of a sector (Geels 2002, Markard, Raven & Truffer 2012, Geels 2004). To enable this process, companies that aim to behave proactively are likely to cooperate actively and constructively with other actors to create the context for the required institutional change and overcome or circumvent institutional resistance. Most companies in the transition towards the active phase have focused inwards to develop own sustainability strategies and implementing required management systems. With more proactive ambitions, their focus needs to turn outward again to some extent.

It is proposed to link the conceptual model of pro-activeness specifically to insights from the (sustainability) innovation and transition literature. The innovation literature furthermore provides useful knowledge to define relevant intra-firm resources which drive the firm's capability to proactively change its own processes and products (Dasgupta, Gupta & Sahay 2011, Hauser, Tellis & Griffin 2006). This body of knowledge has an established place in business research. It has linked structures as well as capabilities of firms with successful innovation and eventually improved financial performance. In the last decade, a specific sub-school interested in sustainability innovation emerged, which also stresses the importance of open innovation and the involvement of non-market stakeholders in innovation and co-creation processes.

The transition literature further provides insight into the link of a firm's strategies with system level dynamics. Its primary topic of interest is patterns of change in socio-technical systems and strategies to actively influence these change processes. Recently, the field directed attention to the relevance of studying the actor perspective of the firm as well (Farla et al. 2012). The strength of this school is its holistic approach and broad focus on interaction between different actors and levels and as such might be very helpful to enrich the understanding of proactive leadership of firms in sustainability transitions, especially considering the need to influence the firm's context as well.

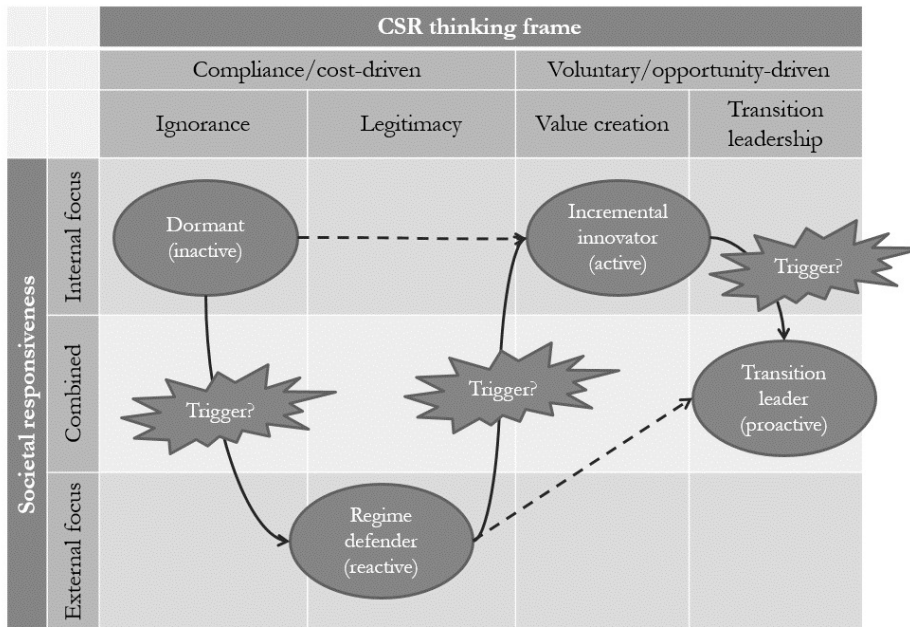
2.5.2 Leadership: from organization to mindset

What is called pro-activeness at the level of organizations is in essence also a phenomenon at the level of a shared mindset of managers and leaders, internal and external to the company. The conceptual and empirical analysis of the literature revealed a large diversity of interpretations of the core concept. Refining the definition of the proactive mindset therefore remains essential. It is proposed to define the concept of the proactive mindset as "a shared and (somewhat) congruent set of thinking-frames which moderates the firm's behavior in reaction to opportunities and threats resulting from societal issues in interaction with the firm's position and capabilities and aimed at maximizing societal impact either directly or indirectly." This stresses that the essence of pro-activeness is shared thinking-frames on the level of the firm. For example, an important thinking-frame is the conviction

that an active CSR strategy focuses on CSR as an opportunity driver and less as a constraint or cost driver. These thinking-frames cause the congruence in behavior that can be observed on the behavioral level.

The mindset underlying proactive behavior is characterized by its *focus on system level*. Because these firms understand that their existence in periods of radical change is directly related to the survival of the system, they focus on what is needed to make the system sustainable again. Instead of thinking about what is currently possible, back casting from a sustainable future vision is expected. Due to a deep understanding of the many barriers to change, the leaders of these firms actively think about cooperation with other actors – increasingly also non-market actors – to create the institutional context to increase the speed of the transition. They have learned that to ensure their own credibility, their internal initiatives have to be setting the example as well. As such this mindset is characterized by its focus on what is needed to ensure a sustainable system and a combined focus on internal and external perspectives. In the leadership literature, comparable – but often equally ambiguous – concepts like ‘transformational,’ ‘sustainability,’ ‘connected,’ ‘collective,’ or ‘thought’ leadership are introduced to distinguish the proactive (societal) from the active (strategic) leadership styles (e.g. (Tideman, Arts & Zandee 2013). The basic transition model thus consists of the societal responsiveness of the company, combined with the CSR thinking-frame of the corporate leadership (Figure 2.2).

The societal responsiveness in combination with the central CSR thinking frame are central to distinguish a proactive mindset from the other ideal types. The CSR thinking-frame can be based on compliance, cost-driven motives, or on voluntary, societal, opportunity-driven motivations. On the basis of these characteristics, inactive (ignorance), reactive (legitimacy), active (strategic value creation) and proactive (transformational) mindsets can be positioned. This operationalizes proposition 1. The transition of CSR thinking-frames from inactive to more active approaches can theoretically be considered to represent an evolutionary pathway of increasing involvement and insights which are based on core capabilities and explained by the RBV of the firm. Introducing the societal responsiveness dimension (cf. also Van Tulder et al. 2009, 2013), however, highlights the changing stakeholder perspective that moves the drivers/triggers of the transition from an internal to an external focus. This also makes the transition model more interactive, with leaps and bounds and less evolutionary or incremental progress. The essence of the difference between a reactive and a proactive leadership style lies in a fundamentally different approach towards societal stakeholders.



→ Common trajectory - - - → Less common trajectory

Figure 2.2: A dynamic transition model for CSR thinking-frames and trajectories (van Tulder et al. 2014).

The Figure 2.2 shows that each transition from one stage to another implies a *fundamental change* in both the focus and approach of the firm. These transition involves ‘tipping points’ or ‘triggering events’ that define the nature of the change and is linked to the propositions:

Trigger 1 (from inactive to reactive) is primarily externally induced (often a scandal or other trigger event) and relates modestly to proposition 2.

Trigger 2 (from reactive to active and from compliance to opportunity-driven) is internally defined (internal alignment) and relates primarily to proposition 3.

Trigger 3 (from active to pro-active) is both internally and externally defined (external alignment) and relates to all propositions, but in particular to proposition 2.

The difference between the active and proactive approach then lies amongst others in the change from an internal focus of the value proposition of the company towards a combined focus in which internal and external stakeholders get aligned. It is highly unlikely that a company leader can make the transition from an inactive to an active or proactive approach, for instance because of internal alignment barriers (employees might not be able to follow). For comparable reasons, it is highly unlikely that the company leader can make the transition

from a reactive to a proactive strategy due to lacking legitimacy with external stakeholders (external alignment). Only in case companies are able to ‘walk the talk’ by really changing the core of their business model, will they be able to align external stakeholders as a precondition for making the transition.

Figure 2.2 also illustrates that the transition of an inactive to an active approach towards CSR can be based on a gradual change trajectory, provided that the societal responsiveness remains constant, i.e. intrinsically motivated. What is likely to trigger a transition from a (re)active to proactive mindset? In line with one of the core assumptions in earlier research, it can be posited that a proactive strategy resulting from a proactive mindset is likely to be built on learning processes and capabilities obtained earlier when reacting to demands of stakeholders and executing CSR initiatives. This is also why it is relevant to define the proactive mindset on the basis of a review of current knowledge, instead of defining transition or transformational leadership separately.

Chapter 3 – Can Elephants dance? A systematic framework to explore incumbents' behavior in sustainability transitions

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3.1 INTRODUCTION

Established firms often demonstrate immense inertia in times of radical transitions (Henderson, Clark 1990, Rothaermel 2001). The problems that incumbent firms face during periods of transition is so renowned that it is often referred to as the “incumbent’s curse” (Chandy, Tellis, 2000). The rise of the personal computer and the accompanying software, for example, brought IBM close to the edge of extinction, being challenged and then overtaken by –at that time– small companies like Apple and Microsoft (Dittrich et al. 2007, Gerstner 2002). Though in this case the incumbent did survive, radical transitions create opportunities for niche players leading to a Schumpeterian process of creative destruction, whereby incumbents are replaced by new entrants (Dittrich et al. 2007, Rothaermel 2001, Roy, Sarkar 2016). Radical transitions often lead to the creation of new markets targeted at different consumers and emphasizing different performance features. Incumbents struggle to adapt to these new markets and consumers. Previous research suggests a number of mechanisms why incumbents fail to adapt, such as prior experience (Henderson, Clark 1990), a different economic incentive structure (Christensen 1997, Rothaermel 2001), an inability to learn and adopt new competencies and routines (Dosi 1982, Nelson, Winter 1982, Tushman, Anderson 1986, Rothaermel 2001), a mental lock-in (Benner, Tripsas 2012), and the embeddedness of incumbents within an established industrial network that does not believe and foresee the market potential of a new technology (Dittrich et al. 2007, Hamel 2000, Rothaermel 2001).

However, there is also evidence that incumbents sometimes succeed in facing radical transitions and are able to adapt, survive, and recapture performance levels of previous periods (David, Steinmueller 1994, Rothaermel 2001, Chandy, Tellis 2000, Danneels 2004, Hockerts 2010). This is especially the case when incumbents make use of earlier investments in capabilities and assets that are redeployed and leveraged in the new technological regime and market (Klepper 2002, Roy, Sarkar 2016). In addition, incumbent firms are also known to jointly create new markets via standardization consortia with other companies in the same line of business, thereby creating huge barriers of entry for newcomers (David, Steinmueller 1994, Dittrich, Duysters 2007, Egyedi 1999, Hawkins 1999, Schmidt, Werle 1998).

Building further on the pro-activeness propositions of the last chapter, this second theoretical chapter outlines a systematic approach to study the behavior of incumbents in sustainability

transitions. Understanding the incumbents' role in radical sustainability transitions is urgent from both societal as well as business perspective, as has been explained in chapter 1¹⁰. The combination of climate change, resource depletion, population growth, and increasing consumption in emerging economies creates the need for radical change in the backbone of our economic system (Sachs 2008, Pollard et al. 2010, Hart 2010). While many firms have acknowledged the need to innovate, many firms struggle to get beyond pilot stage or focus mostly on incremental solutions (Lacy et al. 2013). That a lack of change can eventually disrupt a sector can currently be seen in the energy sector. As an executive of one of the major European energy incumbents recently acknowledged, the energy transition is currently a realistic threat to the firm's survival: "The massive erosion of wholesale prices caused by the growth of German photovoltaics constitutes a serious problem for RWE which may even threaten the company's survival" (Beckman 2013). As such, the understanding of how firms can contribute and be part of a transition towards a new, sustainable ecosystem is of key business and societal relevance today. Incumbents are a category of specific interest, both because of their large vested interests as well as their potential power to lead change.

Current theoretical and empirical approaches in CSR research need to be improved to make sense of the complex reality in these sustainability transitions. CSR research has studied the behavior of firms with respects to societal issues for a long time (Garriga, Melé 2004, De Bakker, Groenewegen & Den Hond 2005, Aguinis, Glavas 2012). Yet after decades of CSR research, there is still a strong controversy on how to perceive the role of the firm in solving complex societal issues. On the one hand, some authors hail business power to innovate and develop scalable solutions (Hart 2010, Porter, Kramer 2011, Nidumolu, Prahalad & Rangaswami 2009). In contrast, others emphasize that incumbents especially use their economic and political power to resist the needed change, and that CSR often represents superficial reactions to legitimize unsustainable pathways (Banerjee 2008, Prieto-Carrón et al. 2006, Frankental 2001, Font et al. 2012). This chapter builds on the pro-activeness concept as it is extensively reviewed in chapter 2. To better understand why these divergent views on incumbents' contributions can persist, this concept is further contextualized and improved in the context of incumbent behavior in sustainability transitions.

Improved understanding of the concept of pro-activeness and its antecedents can both benefit the scientific debate as well as practitioners. Although the limitations and caveats of the pro-activeness concept have been demonstrated in several reviews (Kolk, Mauser 2002, Schaefer, Harvey 1998, Ghobadian et al. 1998, Hart, Dowell 2011), the linear conceptualization continues to be dominant in the literature (see chapter 2). Integrating insights from innovation and transition theory and the introduction of a differentiated view

¹⁰ This paragraph repeats some relevant material from section 1.1.

of antecedents can further enrich our understanding. Considering that radical transitions have a disruptive impact in many sectors, executives of leading incumbents can benefit from a greater understanding of how they lead their firms in developing proactive, transformative strategies. Also, societal stakeholders can use the generated knowledge to understand under which circumstances incumbents are well positioned to drive innovation towards sustainability and can, as a consequence, improve their intervention strategies.

This chapter builds further on earlier research to formulate an improved approach to understand pro-activeness of incumbents' strategies in the context of radical sustainability transitions. To do so, the pro-activeness approach is combined with concepts from transition studies as well as sustainability innovation literature largely based on the outcomes of a systematic literature review (see Appendix A.1) and refined based on the insight of a pilot case study (see Appendix A.2). An integral framework is presented to capture the multi-level interaction between an incumbent's behavior, regime-level coalition formation and discursive struggle, and the interaction with landscape-level contextual antecedents. Within this framework, propositions are developed on how the incumbent's (leadership) mindset, in interaction with its strategic position, capability and contextual antecedents, shape the incumbent's innovation and context creating behavior and how this relates to outcomes on firm and societal level. The propositions presented in this chapter further operationalize each of the more general propositions of the last chapter. At the end of this chapter an overview is presented mapping this relationship.

The propositions formulated in this framework are specifically targeted to distinguish the proactive ideal type from the other three. Earlier literature focused mainly on the distinction between reactive, compliance-oriented strategies from active, value-creation focused behavior (see chapter 2 for an extensive discussion of this point). There is a need to conceptualize the proactive ideal type more precisely and to find evidence of its existence in practice (Hart, Dowell 2011). Therefore, the propositions formulated in this chapter focus specifically on how to differentiate the proactive ideal type from the other three.

In the next section the multi-level perspective model from transition studies (Geels 2002, Van den Ende, Kemp 1999, Geels 2005) is presented as a framework to study the incumbent-context co-evolution in the course of transitions. Thereafter, the sections respectively discuss contextualizing the pro-activeness framework in the context of transition, linking it to innovation and context creating behavior based on literature, developing propositions on societal and firm level outcomes, and finally relating it to the contextual antecedents and the incumbent's position and capabilities as key mediators.

3.2 A MULTI-LEVEL PROCESS UNDERSTANDING OF SUSTAINABILITY TRANSITIONS

In the context of sustainability transitions, the success of incumbents' strategies co-depends on the transition of the broader business (eco)system in which the incumbent operates. Because the transitions are driven by societal issues which are often not fully internalized in the market, change processes are dependent on public and policy support (Smith, Crotty 2008, Hills, Lam & Welford 2004, Blum-Kusterer, Hussain 2001, Fischer, Newell 2008). Moreover, as transition studies have eloquently illustrated, transitions are socio-technical in the sense that besides technological change the institutional structures of a sector also need to change, in order to produce persistent improvement (Markard, Raven & Truffer 2012, Geels 2005). To facilitate and embed the new technologies and solutions, new infrastructures (Farla, Alkemade & Suurs 2010, Hillman, Sandén 2008), business models (Christensen et al. 2006, Yunus, Moingeon & Lehmann-Ortega 2010), but also mindsets (Valente 2012, Senge et al. 2007) and market standards (Smink, Hekkert & Negro 2013, Dean, McMullen 2007, Dangelico, Pujari 2010) are needed. Therefore, understanding the impact of strategies of incumbents requires a strong understanding of the co-evolution of solutions, markets, and the institutional structure in which they are embedded.

The multi-level paradigm (MLP) model, developed within the transition studies community, is adopted as a framework to study the interaction between incumbents and their context (Geels 2002, Van den Ende, Kemp 1999, Geels 2005). The MLP outlines three levels on which concurrent change processes interact to create persistent change. The *niche level* represents technological niches in which (radical) new solutions are developed within a (partially) shielded context. These niches can either exist within R&D departments of larger organizations such as incumbents, or in innovation ecosystems developed in, for example, the context of government supported facilities. Second, the *landscape level* represents the largely exogenous context of contextual social, cultural, economic, and political factors which can induce pressures on the current system to change. Third, at the meso level, the *regime* is conceptualized as a cross-sector group of actors (e.g. policy makers, business leaders and applied researchers), who share practices. These practices are strongly interconnected with the expectations and skills of technology users, with institutional structures, and with broader infrastructures. Based on this shared understanding and practice, the regime tends to impose an incremental logic and direction for socio-technical change (Geels 2004, Smink, Hekkert & Negro 2013, Kemp, Schot & Hoogma 1998, Lawrence, Suddaby & Leca 2009). However, when the landscape pressure rises, either due to structural trends or specific shocks, and developing niches provide a challenge to the status quo, the regime stability might weaken and radical changes in technologies, institutional structures, and actor constellation might be induced.

In this chapter it is proposed to model the micro-level dynamics within the incumbent embedded in the MLP framework. This is in line with the recent, repeated call to pay more attention to actor level dynamics within the transition studies community (Farla et al. 2012, Geels 2011, Markard, Truffer 2008, Markard, Raven & Truffer 2012). Innovation processes within the incumbent can be compared to niche level processes and include typical niche processes such as vision articulation, network building, and learning processes as they are conceptualized within the Strategic Niche Management (SNM) approach (Schot, Geels 2008). Moreover, to understand the success and effect of intra-incumbent innovation processes, it is argued that both the dynamic at regime level, in the sense of creating a coalition for change and creating support to alter crucial institutions, as well as the presence of sufficient supporting landscape pressure are strongly relevant. It is relevant to note that in contrast to entrants and start-ups, incumbents are assumed to have more capacity to influence regime and maybe even landscape dynamics (especially in coalitions). However, this makes it even more relevant to study their behavior in a multi-level approach to further understand their agency in altering institutions.

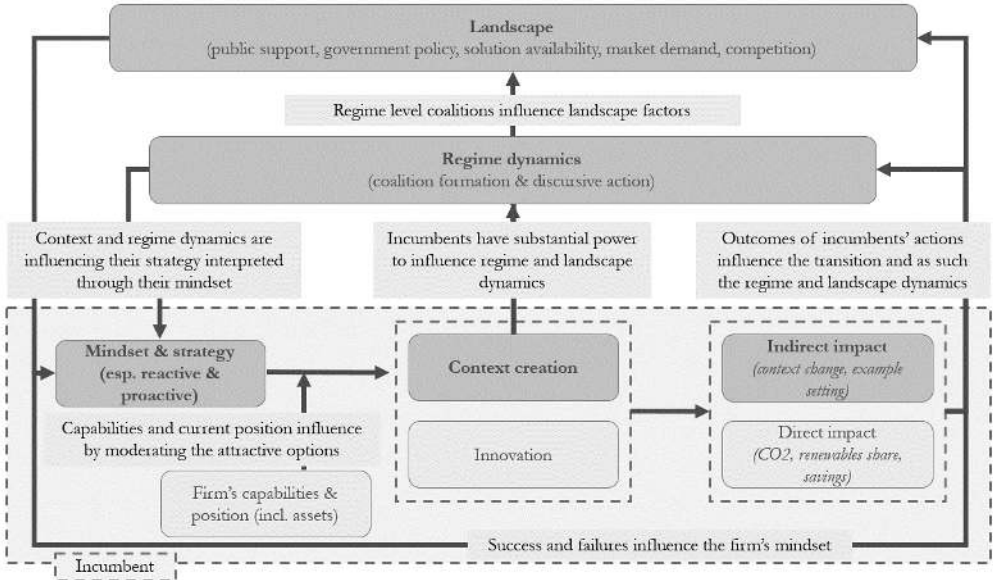


Figure 3.1: A multi-level conceptual model to improve understanding of incumbent's strategies in transitions.

This chapter elaborates on a causal model for the incumbent level dynamic with a central role for pro-activeness. Building on the conceptualization of pro-activeness (as detailed in chapter 2), it argues that the pro-activeness of the mindset of the incumbent's leadership, as it becomes evident in its strategy, is a key antecedent of both innovation and context creating

behavior. By focusing on innovation and context creating behavior, the model becomes dynamic and tackles one of the key limitations of the static approach within CSR studies, which has often focused on the diffusion of specific practices. By conceptualizing the behavior as innovation and context creating, the accumulated knowledge of the innovation studies (Danneels 2004, Dasgupta, Gupta & Sahay 2011, Hauser, Tellis & Griffin 2006), as well as corporate political action (Oliver, Holzinger 2008, Holburn, Bergh 2008), and institutional entrepreneurship (Maguire, Hardy & Lawrence 2004, Greenwood, Suddaby 2006, Garud, Hardy & Maguire 2007) can be applied to develop a more nuanced understanding. Based on the literature, the firm's capabilities and strategic position are also included as key antecedents which interact with the mindset in shaping the firm's response. Considering the outcomes, it is important to study both the direct impact (financial, environmental and social performance of the firm), as well as the broader influence through context creation and example setting. The multi-level, iterative dynamic elaborated in this chapter is expected to play a crucial role in the superior long-term impact and performance of a proactive approach, as proposed in proposition 3 & 4 of chapter 2.

The proposed model is summarized in the following propositions:

Proposition 5: The higher the level of pro-activeness (of the incumbent's leadership mindset), the higher the impact of the incumbent.

Proposition 5a: The relationship between pro-activeness of the mindset and impact is mediated by context creating and innovation behavior.

3.3 FOUR TYPES OF INCUMBENT STRATEGIES BASED ON DISTINCT LEADERSHIP MINDSETS

The different levels of pro-activeness of incumbent behavior as observed in practice contributes to the divergent perspectives on CSR and the role of incumbents. On an empirical level, companies show many different kinds of behavior gathered under the same label of CSR. As a consequence, the value and impact of CSR is evaluated rather differently. On the positive side, some observers are talking about the key role business plays in moving towards a new, sustainable economic paradigm and system (Hart 2010, Porter, Kramer 2011, Nidumolu, Prahalad & Rangaswami 2009). These are, however, opposed by equally strong discourses, which position CSR as a barrier to change because it legitimizes unsustainable practices and superficial improvements (Banerjee 2008, Prieto-Carrón et al. 2006, Frankental 2001, Font et al. 2012).

Understanding of the underlying mindsets of incumbent leadership can help to understand the diversity of CSR behavior (Valente 2012, Van Marrewijk, Werre 2003, Bansal, Roth 2000, Groza, Pronschinske & Walker 2011). Firms behave inactively with regard to societal issues if they consider them irrelevant to proper business. Reactive behavior is linked to a legitimacy-focused mindset. When firms show more active behavior, this is often based on the fact that they perceive societal issues as drivers of value-creating opportunities. Finally, more proactive behavior is related to a more holistic understanding of the need to lead and co-create the transition to a new sustainable situation. As such, pro-activeness is understood as a typology of four ideal types of mindsets (Kolk, Mauser 2002, see also chapter 2) which drive different kind of behaviors. Viewing behavior in the light of these mindsets can therefore increase the understanding of why incumbents react differently to the same societal issues affecting their sector and firm.

A non-linear and not mutually exclusive conceptualization of pro-activeness is needed to match the complex reality (Kolk, Mauser 2002, Schaefer, Harvey 1998, Hass 1996). In the research tradition, pro-activeness was often conceptualized as a linear pathway to the most advanced form of CSR (Maon, Lindgreen & Swaen 2010, Roome 1992, Hunt, Auster 1990). The assumption was that the corporate world would gradually discover the hidden value of CSR and build its capacity to create value by solving societal issues. As others have already shown, reality is much more complex (Schaefer, Harvey 1998, Hass 1996). Although an average tendency from compliance driven to voluntary CSR can be observed, this process is far from linear and evidence is lacking that companies move beyond utilizing CSR as a short-term, value-creating strategy. Furthermore, the evolution towards embracing CSR can also stall and fall back to more reactive or inactive approaches (Ghobadian et al. 1998). Empirical evidence also shows that companies concurrently show behaviors of different levels of pro-activeness and the level of pro-activeness of different units within the same firm can diverge (van Tulder et al. 2014). This confirms the thesis that pro-activeness is related to different mindsets or motives which are not mutually exclusive and which do not present a linear pathway.

Capturing motives, role perceptions, and vision of the transition can help to determine which mindset underlies the firm's strategy and behavior. Motives and role perceptions have traditionally been associated with the different levels of pro-activeness in classification and typologies (Valente 2012, Bansal, Roth 2000, Groza, Pronschinske & Walker 2011). In this regard, the description below is developed based on the systematic review (see chapter 2). This is supplemented with a third category: the transition perspective. When firms share motives and role perceptions, they can still react differently towards the same transition (or more traditionally: issue) because of different perspectives of nature and priority of the issue. Because of the multitude of societal issues and other business issues, corporate leadership

needs to prioritize. The urgency and potential disruptiveness are two important aspects in this regard. The literature on disruptive innovation notes that incumbents tend to underestimate the potential of (disruptive) innovations (Hamel 2000, Rothaermel 2001). This is related to transitions literature's finding of a tendency of regimes to prefer incremental over radical change (Geels 2004, Smink, Hekkert & Negro 2013, Kemp, Schot & Hoogma 1998, Lawrence, Suddaby & Leca 2009). These differing visions regarding what is a potential future sustainable state and the need for more or less radical moves to achieve this state influence the resulting action. The most likely perspective on each of these aspects in relation to the four ideal types of mindsets are derived based on logical induction.

Type 1: *Inactive firms* can be characterized by their ignorance of societal issues and mostly profit-driven motives (Friedman 2007). Demands from society are perceived as cost drivers. The solution of societal issues is primarily seen as the responsibility of the government and/or individual citizens and consumers and the only responsibility of the firms is to incorporate their explicit demands. Often this goes together with a lack of focus or ignorance of the societal issues and ongoing transitions, because the firm is inwardly focused. As such, the firm is not active in developing future visions with regard to societal issues or actively solving these. Because of this attitude, the firm is likely not to have clear visions on the potential disruptiveness or potential future situation regarding specific sustainability transitions.

Type 2: *Reactive firms* are characterized by the pursuit of legitimacy either in a reactive or defensive way (Maon, Lindgreen & Swaen 2010, van Tulder et al. 2014, Oliver, Holzinger 2008). CSR is still seen as a liability or cost driver. However, these firms are much more responsive towards societal issues than the inactive ones. Potentially building on hard lessons in the past, these firms understand that business needs a license to operate and that they need to work with stakeholders to ensure this (Van Tulder, Van der Zwart 2006). Their approach can be characterized by its external focus on understanding and potentially debating societal demands. The actual manifestation can either be reactive or defensive (Oliver, Holzinger 2008). Reactive firms mainly respond to the demands based on their perception of what is necessary to be legitimate while minimizing the cost. Especially larger firms are in the position to influence the public debate and will use this to defend their current stakes. This typically takes form of stressing the need for continuity (e.g. to ensure a stable supply or protect jobs), stressing the risks of hasty change or advocating future directions complementary with their stakes (Smink, Hekkert & Negro 2013, Bosman et al. 2014). A clear characteristic, however, remains that they see government, civil society, and citizens as leading with regard to societal demands and themselves as reacting to these. Because they are mainly reacting, these firms are likely to have limited vision for the future in relation to the transition. Consequently, a reactive attitude is often connected to a perception that the

transition is not a priority business issue and is considered limited in terms of disruptiveness and urgency. It should be stressed that their assessment in some cases can be correct, but can also result from their limited perspective and reactive approach. In the last case, they might be caught by surprise by a transition suddenly accelerating in reaction to some trigger event (Geels, Schot 2007, Chesbrough 2001).

Type 3: *Active firms* have learned to embrace CSR as a source of value creation (Nidumolu, Prahalad & Rangaswami 2009, Hart, Dowell 2011, Dangelico, Pujari 2010, Holliday 2001). They are talking about societal or sustainability issues as opportunities and use jargon like “the triple bottom line” (Elkington 1997). Based on this approach they tend to have their own strategies or policies (but not necessarily integrated with the general strategy), have implemented management systems, and are actively pursuing either cost saving or revenue opportunities based on process or product improvements. In comparison with the reactive firms they tend to have shifted their focus inwards, because they see their responsibility as using the business opportunities which arise in the context of transition (van Tulder et al. 2014). A clear trait is that they embrace the triple bottom line such that they pursue business opportunities in which concurrently financial as well as social or environmental improvements can be made. In line with this argument, they still tend to emphasize that they are restricted by the boundaries of the market, in case the financial and social outcomes are not aligned. This leads to an active approach towards incremental opportunities, while waiting for the more radical solutions to become “competitive” (Lacy et al. 2013). As long as firms do not see the need to move further than this incremental approach, they perceive that the disruptiveness and urgency are still manageable. Because of this perspective, active firms in most cases show limited vision on how the sector is going to overcome the barriers towards more radical change.

Type 4: *Proactive firms* have taken up a transformational role in ensuring a successful and timely transition towards a more sustainable state (Nidumolu, Prahalad & Rangaswami 2009, Maon, Lindgreen & Swaen 2010, Mirvis, Googins 2006). Often their motives are a combination of enlightened self-interest (no future without a transition) and intrinsically values-driven motives (van Tulder et al. 2014). They embrace the necessity of ensuring that the whole economic system is sustainable, based on an understanding of the severity of issues and the interconnected nature of the economic system in a globalized world (Valente 2012, Van Marrewijk, Werre 2003). Furthermore, they understand the radical change required and dependence on the actions of other actors. Based on these insights they show both external as well as internal focus, by concurrently changing their own operation while also working together with other stakeholders to ensure that the right enabling conditions develop and barriers to change are removed (van Tulder et al. 2014). They see that leadership is required from them, while also acknowledging that the development of a multi-

stakeholder coalition with sufficient momentum is required to change the current regime. It is likely that their behavior is related to an understanding of the transition as both urgent and potentially disruptive for the sector as well as an acknowledgment that more radical changes are needed to arrive at a more sustainable future state.

The operationalization of each of the aspects is summarized in table 3.1 below, and the following propositions summarize the core point which should be empirically validated.

Proposition 6: Four types of incumbent mindsets can be distinguished in practice based on the motives, role perception, and transition vision of incumbent leadership.

6a: The inactive ideal type is characterized by its explicit positioning of sustainability aspects as irrelevant to business and ignoring activities which do not fit their general profit-focused strategy.

6b: The reactive ideal type is characterized by its focus on external demands and activities targeted mainly at sustaining public legitimacy.

6c: The active ideal type is characterized by its focus on implementing the internal strategy and capturing opportunities for value creation with incremental sustainability innovations.

6d: The proactive ideal type is characterized by its focus on leading systemic change and embracing collaborative and radical change.

3.4 LINKING INNOVATION BEHAVIOR TO MINDSETS

Incumbent behavior in relation to transition is dynamically related to the underlying mindset of the incumbent's leadership. The four ideal types of mindsets form the perspective through which the firms interpret the transitions. As such the mindset modifies behavior in response to issues or transitions. Much earlier research has implicitly or explicitly conceptualized a static link between mindset and specific types of behavior (see chapter 2). This literature uses static schemes of concrete behaviors related to each ideal type. However, it is clear that a dynamic interpretation is more robust. Specific behaviors might be related to different mindsets in different phases of the transition or different contexts. A behavior that is highly radical in early stages of a transition is likely to be induced by a proactive mindset. When, however, the innovation is optimized and embedded in the institutional context, even a reactive actor might adopt the same practice. A comparable difference can arise when different sectors are compared, because they are likely to differ in terms of development and

Table 3.1 - Operationalization of the four ideal types of corporate mindsets in relation to societal/sustainability transitions.

Motives for CSR	Inactive		Reactive		Active		Proactive	
	Central motive	Profit	Legitimacy	Value creation	Leading transformation	Value creation	Leading transformation	
	Liability/opportunity	Cost	Cost/liability	Opportunity	(Long-term) opportunity & responsibility	Opportunity	(Long-term) opportunity & responsibility	
	Key rationales	Not our responsibility Unnecessary cost/inefficiency	Stakeholder/government demand/compliance Ensure continuity/balanced approach/level playing field	Triple bottom line opportunity: cost saving, revenue growth, improve efficiency. Clear targets & internal translation	System sustainability as goal Embrace radical change Acknowledge interdependence	Triple bottom line opportunity: cost saving, revenue growth, improve efficiency. Clear targets & internal translation	System sustainability as goal Embrace radical change Acknowledge interdependence	
Role of the firm regarding societal issues	Focus	Internal	External	Internal	Internal & external	Internal	Internal & external	
	Firms role	Not relevant	Reacting to demands & protecting its stake	Actively using opportunities for the firm	Showing leadership in the transition	Actively using opportunities for the firm	Showing leadership in the transition	
	Societal role division	Not more than legal compliance	Government & societal actors are leading	Business is active, but restricted by market boundaries	Business as leader in forming multi-stakeholder coalitions	Business is active, but restricted by market boundaries	Business as leader in forming multi-stakeholder coalitions	
Transition perception	Disruptiveness	Limited vision	Manageable	Manageable	Potentially high	Manageable	Potentially high	
	Urgency	Limited vision	Sufficient time	Sufficient time	Quick action required	Sufficient time	Quick action required	
	End state	Limited vision	Potentially less vision/focus	Potentially less vision/focus	Radical change required	Potentially less vision/focus	Radical change required	

institutional context. Therefore, a more dynamic perspective is needed that can be placed in the context and state of the transition in the case studied.

Embracing innovation to conceptualize an incumbent's behavior provides the basis for this more dynamic operationalization. A focus on organizational arrangements of CSR processes and disclosure was an important part in earlier operationalization of pro-activeness (see chapter 2). However, focus on actual changes in core business is much less prone to superficial tactics and is considered more robust in terms of construct validity. Because transitions pose the challenge to substantially change current practices, a conceptualization in line with long-standing tradition of innovation research is most appropriate (Nidumolu, Prahalad & Rangaswami 2009, Halme, Laurila 2009). Innovation in this context is defined as "the process of inventing, developing and implementing new products and processes which are substantial changes to the current situation" (Linton 2009).

It is proposed to conceptualize innovation behavior as an innovation portfolio with the number of projects, radicalness, and scale as key characteristics. Considering innovation (or technology, or R&D) portfolios is a well-established approach within the innovation and technology strategy literature (Zahra 1996, Klingebiel, Rammer 2014, Nagji, Tuff 2012). The breadth of the portfolio is often characterized by the number of projects. Radicalness (or exploration vs. exploitation) is another frequently used characteristic. It is proposed to add scale as a third evaluation characteristic by linking the pilot paralysis documented in practice to the "Valley of Death" debate in literature (Auerswald, Branscomb 2003, Barr et al. 2009, Markham et al. 2010, Raven, Geels 2010, Wessner 2005).

Evaluating the radicalness of the innovation portfolio enables visualization of the degree to which incumbents suffer a bias towards incremental innovation. Both the transition as well as the radical innovation literature document that incumbents (as central regime actors) tend to favor incremental innovation because of the alignment with their current mindset and business model; it fits in with their assets and infrastructure, and involves lower risk and higher short-term returns (Henderson 1993, Geels 2004, Unruh 2000, Christensen 1993, Leonard-Barton 1992). Therefore investigating whether an incumbent's behavior is biased towards optimization is an important perspective. Radicalness (or the related concept of discontinuous innovation) is a frequent concept in literature and can therefore be used to build a robust operationalization (Danneels 2004, Garcia, Calantone 2002, Chesbrough 2001, Slater, Mohr & Sengupta 2014, Sandberg, Aarikka-Stenroos 2014, Chandy, Tellis 1998, Hill, Rothaermel 2003). Radical innovations can, depending on the firm's current position, render the incumbent's existing assets and competencies obsolete (Hall, Kerr 2003). Logically, incumbents are not inclined to tear down their core competencies and cannibalize their cash cows by engaging in radical innovation. Moreover, they may not be able to do so, because they may lack the necessary capabilities, routines, or assets (Nelson,

Winter 1982, Henderson 1993). As a consequence, the incumbent's core competencies become 'core rigidities' (Leonard-Barton 1992). This is why incumbents have great

Table 3.2 - Operationalization of radicalness of innovations.

	Incremental	Radical
Contextual risk/dependency	<ul style="list-style-type: none"> - limited risk * not dependent on policy changes and/or stable policy * not dependent on other complementary changes by other actors (e.g. infrastructure) * clarity on role of solutions in transition 	<ul style="list-style-type: none"> - substantial risk * dependent on policy which might change * dependent on other actors' action * solution potential & role in transition unclear <p>(Hill, Rothaermel 2003, Meijer, Hekkert & Koppenjan 2007)</p>
Newness	<ul style="list-style-type: none"> - Knowledge with this or comparable technology and market segments 	<ul style="list-style-type: none"> - New to sector and/or company (Garcia, Calantone 2002) - Newness can be both market (untested proposition, only latent demand, new market segment) or technology (untested and different technology, not an adaptation of current technologies) (Garcia, Calantone 2002, Ritala, Sainio 2014)
Business case	<ul style="list-style-type: none"> - investment is limited (in relation to balance size) and/or with average ROI - margins are in line with market average 	<ul style="list-style-type: none"> - major investments (in relation to balance size) (Ritala, Sainio 2014) - long payback time, lower than market ROI & margins (especially in early phase) (Danneels 2004, Chandy, Tellis 1998, Hill, Rothaermel 2003) - cannibalization of current revenue streams (Slater, Mohr & Sengupta 2014, Chandy, Tellis 1998)

	Incremental	Radical
Behavioral change & complementarity	<ul style="list-style-type: none"> - complementary with current practices of organization and customer - complementary with current assets and infrastructure 	<ul style="list-style-type: none"> - requires major process or organizational changes of company (Ritala, Sainio 2014) - requires substantial behavior change from the customer (Garcia, Calantone 2002, Ritala, Sainio 2014, Veryzer 1998) - requires major reconfiguration of firm’s asset portfolio or infrastructure (Kunz, Warren 2011, Farla, Alkemade & Suurs 2010)

difficulty adopting (systemic) radical technological innovation, and are therefore going into decline, whereas new entrants overtake as market leaders (Hill, Rothaermel 2003). There are different explanations for the inert behavior of incumbents: economic (monopoly rents), organizational (formalization and bureaucracy), and strategic (embedded in ‘fixed’ network) (Hill, Rothaermel 2003). Furthermore, due to the co-evolution of technology and institutions (Geels 2004, Brown et al. 2013), incumbents’ interests are typically aligned with institutions of the current regime (Smink 2015), not with new technological paradigms.

Table 3.2 presents an operationalization of radicalness in four categories of indicators with reference to important reviews or conceptual articles.

Considering the scale of projects in the innovation portfolio makes it clear whether incumbents are able to make innovations successfully to pass through the “Valley of Death.” Within the innovation literature the “commercialization of technology” stream has documented that in the midst of the innovation process a crucial phase – in which development evolves into commercialization – causes failure for many innovations (Auerswald, Branscomb 2003, Barr et al. 2009, Markham et al. 2010, Raven, Geels 2010, Wessner 2005). In fact, this is termed the “Valley of Death” for innovation and has been broadly adopted in business discourse. Transition scholars have also paid attention to the challenge, especially within the Strategic Niche Management stream (Schot, Geels 2008, Raven, Geels 2010). They found that this is partly related to the lack of attention to the business case and business model in the earlier development phases. Another documented cause of the “Valley of Death” are difficulties of attracting funding. Furthermore, the risk and unpredictability in scaling production, as well as hesitations of users to adopt a new

product, contribute to the failure of innovations in this critical phase. It is argued that the pilot paralysis, which has been recently observed specifically in the context of corporate sustainability action (Lacy et al. 2013, Flaim, Neenan & Robinson 2013), is related to the “Valley of Death” findings. Scaling and the associated risks and challenges could be perceived as another dimension of radicalness. However, here it is argued that an optimization bias and pilot paralysis represent two distinct dynamics and that separating them creates more insight. Slayton recently also emphasized this difference and related it to the difference between product and process innovation (Slayton, Spinardi 2016).

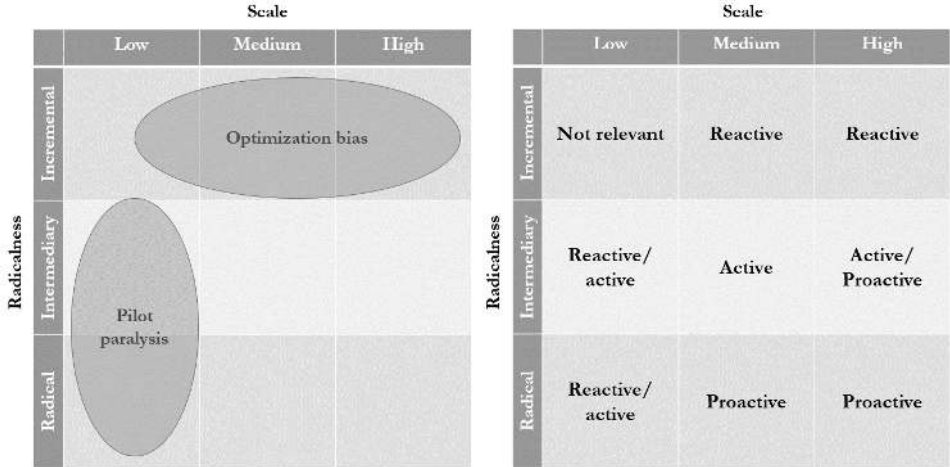


Figure 3.2 - Mapping the incumbent's innovation portfolios makes transparent whether two key biases have influenced their portfolio (left). This can be translated into which zone of the innovation matrix is likely to be related to a certain dominant mindset within incumbent's leadership (right).

It is proposed that the scale and radicalness of the innovation portfolio are closely linked to pro-activeness of the incumbent's leadership mindset. Actors ranging from reactive to proactive in terms of mindset are all likely to show innovation behavior in relation to the transition. Since active incumbents have also embraced sustainability as a value-creating option, breadth (# projects) is not expected to be directly differentiating. The more radical innovations, however, differentiate proactive actors from the other (re)active actors. While radical innovations per definition involve substantial risk and upfront investments, they are more or less dismissed by (re)active actors because of the lack of win-win, or potential threat to the current situation. In contrast, incremental innovations are likely to be strongly embraced by reactive players as a way to remain legitimacy while protecting their current assets and business models and minimizing added cost. Moreover, it is likely that scale also plays a differentiating role. Smaller (pilot scale) experiments with radical innovation are also

attractive for (re)active players as they represent incremental resource commitments, while still providing the legitimacy benefit of being able to show activity in areas where the regime or public debate has high expectations. In contrast, proactive incumbents are more likely to be willing to incur the upfront investment and risk of scaling a more radical innovation. Therefore, a radicalness x scale matrix can be used to map empirical evidence of innovation portfolios and show the presence of two key biases. The discussion on the evaluation of these portfolios in relation to pro-activeness can be summarized in the following proposition:

Proposition 7a: A proactive mindset leads to relatively less incremental innovation.

Proposition 7b: A proactive mindset leads to relatively more innovations of intermediate and radical (highest) level of radicalness, as well as a higher average scale for these innovations.

3.5 LINKING CONTEXT CREATING BEHAVIOR TO MINDSETS

Transitions are not only processes of (technological) change, but also of the concurrent adaptation of the institutional context (Markard, Raven & Truffer 2012, Geels 2005). Within the transition studies several approaches such as Strategic Niche Management (Kemp, Schot & Hoogma 1998, Schot, Geels 2008) and Transition Management (Rotmans, Kemp & Van Asselt 2001, Loorbach, Rotmans 2010) are actually intended to influence these processes to increase the speed and likeliness of transition. The stakeholder dialogue literature within the CSR literature is also focused on interacting with the context on the solution of societal issues, although the focus has been on listening and responding rather than influencing (van Tulder et al. 2014, Senge et al. 2007, Dentoni, Bitzer & Pascucci 2016). Besides that, corporate political action (Oliver, Holzinger 2008, Holburn, Bergh 2008, Hillman, Keim & Schuler 2004, Mathur, Singh 2011), institutional entrepreneurship (Maguire, Hardy & Lawrence 2004, Greenwood, Suddaby 2006, Garud, Hardy & Maguire 2007) and policy science (Markard, Suter & Ingold 2016, Ingold, Varone 2011) have also studied the role of actors, including incumbents, in shaping institutions. The different ideal types of incumbents following from their mindsets have a different degree of focus on the external context and their role in it, as was shown in chapter 2. Supplementing innovation behavior with context creating behavior is therefore also relevant to establish the relationship of behavior with the underlying mindset.

It is argued that coalition building and discursive strategies are the most relevant aspects to consider. While realist research traditions have narrowly focused on actors and coalitions (as representing actors with associated power), this thesis follows the approach of acknowledging that the content of the advocated agenda and the way language is used to express this in the public debate is of equal relevance (Hajer 2006, Hajer, Versteeg 2005).

In fact, the discursive strategies (content) represent a rich source of information for understanding how the different mindsets are reflected in the public debate and how they interact. Both SNM (expectations & social networks, Schot, Geels 2008) and Transition Management (problem structuring/agenda/image development & coalition formation, Loorbach, Rotmans 2010) acknowledge the relevance of both. This is also closely aligned with the discourse analysis tradition, which is utilized in both organizational science (Heracleous, Barrett 2001, Vaara, Kleymann & Seristö 2004, Phillips, Lawrence & Hardy 2004) as well as policy science to study the influence of actors in the public and policy debate (Hajer, Versteeg 2005, Hajer 1995, Winkel et al. 2011, Hermwille 2016).

Reactive and proactive incumbents can be distinguished by the openness of their approach to coalition-building. As was also discussed in the previous chapter, reactive and proactive players actively engage in the external dynamic, while active players tend to focus more on the intra-firm processes. This distinction between reactive (defensive) and proactive engagement strategies can also be found in the corporate political strategy literature (Oliver, Holzinger 2008). In essence, reactive players focus on partnering with core regime players as they share interest in maintaining the status quo. Although these coalitions tend to be dominated by business actors and their representative stakeholder bodies, other regime actors such as policy makers or scientists can also be allies, insofar as they share a strong stake in protecting the current institutional structures. In their effort to transform the institutional structures, proactive players need to ally with a broader set of actors. These are much more likely to include e.g. NGOs advocating a certain issue and entrants and challengers with new solutions. As such their coalition is likely to be more open and cross-sector by nature. The proactive mindset in general is more proactive in embracing critical voices as they strive to find a new solution that is acceptable for all stakeholders (Valente 2012, van Tulder et al. 2014, Senge et al. 2007).

The discursive strategies are expected to closely resemble the core beliefs of the reactive and proactive mindsets. As such the reactive players and their allies can be expected to endorse certain societal issues (legitimacy focus), but frame these in combination with the need for continuity. This is, for example, associated with the arguments stressing risks (e.g. job losses, system disruption) of a too radical approach. Furthermore, they emphasize the need for a level playing field and request support to mitigate market externalities. Proactive incumbents, however, are expected to focus on what is needed to solve the underlying issue in a manner acceptable for key stakeholders. They are future oriented and sustainability centered in their arguments. Furthermore, the acknowledgement of the need for radical change in business models and institutions to facilitate innovation is a key trait of a more proactive discourse. Active incumbents are likely to use an opportunity-based discourse, but mostly focus on their own goals and initiatives and pay limited attention to the broader issue.

Proposition 8: A proactive mindset leads to creating cross-sectoral, multi-stakeholder coalitions around sustainability-centered, future-oriented visions.

Table 3.3 - Context creating strategies of incumbents in relation to the pro-activeness of the mindset of the incumbents' leadership.

	Inactive	Reactive	Active	Proactive
Coalition building	Not participating	Potentially active organizers Regime & business dominated	Ambiguous and less focused, might join either reactive or proactive coalitions	Active organizers Cross-sector Open to challengers and critics
Discourse	Not participating	Legitimacy & continuity focus	Focus on internal goals & initiatives Does embrace opportunities	Sustainability centered Future oriented Embracing radical innovation

Based on the previous discussion, the operationalization of the ideal types on the behavioral level is summarized in table 3.4. Each ideal type has been given a contextualized name as well to represent their typical strategy on the behavioral level.

Table 3.4 - Operationalization of ideal types in terms of innovation and context creating behavior.

	Dormant <i>(Inactive)</i>	Regime defenders <i>(Reactive)</i>	Incremental innovators <i>(Active)</i>	Transition leaders <i>(Proactive)</i>
Innovation	Accidental	Incrementally dominated	Incremental - intermediate	Broad portfolio, differentiated in scaling radical innovation
Context creation	Not participating	Regime coalition, legitimacy, continuity focused	Internal focus, might join reactive or proactive coalitions	Open, cross-sector coalition, advocating future sustainability & radical change

3.6 OUTCOMES OF INCUMBENT'S PRO-ACTIVENESS

A core argument of this thesis is that proactive strategies can be expected to have superior outcomes both in terms of impact (environmental/social performance) as well as financial performance. (Pro)active strategies focus on value creation and are more likely to monetize opportunities in the context of transitions. More importantly, however, the eventual outcomes are strongly dependent on the eventual multi-level dynamic leading to concurrent radical change in technologies, business models, and institutions. While proactive incumbents show active leadership in these processes, they have the best chances of surviving and thriving in this context. A more extensive version of this argument is found in chapter 2, in the elaboration of propositions 3 & 4.

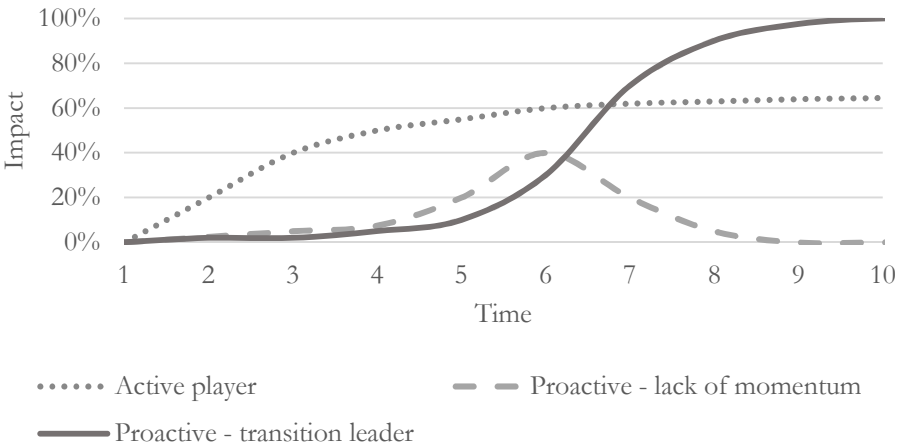


Figure 3.3 - A potential pattern of the nonlinear impact of actors in the transition.

As was outlined in propositions 3 & 4, it is crucial to consider the outcomes from a long-term perspective. When judging midterm-horizon performance or, more specifically, when comparing outcomes before the acceleration phase of the transition (Rotmans, Kemp & Van Asselt 2001), contrary impressions may even arise. For example, an actor with an active or even reactive approach might have implemented many incremental innovations with most accumulated impact, while still being on a path which does not lead to a sustainable future. As the transition literature shows, the lack of issue resolution as a result of focus on incremental innovation might eventually lead to disruption of the regime and might even threaten the survival of the incumbents (Geels, Schot 2007, de Haan, Rotmans 2011). At the same time a more proactive actor might have been occupied with creating the context for, and developing, more radical innovations that have the potential to develop a future sustainable situation, but might at the time of measuring have less accumulated impact and scale. If, however, the proactive player operates in a coalition which is not able to build

sufficient momentum to scale, the efforts still might prove less effective and might stall in the long run. In this sense, proactive approaches are more risky than active approaches. Figure 3.3 depicts a typical pattern of incumbent impact during a transition. It clearly shows that a unidimensional focus on relative leadership at one moment in time of the transition might result in wrong hypotheses about which firm is best positioned to survive and lead the transition. Therefore, this chapter has developed a more qualitative differentiation of the content of the incumbent's innovation and context creating behavior as a more robust predictor of the eventual outcomes.

Proposition 9: Proactive innovation and context creating behavior increases the impact of the incumbent's behavior on the transition in the long run.

The financial performance outcomes of proactive incumbent strategies in the context of sustainability transitions are assumed to be superior. First, it should be understood as having a higher survival chance in an era of radical change. As both the transition as well as the discontinuous innovation literature have documented, incumbent survival in these phases is clearly threatened (Henderson 1993, Christensen 1993, Leonard-Barton 1992, Turnheim, Geels 2012). Moreover, positives outcomes are expected to be leveraged further by potential first-mover advantages (Lieberman, Montgomery 1988, Lieberman, Montgomery 1998, Morgan, Strong 2003, Ketchen, Snow & Hoover 2004) and positive reputational effects which are related to sustainability leadership (van Tulder et al. 2014, Van Tulder, Van der Zwart 2006).

Proposition 10: Proactive innovation and context creating behavior increases the survival chance and future competitive advantage of an incumbent's behavior, especially from a long-term perspective.

3.7 CONTEXT, POSITION, AND CAPACITY AS INTERACTING ANTECEDENTS

Four other antecedents interact with the leadership mindset in shaping the incumbent's behavior. An earlier systematic review of the drivers of sustainability innovation can be summarized in five categories of antecedents¹¹. First, contextual forces shape the firm's reaction to the issue. Whether stakeholders put pressure on the firm, how the government intervenes in the dynamic, whether solutions are available, and there is market demand, is likely to shape the firm's reaction. Another perspective is that the firm's reaction is often path dependent on its current strategic position. Third, the firm's capabilities moderate

¹¹ This approach to summarize antecedents was developed based on a systematic literature review and a pilot case study. See Appendix A.1 & A.2 for a short summary of this process.

whether it can react effectively. Related to the two behavior types (innovation and context creation, and associated separate literature bodies), capabilities are operationalized in two important categories. First is the firm’s capacity to act responsibly on societal issues and cooperate with different stakeholders in this respect (as is studied in the CSR literature). Second is the capacity to develop new solutions and to transform its core business while implementing these (as is studied in the innovation literature).

A systematic enquiry of these rival explanations and how they interact is likely to increase our understanding of the firm’s reaction to sustainability transitions. These different explanations reflect rival theoretical schools and explain the firm’s behavior in the context of radical transitions. It is therefore relevant to study their relative strengths in explaining the behavioral dynamic. In reality, these are also likely to interact and together improve the explanatory power of the conceptual model. While abundant research is available on the

Table 3.5 - Elaborating the five perspectives on antecedents of pro-activeness on behavioral level (based on earlier systematic review & pilot case, see Appendix A.1 & A.2).

Perspective	Core hypothesis	Key sub-aspects
Mindset	How incumbents behave depends on how their mindset guides their interpretation of the issue and context	<ul style="list-style-type: none"> • Motives • Role perception • Transition vision
Context	Incumbents show behavior that reflects which behavior the context stimulates	<ul style="list-style-type: none"> • Stakeholder pressure • Government intervention • Market demand • Solution availability • Competition
Strategic position	Incumbent’s behavior is path dependent on its current position	<ul style="list-style-type: none"> • Current asset base • Resource availability • Ownership
CR capabilities	Incumbent’s behavior is dependent on its ability to implement corporate responsibility	<ul style="list-style-type: none"> • Stakeholder dialogue & partnering • Strategy integration • Management system
Innovation capabilities	Incumbents’ behavior is dependent on its ability to innovate	<ul style="list-style-type: none"> • Structural flexibility • Innovation culture • Innovation track record

different sub-aspects of each of these moderating variables, much less knowledge is available comparing their strengths and investigating their interaction. Because of the complexity of this venture, a systematic and holistic approach is rather important to improve the reliability of the outcomes. The next chapter further elaborates this systematic approach.

3.7.1 Differential impact on distinct mindsets

Assuming that antecedents can have a different impact on each of the pro-activeness ideal types is a novel approach. In line with the common linear framing of pro-activeness, antecedents are most often studied as linear influence on pro-activeness. For example, if stakeholder pressure is an antecedent of pro-activeness, then more stakeholder pressure will result in more pro-activeness in the firm's responses. Considering the interpretation of pro-activeness as a typology of different ideal types of mindsets also opens the perspective of potentially different impacts. For example, a lack of market demand might stimulate proactive firms to try to influence customers, while active firms might conclude that there is no business case due to a lack of demand. Or a government intervention to stimulate innovation might either stimulate (re)active or proactive behavior the most, depending on whether incremental or radical innovation is stimulated.

Evidence can be systematically gathered by formulating a set of hypotheses of how the mindset of the incumbent moderates the impact of the other antecedents. From this differential perspective, the question is whether an antecedent equally influences the behavior of different ideal types or how different influences emerge in interaction with the mindset underlying an ideal type. Based on a combination of a systematic review of the sustainability innovation literature, input from a pilot case study, and logical induction, a set of hypotheses is developed to systematically investigate whether this differential impact can be identified in practice and whether this improves our understanding. An important assumption in this attempt is that the mindset is at least partly independent of the other causal antecedents of incumbent behavior. In practice, this means that the mindset of the incumbent's leadership developed based on earlier experiences, influences how it responds to its current situation. This is manifested in how the incumbent interprets contextual influences and its own abilities.

3.7.2 Differential influence of the context

The intervention strategies of secondary stakeholders moderates whether between reactive and proactive strategies are stimulated. Stakeholder pressure is foundational for the birth of a societal issue, however, how it is exercised clearly influences the outcomes. The literature documents that NGO strategies range from confrontational to cooperative (Van Tulder, Van der Zwart 2006, van Huijstee, Glasbergen 2010). Research shows that more confrontational

strategies are likely to reinforce reactive behavior from firms (Miles, Munilla & Covin 2002). On the other side of the spectrum, NGOs endorsing transformational leadership and working together with business leaders to determine future agendas are likely to stimulate proactive strategies of firms. If active behavior is combined with a more internal focus, the direct influence of stakeholder pressure is considered to be less.

The stability of government policy as well as its focus on either radical or incremental innovation influences which firm's strategies are supported. If government does not prioritize an issue or frame a role for business in the solution, this confirms firms with an inactive mindset. If a government clearly embraces economic stability (e.g. to protect jobs), this is likely to induce persistent reactive behavior of firms, because they feel strengthened in their legitimacy and continuity focus. As transition scholars point out, heavy involvement of regime actors in policy formulation is likely to produce this kind of policy situation (Smink, Hekkert & Negro 2013, Geels 2005). The literature also stresses that policy uncertainty and instability causes more hesitant reactions of firms and is likely to stimulate reactive behavior (Meijer, Hekkert & Koppenjan 2007, Markusson et al. 2012). Active behavior is stimulated by active support (e.g. subsidy) for incremental innovation. Subsidy schemes that use an auction mechanism to find a most cost-efficient solution fall in this category. Proactive behavior is best supported by a stable policy with long term vision and consequently support of more radical innovations (Meijer, Hekkert & Koppenjan 2007, Markusson et al. 2012). Policy strategies that focus on the stimulation of knowledge creation (R&D) and have specific budgets and approaches for different types of technologies or solutions are likely to provide more room for radical innovation.

How incumbents react also depends on whether and what kind of solutions they perceive as available. Lack of (competitive) solutions strengthens inactive or reactive behavior. Because of the value creating perspective, active strategies depend on the availability or opportunity to (incrementally) improve processes and products with a clear, short-term, positive business case. A proactive strategy is likely to depend on whether a firm can see a possible (though radical) path towards a sustainable future. Partial complementarity with current assets and capabilities increases the likeliness of an incumbent embracing radical innovation (Danneels 2004, Avadikyan, Llerena 2010, Chesbrough 2003). Technologies that bridge the current situation and more radical platforms (called stepping stone technologies) are also likely to confirm and empower firms with a (pro)active strategy in the transition (Farla, Alkemade & Suurs 2010, Suurs, Hekkert 2009a). Thus, especially when radical innovation is required, but proactive leaders can see a path and/or bridging technologies, their behavior is likely to differ significantly from incumbents with a less proactive mindset.

Table 3.6 - Hypotheses for the differential impact of contextual antecedents on reinforcing the incumbent's pro-activeness.

		Reactive		Active		Proactive	
		Inactive		Active		Proactive	
Stakeholder pressure	<ul style="list-style-type: none"> - dormant issue life cycle 	<ul style="list-style-type: none"> - heavy NGO campaigning against negative behavior 	<ul style="list-style-type: none"> - transition policy in action, but focused at sustaining current economic balance 	<ul style="list-style-type: none"> - stimulation with focus on implementation of incremental innovations (e.g. auction mechanisms) 	<ul style="list-style-type: none"> - stakeholder pressure that supports leadership 	<ul style="list-style-type: none"> - clear and stable long term vision - stimulation of radical innovation 	
Government support	<ul style="list-style-type: none"> - government ignores the issues or business' role in it 	<ul style="list-style-type: none"> - heavy involvement of regime actors in policy formulation - alternating interventions 	<ul style="list-style-type: none"> - lack of solutions from the position of the incumbents 	<ul style="list-style-type: none"> - incremental solutions available with efficiency or commercial gains 	<ul style="list-style-type: none"> - a path is visible towards a sustainable future - solutions are complementary with current system or bridging solutions exist 	<ul style="list-style-type: none"> - clear and stable long term vision - stimulation of radical innovation 	
Solutions availability	<ul style="list-style-type: none"> - lack of solutions from the position of the incumbents 	<ul style="list-style-type: none"> - lack of solutions from the position of the incumbents 	<ul style="list-style-type: none"> - lack of solutions from the position of the incumbents 	<ul style="list-style-type: none"> - incremental solutions available with efficiency or commercial gains 	<ul style="list-style-type: none"> - a path is visible towards a sustainable future - solutions are complementary with current system or bridging solutions exist 	<ul style="list-style-type: none"> - clear and stable long term vision - stimulation of radical innovation 	
Market demand	<ul style="list-style-type: none"> - no focus on the customer 	<ul style="list-style-type: none"> - customer boycotts and negative reaction to inactivity - commodity product 	<ul style="list-style-type: none"> - lack of solutions from the position of the incumbents 	<ul style="list-style-type: none"> - clear demand, but broad definition - market transparency 	<ul style="list-style-type: none"> - active customer recognition of positive leadership - market transparency 	<ul style="list-style-type: none"> - clear and stable long term vision - stimulation of radical innovation 	
Competition & investors	<ul style="list-style-type: none"> - limited to no attention for sustainability at regime level 	<ul style="list-style-type: none"> - heavy (cost) competition, lack of resources - successful new entrants - exclusion or risk reduction framing by investors 	<ul style="list-style-type: none"> - lack of solutions from the position of the incumbents 	<ul style="list-style-type: none"> - ambiguous situation at regime level - room for commercial differentiation with sustainable products 	<ul style="list-style-type: none"> - potential to form coalition for future sustainability - successful new entrants - margins allow investment - investors with impact investing vision - experience with proactive behavior being rewarded 	<ul style="list-style-type: none"> - clear and stable long term vision - stimulation of radical innovation 	

If customers clearly value more sustainable products, this is likely to strengthen behavior resulting from a (pro)active mindset. A lack of customer attention reinforces inactive behavior. In line with the effect of confrontational NGO strategies, negative framing (e.g. boycotts) is most likely to stimulate reactive action. Differentiation potential creates value creating potential and hence more active strategies (Luo, Bhattacharya 2009, Hull, Rothenberg 2008). In contrast, a lack of potential to differentiate (e.g. in commodity product categories) is also likely to induce reactive strategies. Clear market demand and transparency of the market regarding product impact strengthens (pro)active reactions (Horbach 2008, Kesidou, Demirel 2012, Husted, Allen 2007, Chesbrough 2012). If the market's definition of what is sustainable is too broad, or with criteria too low in designating a product as sustainable, this confirms the attractiveness of more incremental (and thus active) strategies, as a comparable market premium can be acquired with less effort. This is the case in the Dutch electricity market, where imported hydro energy and locally generated wind power go under the same label of green energy. On the other hand, if customers recognize clear leadership and positively value more radical solutions, this is likely to provide a tailwind for proactive incumbents.

Competition might inspire incumbents to show (pro)active behavior, however a high degree of competition might also limit the resources available to show leadership. Incumbents that are used to a high level of competitiveness are also likely to be more maneuverable in the context of transition; they understand the value of proactive approaches based on earlier experiences (Pinkse, Kolk 2010, Rothenberg, Zyglidopoulos 2007). Especially incumbents with a (pro)active mindset might also be encouraged by challengers to replicate the new business model that the challengers have implemented (Hockerts 2010). The challengers might also be partners and allies in pursuing a proactive agenda. Competition can thus be a positive driver of pro-activeness. It can also be a barrier when e.g. strong cost competition reduces margins and results in less investment in new innovations (Ghobadian et al. 1998, Henriques, Sadorsky 1996, Carballo-Penela, Castromán-Diz 2014). New entrants might also trigger a defensive approach by incumbents trying to mitigate competition with institutional power, for example, by arguing for entry barriers (Smink, Hekkert & Negro 2013). The framing of sustainability by investors is likely to stimulate the choice of reactive or proactive behavior. Comparable with the effect on customer level, investors' strategies focused on excluding investments below a certain standard, or with the primary concern of preventing risk of negative impact, amplify legitimacy-focused strategies. If investors, however, clearly value proactive strategies, either because they have impact goals or have a longer-term perspective on risk reduction, this improves the space for firms to show proactive behavior.

Table 3.6 summarizes the propositions discussed above. It can also be summarized in the next proposition.

Proposition 11a: The influence of (a) stakeholder pressure, (b) supporting government policy, (c) market demand, (d) solution availability, and (e) competition is moderated by the pro-activeness of the incumbent's mindset.

Besides moderating the contextual response, the incumbent's mindset also develops in reaction to contextual dynamics. As the concept of a socio-technical transition implies, transition also involves strong changes to cognitive and normative institutions (Markard, Raven & Truffer 2012, Geels 2005). Correctly interpreting the transition requires the embedment of these emerging institutions. Innovation literature has documented that the lack of adoption of these new institutions is an important part of the struggle by incumbents attempting radical change (Christensen 1993, Danneels 2004, Christensen, Bower 1996). Transition literature has emphasized the desire of regimes and incumbents to hold onto current cognitive and normative institutions in the efforts of the regime to sustain stability (Geels 2004, Markard, Raven & Truffer 2012, Geels 2002). For example, as result of an emerging issue, government policies might focus on stimulating businesses to adopt new tasks. If, however, businesses categorically reject these tasks as not being their responsibility, this probably leads to a reactive response at best. Or a transition might imply new business models that shift the earning or competitive criteria, such as from selling products to services, or from physical assets to data driven products. If businesses dismiss these business models as beyond the scope of their activities, they are likely to again adopt a reactive approach. A metaphor summarizing this dynamic is that incumbents often look to the future with the lens of the past.

Proactive incumbents are more likely to embrace these new institutions and incorporate them as part of their vision or mindset. In that case, their mindset develops as part of the transition process. This was also reflected in our discussion of the mindset in section 3.3, in which the transition vision was identified as a key aspect of the incumbent's mindset. When an incumbent expects a radical change of business models and practices, the incumbent is also more likely to identify and accept these changes in a timely manner. This dynamic is iterative in the sense that an earlier development of a proactive mindset makes expecting and accepting radical changes more likely. Furthermore, accepting key cognitive or normative institutions facilitates identifying opportunities that result from these perspectives. Inactive or reactive incumbents are likely to fundamentally reject certain key normative or cognitive institutions implied in an emerging transition path, because they are in conflict with their perceptions on role division, or cannibalize their current assets (Chandy, Tellis 1998, Turnheim, Geels 2013, Richter 2013, Richter 2012). In that case, the mindset development is not likely to take place and their conceptual backlog will progressively grow as the transition proceeds. Active players, because of their ambiguous view on the end state of the transition, can also be expected to less confidently embrace the emerging institutions.

This translates to the proposition that one of the key dynamics leading to the advantage of proactive strategies is the openness to embrace and develop new mindsets in the context of the transition.

Proposition 11b: A proactive mindset positively influences embracing specific emerging cognitive institutions implied in a transition and, as such, a mindset change mediates the proactive behavior in anticipation of the transition.

3.7.3 Differential impact of internal enablers

The current position in terms of assets structurally influences the ability to show proactive behavior. In the face of radical or discontinuous innovation the availability of complementary assets can make a clear difference in the possibility of incumbents to show more proactive behavior (Danneels 2004, Farla, Alkemade & Suurs 2010, Avadikyan, Llerena 2010, Safarzyńska, Frenken & Van Den Bergh 2012). A lock-in in the current situation regarding either substantial fixed investments, high profitability, or in terms of a considerable difference in mental models and assumptions, makes change unattractive and might make it hard to convince internal and external stakeholders (Chandy, Tellis 2000, Avadikyan, Llerena 2010, Safarzyńska, Frenken & Van Den Bergh 2012). Considering the likely need for substantial upfront investment, low resource availability is also more likely to trigger reactive behavior (Ghobadian et al. 1998, Sandberg, Aarikka-Stenroos 2014, Hill, Rothaermel 2003). In general, these three factors mainly influence the choice between reactive and proactive behavior. While active, value-creating behavior is focused on win-wins, and incremental innovations are complementary with the current situation, a lack of resources and lock-in have much less influence on the ability to produce this kind of behavior.

The moderating effect of ownership structure on the different behavioral patterns of incumbents need to be explored more. Evidence is available that more long-term and values-driven strategies of family businesses, are most aligned with proactive behavior (Wagner 2010). Family businesses, however, represent only a small fraction of the total number of large incumbents. The pilot case study highlighted the relevance of public shareholders (governments and related agencies with public missions). It is important to ascertain whether the general policy goals of governments translate into their behavior as shareholders in utilities, or that in contrast they manage their shares mostly in terms of continuity or financial returns.

Different kind of CR capabilities are likely to enable different behavioral patterns. In fact, the three ideal types (reactive, active, proactive) relate to three schools of thinking within the CR community. The schools have made different behavioral and organizational

recommendations. Depending on which school the firm has embraced, a firm is likely to moderate its reaction to concrete sustainability issues. Reactive behavior is likely to be related to strategies and systems focused on ensuring legitimacy, such as interest-focused stakeholder dialogues in the sense of determining stakeholder demands and positioning the firm's stake (van Tulder et al. 2014). This approach contrasts with the more strategic dialogues focused on creating and envisioning a common future (van Tulder et al. 2014). Defensive or reactive strategies are more likely when a firm has strong stakeholder ties and has the capacity to actively negotiate about its stakes and the need for continuity, and a level playing field (Oliver, Holzinger 2008). This is often supplemented with management systems focused on implementing and reporting on what was negotiated, or achieving external standards. In contrast to the standard assumption that CR systems become more advanced when firms become more proactive (Maon, Lindgreen & Swaen 2010, Maon, Lindgreen & Swaen 2010), empirical evidence from the pilot case study (see Appendix A.2) shows that firms with reactive strategies might have a quite advanced CR management system and have achieved considerable external recognition in this respect as well. Management systems that are more focused on internal, continuous improvement instead of external reporting and recognition, are likely to produce more active behavior (Holliday 2001, Henriques, Sadorsky 2007, Könnölä, Unruh 2007). Integration of sustainability in the general strategy, which gives it more priority and visibility, is likely to stimulate both active and proactive behavior (Arnold, Hockerts 2011, Husted, Allen 2007, Wagner 2009). The ambition of proactive strategies to influence and co-direct the whole ecosystem means that partnering capabilities are essential in order to show effective proactive behavior (Nidumolu, Prahalad & Rangaswami 2009, van Tulder et al. 2014, Senge et al. 2007, Oliver, Holzinger 2008, De Marchi 2012). Empirical evidence suggest that the default type of CR management system is most focused on core business integration and continuous improvement. As such, it might be less suited to stimulate radical innovation as part of proactive strategies (Könnölä, Unruh 2007).

The capacity to innovate is essential to both active and proactive strategies. Considering the unsustainability of the current situation, substantial changes are required. Innovation research has a long-standing tradition to show that specific, dynamic capabilities are required to innovate. A lack of innovation capability, of which a lack of innovation track record is a general indicator, is likely to moderate responses towards more inactive or reactive strategies. The different capabilities required for incremental and radical innovation run parallel with the likeliness of more active versus proactive strategies. Continuous improvement systems and culture, such as TQM, LEAN or six sigma, are complementary to active behavior (Holliday 2001, Henriques, Sadorsky 2007). A strong track record in terms of incremental process and product innovations are evidence of these capabilities. Considerable research has indicated that more exploratory, radical innovation requires a

Table 3.7 - Moderating effects of internal antecedents on the link between the pro-activeness of the mindset and behavior.

		Inactive	Reactive	Active	Proactive
Strategic position					
Resource availability			Low		High
Complementary assets			Low	High	High
Lock-in			High		Low
Ownership structure	Theory needs to be developed further - family firms have been reported to have positive influence on more (pro)active behavior, influence of public shareholders is also relevant				
CR capabilities					
Stakeholder management capacity			Strong ties Negotiation capability		Influence capacity Partner capacity
Management system			Focused on standards and reporting	Positive in stimulating incremental innovation	Potentially negative
Strategy integration				Positive	Positive
Innovation capabilities					
Earlier track record with types of innovation		Limited track record	Limited track record	Incremental innovation, product, process innovation	Radical innovation, R&D, business model innovation
Structural flexibility				Organized in core business	Structural separation/flexibility
Culture				Continuous improvement culture	Embracing radical innovation & risk taking

higher degree of freedom and maneuvering space. This is mostly likely to be found by structurally separating the more radical business development initiatives from the core business (Hill, Rothaermel 2003, Könnölä, Unruh 2007, Conceição, Heitor & Vieira 2006, O'Reilly III, Tushman 2004). Empirical evidence also indicates that some firms are able to achieve flexibility to manage strong exploitation activities, while at the same time providing freedom to explore radical initiatives. This is captured in the label ambidexterity (O'Reilly III, Tushman 2004, Raisch, Birkinshaw 2008). Other research indicates that a tendency towards more proactive, radical innovation with its associated high risk and chance of failure, is moderated by a culture of embracing radical innovation, risk taking, and experimental learning (Senge et al. 2007, Hill, Rothaermel 2003, Siebenhüner, Arnold 2007). The ability to radically innovate can also be observed in a strong track record in terms of more fundamental R&D activities and business model innovation.

The discussed hypotheses of the differential impact of the current position and capabilities on showing different kinds of behavior in the context of radical sustainability transitions are summarized in table 3.7 and the following proposition:

Proposition 12: The incumbent's capabilities and strategic position moderate the relationship between a proactive mindset and innovation and context creating behavior.

3.8 DISCUSSION & CONCLUSION

In times of radical transitions, understanding the role of incumbents in moving towards a new sustainable equilibrium is extremely relevant. Earlier research has documented a general tendency of the business world to move from compliance-based approaches towards more active approaches of taking responsibility in solving societal issues (van Tulder et al. 2014, Aragon-Correa, Sharma 2003, Claver-Cortés et al. 2007). Yet empirical evidence also shows that reality is far less linear and unidirectional as the theory often assumes. Considering the need for radical change and realignment of institutions to solve critical sustainability issues, an active approach focused on short-term value creation is likely *not* to result in transition towards a new sustainable situation. The need to abandon practices and institutions which are currently rather beneficial, as well as potentially disruptive dynamics caused by new entrants and innovation, means that incumbents are also threatened in their survival and might resist change in a sophisticated manner. This indicates a clear need to understand both the reactive (defensive) as well as proactive behavior of incumbents in relation to radical transitions, as they have long had a place in theoretical pro-activeness models, but have not yet been studied adequately (Hart, Dowell 2011). Therefore, this chapter outlines an improved method to study the pro-activeness of incumbents in radical

transitions, while clearly building on earlier literature and improvement needs as identified in chapter 2.

The first contribution of this chapter is an improvement of the conceptualization of pro-activeness, customized on the motives and behavior of incumbents. This improved conceptualization is likely to significantly improve the construct validity. This conceptualization builds on the MLP concept from transition literature to develop a multi-level iterative understanding of incumbents in transitions and positions pro-activeness as a central concept to create insight into this complex dynamic. In contrast to earlier, linear classifications of pro-activeness, the concept is defined as a typology of four ideal types of behavior produced by four distinct types of leadership mindsets. Congruence in behavior is assumed to be caused by a relatively consistent underlying mindset, including a perception of the motives to act on societal issues, role of the firm in societal dynamics and perspective on the transition. On the behavioral level, pro-activeness is operationalized as the combination of innovation behavior and context creating behavior. Because the same behavior can reflect different levels of pro-activeness in a different context, a dynamic operationalization is introduced on the behavioral level. This operationalization builds on innovation as well as transition literature and also incorporates insights from corporate political action and institutional entrepreneurship literature. Based on this approach, propositions are defined on how mindset (leadership) behavior and outcomes are linked and together are expected to produce superior outcomes for proactive strategies on a long-term horizon. These propositions translate the more generic propositions of chapter 2 into more specific, and as such, testable propositions, as is demonstrated in the table in table 3.8.

The second contribution is the introduction of a systematic and differentiated approach to study antecedents of pro-activeness of incumbents. It acknowledges that literature provides several rival explanations of corporate behavior in response to sustainability issues, including the path dependence based on current position, contextual influence, and the capabilities of the firm. A novelty introduced in this chapter is an approach to study the differentiated impact of antecedents on specific behavior ideal types. For example, a certain antecedent might mainly influence one specific level of pro-activeness or have nonlinear influence on the different ideal types. For a systematic enquiry of the relevance of the different effects, a set of hypotheses is developed by segmenting antecedents according to their differentiated impact, based on earlier evidence as well as logical induction.

The added value of the improved typology of pro-activeness and the differentiated set of hypotheses should be validated further based on empirical data. Although the developed hypotheses build on much earlier evidence, the novel operationalization and differentiation of antecedents should be evaluated on their appropriateness in the empirical context. It is also recognized that the presented conceptualization is likely to be non-exhaustive and can

be supplemented with more relevant antecedents. The operationalization of the ideal types can thus be extended and sharpened further.

The presented conceptualization of pro-activeness is rather sophisticated and requires careful implementation. As argued, there is no substitute for considering the complex, multi-faceted reality of corporate responsibility behavior. However, to produce reliable results, this requires careful implementation by knowledgeable researchers. As is further discussed in chapter 4, sufficient theoretical knowledge is a prerequisite and the use of (partial) dual coding and informants improve both reliability and validity of the outcomes. Potentially, researchers can however scope their conceptual approach to a specific set of antecedents or develop robust, but easy-to-measure indicators for each category of moderating variables to reduce the costliness of this approach.

A limitation of potential outcomes, to be carefully discussed when implementing this framework, is the external validity. Because pro-activeness of behavior is highly context- and time-dependent, the generalization of findings requires consideration of contextual specifics. These should certainly be made explicit when presenting the results. Important aspects that define the potentially external validity are the sector characteristics (e.g. fragmented vs. concentrated), firm characteristics (e.g. large incumbent vs. SME) and transition characteristics (e.g. radicalness and presence of multiple, mutually exclusive pathways). In fact, all presented antecedents moderating the transition reaction of a firm might be indicating a limited applicability. Therefore, structurally eliminating antecedents which prove less differentiating in practice will improve the applicability and relevance of the approach.

Further research, besides the empirical validation of the hypotheses, can focus on the link between pro-activeness and eventual impact. In contrast to financial outcomes of CR activities, environmental and social impact (and as such the impact on transition) needs to be further studied. An important motivation to differentiate between the different ideal types is that large incumbents are expected to have much broader influence on the overall transition than just their direct impact. This indirect impact is both manifested in context creation as well as example setting and can be especially expected when they are following defensive or proactive strategies. Studying how transition processes are shaped by incumbents showing context creating and shaping behavior is likely to improve our understanding of the potential role of incumbents. As an indirect impact has been largely ignored in earlier CSR research, cross-fertilization with transition studies (Markard, Raven & Truffer 2012, Farla et al. 2012) might be beneficial.

Improving the sophistication of the propositional scheme by addressing different phases in transitions (Rotmans, Kemp & Van Asselt 2001, Geels 2005) can further improve our

Table 3.8 – Mapping how the propositions of chapter 2 have been translated into more specific, incumbent-focused propositions in this chapter.

Chapter 2		Chapter 3
Focus	Overall	<p>5: The higher the level of pro-activeness (of the incumbent's leadership mindset), the higher the impact of the incumbent.</p> <p>5a: The relationship between pro-activeness of the mindset and impact is mediated by context creating and innovation behavior.</p>
Mindset & strategy	<p>1: There exist four distinct ideal types of CSR strategies; they can be linked to stages of CSR engagement, but in a non-linear mode; the distinction between the effectiveness on firm level and on societal level as well as planned vs. actual behavior is crucial to gain further understanding of the proactive stage.</p>	<p>6: Four types of incumbent mindsets can be distinguished in practice based on the motives, role perception, and transition vision of incumbent leadership.</p> <p>6a: The inactive ideal type is characterized by its explicit positioning of sustainability aspects as irrelevant to business and ignoring activities which do not fit their general profit-focused strategy.</p> <p>6b: The reactive ideal type is characterized by its focus on external demands and activities targeted mainly at sustaining public legitimacy.</p> <p>6c: The active ideal type is characterized by its focus on implementing the internal strategy and capturing opportunities for value creation with incremental sustainability innovations.</p> <p>6d: The proactive ideal type is characterized by its focus on leading systemic change and embracing collaborative and radical change.</p>

Focus	Chapter 2	Chapter 3
Antecedent vs. behavior	<p>2: A proactive approach is equally triggered by internal as well as external drivers; internal drivers are based on a timely combination of core capabilities, the nature of the industry, values, and mindsets related to leadership; external drivers, which especially differentiate the proactive from active approach, depend in particular on the potential to engage external stakeholders in positive change.</p>	<p>7a: A proactive mindset leads to relatively less incremental innovation. 7b: A proactive mindset leads to relatively more innovations of intermediate and radical (highest) level of radicalness, as well as a higher average scale for these innovations. 8: A proactive mindset leads to creating cross-sectoral, multi-stakeholder coalitions around sustainability-centered, future-oriented visions. 11a: The influence of (a) stakeholder pressure, (b) supporting government policy, (c) market demand, (d) solution availability, and (e) competition is moderated by the pro-activeness of the incumbent's mindset. 11b: A proactive mindset positively influences embracing specific emerging cognitive institutions implied in a transition and, as such, a mindset change mediates the proactive behavior in anticipation of the transition. 12: The incumbent's capabilities and strategic position moderate the relationship between a proactive mindset and innovation and context creating behavior.</p>
Behavior vs. CFP	<p>3: A proactive strategy produces superior financial performance when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector. A proactive strategy can only be financially viable if mediated by the build-up of specific internal capabilities, mindsets and strategic leadership.</p>	<p>10: Proactive innovation and context creating behavior increases the survival chance and future competitive advantage of an incumbent's behavior, especially from a long-term perspective (mediation (or moderation) aspect separated in the antecedent aspect, see proposition 12).</p>
Behavior vs. Impact	<p>4: A proactive strategy produces superior impact (on the societal issue) especially when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector.</p>	<p>9: Proactive innovation and context creating behavior increases the impact of the incumbent's behavior on the transition in the long run.</p>

understanding. As many sustainability transitions are currently still in pre-breakthrough stages, the findings of earlier research can be expected to be most applicable in this context. In the turbulent breakthrough or later stabilization phases behavioral patterns might differ considerably from what is predicted in the current theories. Therefore further theoretical as well as empirical studies investigating the differences in incumbent behavior in the distinct phase are certainly relevant.

A topic that is not well-studied is what triggers changes and learning on the mindset level. Most research focuses on the behavioral manifestations of the different mindsets. However, what precipitates a transition from one mindset to another remains largely unstudied. Van Tulder et al. present a framework and hypotheses of what might be relevant triggers to investigate further (van Tulder et al. 2014).

Finally, methodologically simplifying the approach, while sustaining a high level of reliability and validity, could be of great benefit. Because of the need to capture complexity of the phenomena and circumvent potential biases, the method is rather costly and time-consuming. Finding robust indicators and excluding hypotheses that are proven irrelevant can improve the efficiency of the method. An example of a potential robust indicator for a whole category is innovation track record as an indicator of innovation capability of the firm. Whether this sufficiently captures the underlying complexity should be investigated first. Although the author is skeptical about the potential validity, considering how this approach could be implemented in a survey-based method remains a relevant consideration.

Part II – Methodology

Chapter 4 – Capturing complexity - A protocol for multi-level, longitudinal case studies into behavior of incumbents in sustainability transitions

4.1 INTRODUCTION

The ambition to capture the complexity of incumbent behavior in transitions created four methodological challenges. The previous three chapters explained the practical and theoretical relevance of this topic. Chapter 3 presented an improved conceptualization to address this research need, with pro-activeness as a central concept. This, however, produces several methodological challenges arising from the analysis of the earlier literature. This chapter presents a case study protocol that addresses these challenges.

A first challenge is finding a suitable case to study pro-activeness in sustainability transitions. Although the idea of a proactive ideal type has been proposed in many theoretical models (Maon, Lindgreen & Swaen 2010, Kolk, Mauser 2002, van Tulder et al. 2014), empirical evidence in this respect has been lacking up until today. As chapter 2 demonstrated, most empirical studies have documented reactive and active behaviors of firms, but evidence for the proactive ideal type is lacking (Hart, Dowell 2011). Furthermore, transitions are complex dynamics to study as they evolve over the course of decades (Markard, Raven & Truffer 2012, Geels 2005). In the often-lengthy predevelopment phase change dynamics can be rather limited (Rotmans, Kemp & Van Asselt 2001). The challenge is thus to select a case in which an incumbent demonstrating the identified characteristics of a proactive mindset is present and in which transition dynamics produce a substantial degree of change.

The second challenge is to understand incumbent's behavior and its outcomes. This requires an understanding of the mindset of its leadership and how it developed. Earlier studies have predominantly focused on capturing behavior and in some cases relating it to financial performance (see section 2.4 for an overview). Rather different phenomena have to be captured to gather evidence of this whole causal chain from mindset to impact. Behavior indicators and key firm-level outcomes are often available from corporate reporting. However, reflecting on causality at the mindset level requires more direct interaction with the key actors involved. Furthermore, understanding impact requires broader indicators on progress at societal level and thus from other sources. This requires a multi-method approach as is outlined in the following sections.

A third challenge is that incumbent's behavior and the contextual transition dynamic in which they operate strongly interact. Incumbent's behavior is not only influenced by

contextual variables, but incumbents are also likely to have significant influence on the contextual variables themselves. Earlier innovation literature has most often focused on firm level characteristics and processes, or an external perspective focusing on market factors only (Danneels 2004, Chesbrough 2001). Transition literature did adopt a multi-level approach, but largely ignored agency by incumbents (Markard, Raven & Truffer 2012, Farla et al. 2012, Geels 2011, Markard, Truffer 2008). The ambition of this protocol is to integrally study this multi-level interaction between incumbents and their context. This adds to the need to apply a multi-method approach, as discussed in the second challenge. Furthermore, a longitudinal method is best suited to capture the iterative nature of this dynamic, as outlined in section 3.2.

Finally, the need for a more dynamic and contextualized operationalization of pro-activeness was an important conclusion from the literature review (see chapter 2). Much earlier literature conceptualized pro-activeness as related to specific practices, and as such had key validity issues (Kolk, Mauser 2002, Schaefer, Harvey 1998, Ghobadian et al. 1998). The level of pro-activeness of specific practices is, however, decidedly time- and context-dependent. To gain a more dynamic perspective, a framework on a higher level of abstraction is needed, which then needs to be translated into a specific situation. This was elaborated on a conceptual level in the previous chapter. From a methodological perspective, this creates the challenge to first develop a good understanding of the dynamics of the case, before a sound analysis of the level of pro-activeness of the incumbent can be made. The presented protocol consists of multiple stages to allow for this sophistication.

The methodological approach presented here to address these challenges is well rooted in the debate on qualitative research quality. As a starting point, the methodologies from the qualitative studies included in the systematic review of sustainability innovation literature were evaluated (see Appendix A.1). This revealed a large diversity of often ambiguous methodological designs, indicating the need to improve the methodological foundations. Three (limited) systematic reviews of high quality papers employing the same methods as this protocol were used to develop that stronger foundation. With systematic queries in Scopus, the top 20 most cited papers in the business literature regarding media analysis and CR report analysis were analyzed upon their methodological foundations and defense. Second, to do the same regarding the interview method and qualitative research in general the *AMJ* best paper award studies from 2003 to 2012 were analyzed. This yielded more extensive insight in the design and defense of qualitative methods. Based on the references found in the systematic reviews, several key methodological source books (Eriksson, Kovalainen 2008, Krippendorff 2012, Miles, Huberman & Saldaña 2014, Yin 2008) and key papers were reviewed (Eisenhardt 1989, Van de Ven, Poole 1990, Pettigrew 1990, Gibbert, Ruigrok & Wicki 2008). Finally, the recent debate on how to improve the quality and

publishing ability of qualitative research in the management community was also integrated in the protocol (Corley 2011, Gibbert, Ruigrok 2010, Eisenhardt, Graebner 2007, Pratt 2009).

After the draft version of the protocol was completed, it was discussed with four senior scholars representing the three theoretical schools (CSR, transitions & innovation) embedded in this protocol. Their feedback was used to improve the final version of the protocol. This chapter is a summary of the most relevant parts of the protocol, the full version is available on request.

As can be expected during the actual implementation of the protocol, the approach was developed further. This is especially the case for phases III and IV (detailed and causal analysis). The data gathering and descriptive analysis are strongly aligned with the original protocol. The original protocol, however, was intended to at once apply the full, detailed coding framework from the systematic literature review as a second, causal analysis step. Instead, eventually three more focuses of causal analyses were applied. These were further enriched in the operationalization with relevant literature. This provides for an optimal combination of the integral, holistic approach of the original protocol with a further sharpened, reliable causal analysis. Section 4.9 of this chapter therefore presents the improved and focused causal analysis methods utilized for chapters 5 to 7 and deviates from the original protocol.

This chapter summarizes the protocol while discussing the implied methodological strength and weaknesses for each aspect as well as for the approach as a whole. Specifically, section 4.9 on the causal analysis discusses how the analysis is linked to, and provides evidence for, the 12 propositions formulated earlier.

4.2 RESEARCH DESIGN: LONGITUDINAL EMBEDDED CASE STUDY

The approach applied can be characterized as an embedded case study in which the behavior of multiple incumbents in one sector is contrasted. A case study is defined as an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-life context (Yin 2008). The approach studies and contrasts the behavior of multiple incumbents embedded within the same sector and transition, and can be termed an embedded (single) case study (Yin 2008). Comparing multiple incumbents provides the opportunity to compare the different strategies and behaviors they employ and to learn from the related outcomes.

By studying the behavior with a longitudinal approach, new insight in causal patterns can be revealed (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014, Pettigrew 1990). Sequences over time, such as behaviors and outcomes show causal patterns and make it

possible to distinguish between causality and co-variance in a way that is not possible with a cross-sectional research approach. Combined, the cross-company and over-time comparison provide a good foundation for new causal insights.

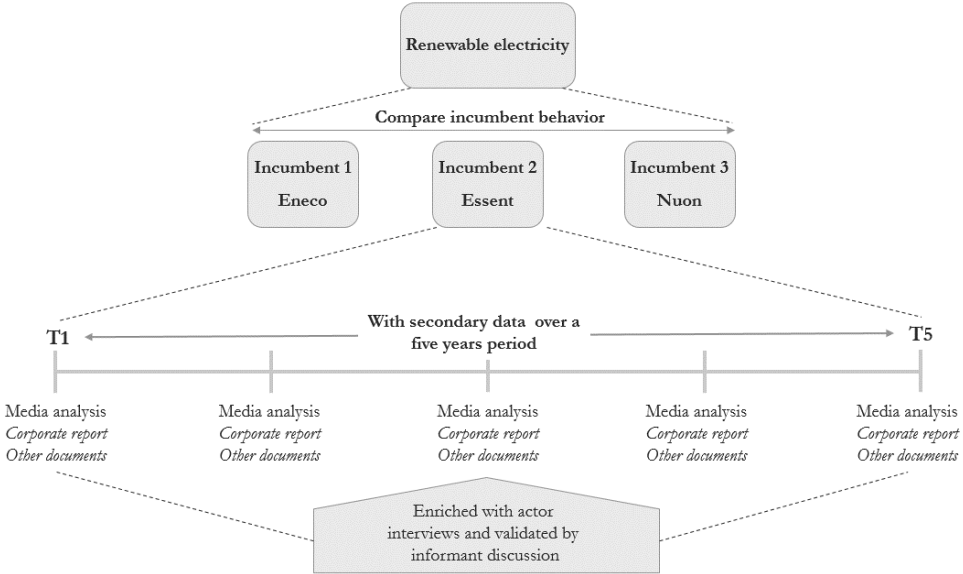


Figure 4.1 - Summary of the research design.

The research design provides for multiple triangulation opportunities (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014, Yin 2008), by combining several secondary data sources with informant and actor interviews. The secondary data allows for building an integral picture of the firm’s strategy and behavior, the relevant context on landscape and regime level, and how these evolve over time. The different secondary data sources, such as different newspapers and corporate reports, can also be used to triangulate the facts from multiple sources. By adding interviews to the data source mix, the external picture from the secondary data can be supplemented with actors’ insights about the underlying internal (i.e. decision making) processes. Also, these actors can reflect on the facts and potential underlying causal linkages from multiple perspectives, because actors from within the firms are supplemented with NGO and government actors.

From a conceptual perspective, this protocol employs a multi-level model based on systematic integration of insights from the innovation, corporate responsibility, and transition schools. This provides for new opportunities to understand how a firm’s behavior interacts with the context and how transitions develop by multiple interactions between landscape, regime, and incumbents. Moreover, the conceptual inclusion of enablers,

behavior, and outcomes provide for a rich understanding of the causal chain underlying incumbents' behavior in transitions.

4.2.1 Discussion

Increasing understanding of 'how and why' of a complex phenomenon fits best with the qualitative research design (Eisenhardt 1989, Yin 2008, Plowman et al. 2007). While quantitative and cross-sectional research provides understanding of what happens, understanding causal linkages is best aligned with a qualitative and longitudinal design. Also the complexity of the phenomenon where transitions and incumbents behavior are shaped by mutual interactions and iterations between different levels confirms the relevance of a holistic, qualitative approach (Yin 2008, Graebner 2009, Greenwood, Suddaby 2006). Finally, the qualitative design allows for the integration of divergent (actor) perspectives, which often co-exist during the evolutionary process of a transition.

The goal to elaborate theory as well as to test earlier findings and contribute to further integration also points to a qualitative design (Eisenhardt 1989, Eisenhardt, Graebner 2007, Greenwood, Suddaby 2006, Gilbert 2005). This case study elaborates the current theory by starting from two systematic reviews, integrating three theoretical schools, and possibly by creating further insights on causal linkages. The clear foundation in literature and holistic approach also allows for theory testing and integration (Dul, Hak 2012). The systematic review on sustainability innovation concluded that current research is still fragmented, without much mutual interaction and testing of earlier work (see Appendix A.1). This design allows to test earlier work by finding new evidence for the included variables. The design also creates the basis to possibly reduce the theoretical complexity. By categorizing the variables and studying them integrally, more insight is produced in the relative importance of variables and categories. Furthermore, throughout this thesis, (as was outlined in chapter 3) pro-activeness is positioned as a framework to further structure and understand the complex dynamic of incumbent behavior in transitions. This might provide a definition of necessary and sufficient conditions for proactive behavior, or survival of incumbents in transitions (Dul, Hak 2012).

This protocol incorporates the recent discussion about the reliability and validity of qualitative management research. While qualitative research has suffered from a critical stance within the management research community, many significant contributions have nevertheless been made, based on qualitative research (Corley 2011, Eisenhardt, Graebner 2007, Pratt 2009). For example, six out of eight of the *AMJ* best paper awards in the 2000s were based on qualitative studies (Corley 2011). The fact remains that qualitative studies are in a minority and authors struggle to publish their work (Corley 2011, Pratt 2009). Part of this problem has been linked to the mistaken use of standards and tactics from quantitative

research to validate qualitative research, such as the use of sampling logic for case selection instead of theoretical case selecting. For this protocol, tactics specifically customized to qualitative research are applied, as proposed by recent methodological literature (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014, Yin 2008, Corley 2011, Eisenhardt, Graebner 2007, Pratt 2009). These include using a protocol, database, and content analysis techniques to ensure *reliability*. Applying triangulation, making the underlying data and chain of evidence transparent, use of pattern-matching techniques, use of informants, and addressing rival explanations ensures *construct and internal validity*. And finally, this protocol explicitly adopts theoretical case selection, built on concepts from literature and replication logic to maximize *external validity*.

Limitations of this approach, especially regarding reliability and external validity, are carefully taken into account. Ensuring sufficient validity with a rich dataset and complex conceptual model is a key challenge. This protocol includes an extensive code book and outlines templates for systematic summary and comparison of the data to ensure maximum reliability (Krippendorff 2012, Yin 2008). Coders' profiles, familiarization procedures, and a partial reliability test have also been included (Krippendorff 2012). In terms of external validity, the specifics of this case (as discussed in the case selection section) should be taken into account when generalizing findings (Miles, Huberman & Saldaña 2014, Eisenhardt, Graebner 2007). Further replication of the findings in other sectors is crucial to improve the validity of the findings (Miles, Huberman & Saldaña 2014, Yin 2008, Eisenhardt, Graebner 2007).

4.3 STEPS AND STAGES IN THE RESEARCH DESIGN

The research design of this protocol is based on the integration and interaction of multiple data sources to create a rich description of the case and allows for the discovery of multi-level causal patterns. In figure 4.2 the protocol is summarized in 20 steps, visualizing the interaction between data gathering, descriptive analysis, and causal analysis.

After selecting the right case, the first step is to optimize the focus and approach based on the insight of informants. Integrating knowledge from persons with prolonged engagement in the approach and validation is likely to greatly improve the quality of the analysis (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014). The protocol is then updated based on the input of the informant.

The second stage of the research design is to build a case analysis based on the use of secondary data. The approach includes the collection of newspaper data to build a holistic picture of the case context, and corporate reporting to add more detailed information of corporate behavior. This is supplemented with relevant secondary data. To build a reliable

description, a systematic coding approach is applied based on a multi-level conceptual model. The coded data is summarized according to the conceptual model, which is the basis for a descriptive memo about the case. Finally, the data is subjected to pattern analysis, by contrasting the strategies of different incumbents and searching for patterns over time. After validating the potential causal linkages by triangulation, this leads to the the first case description with also preliminary causal observations.

In the third stage, the insights from the secondary data are supplemented by actor interviews. This protocol uses interviews with representatives of both incumbent actors as well as NGO and government actors to triangulate perceptions. Interviewees are requested to add to the understanding by revealing underlying internal processes, as well as to reflect on and validate key causal hypotheses resulting from the secondary data analysis. After analyzing the interview data, the data is used to update the descriptive and causal analysis of phase II.

Next, the rich database is utilized for the more focused phase of in-depth causal analysis. Based on the theoretical and practical relevance, three systematic analyses of the contextual antecedents, context creating, and innovation behavior of the incumbents are executed. At this stage, two other researchers were closely involved to allow for a partly dual coded second round of analytical coding (in case of the context creating & innovation behavior analysis).

Finally, the case study is completed by writing a crisp case paper, validated by the informants. Since it presents an engaging narrative with focus on the key insights of the case, this summary is more focused than the intermediate case memos. Validating the final description with the informants ensures the validity of the analysis.

4.4 CASE SELECTION

4.4.1 Theoretical case selection

The quality and especially generalizability of qualitative research is largely determined by the selection of the right case in line with the theoretical aims (Eriksson, Kovalainen 2008, Eisenhardt 1989, Yin 2008, Corley 2011, Eisenhardt, Graebner 2007, Pratt 2009, Miles, Huberman & Saldaña 2014). Theoretical case selection means that potential cases are selected based on the suitability to further develop a certain theory or test a certain theory by replication. Generalizability or external validity is not driven by statistical representativeness, but by linking the findings back to theory and showing that findings can be replicated. Many authors note that there is much confusion, because some authors and referees partially adopt criteria and language from quantitative methodology and discuss

their findings in terms of statistical representativeness (Corley 2011, Eisenhardt, Graebner 2007, Pratt 2009). It is explicitly recommended, within qualitative methodology literature, to instead adopt theoretical sampling of cases and discuss validity by examining specific case characteristics and further validating findings by replication.

Theoretical sampling reveals the need for a strong logic of sampling the cases and replicating findings further (Eriksson, Kovalainen 2008, Eisenhardt 1989, Yin 2008, Eisenhardt, Graebner 2007). Different strategies can be followed. Typical or exemplary cases help to gain a general understanding of the topic. Polar or extreme cases are useful to show the relevance of concepts and understand the potential impact. Revelatory cases with their key feature of unusual access to relevant data can help to shed light on phenomena and causalities, which were previously unclear due to lack of transparency. Which cases are typical or polar depends on the theoretical variables and relationships that are studied. Specific sampling strategies are recommended, depending on whether one is trying to find evidence for specific relationships, such as necessary or sufficient conditions. For example, in case of a necessary condition, one could look for cases which either have the dependent variable, or lack the independent variable or negative values (Dul, Hak 2012). Apart from the theoretical relevance, the access and availability of data are also key criteria to select appropriate case studies (Yin 2008, Pettigrew 1990).

4.4.2 Case selection criteria and sampling strategy

Theoretical selection of cases in the context of the research questions means that cases should provide data on (pro)active behavior of incumbents in the context of radical transitions. Combined with the scoping and information availability, four categories of selection criteria are relevant:

- *Transition likeliness*: the sector should be confronted with a sustainability transition which has the potential of radical influence on the core business process of the sector in the studied time period.
- *(Pro)active behavior of Incumbent*: at least a part of the leadership of key incumbents frames the issue from an opportunity mindset and the actual innovation process at firm level should already be in action.
- *Scoping possible*: it should be possible to define a scope in which a few firms are followed that are comparable in terms of context and business and represent a substantial part of the sector.
- *Information available*: information should be available about both the context, strategies, actions, and impact of the firms and also contacts to interview different stakeholders.

Approach	Data gathering	Descriptive analysis	Causal analysis
Stage I – Optimizing the research approach			
1. Select case			
2. Review approach with informants			
Stage II – Building a case overview with secondary data			
	3. Media analysis		
	4. Corporate report analysis		
	5. Search other relevant data		
		6. Familiarization & reliability analysis	
		7. Descriptive coding	
		8. Summarizing the data in analytical memo's	
			9. Write causal analysis memo
10. Informant validation			
Stage III – Integrating actor insight in the case analysis			
11. Review interview approach			
	12. Actor interviews		
		13. Update descriptive analysis	
			14. Integrate causal insights
Stage IV – Systematic analysis of causal linkages			
			15. Contextual antecedent analysis
			16. Discourse analysis of energy debate and energy policy
			17. Analysis of incumbent mindset, behavior, and outcomes
Stage V – Finalizing and validating the case description			
18. Write case study paper(s)			
19. Informant validation			
20. Final case study paper(s)			

Figure 4.2 - Overall case study research design.

Transition refers to radical change processes in the socio-technical context of the firm (Markard, Raven & Truffer 2012, Geels 2005). In this project, focus is on transitions driven by sustainability issues. In selecting appropriate cases, the radicalness of the issue from the perspective of the incumbent is especially relevant, because radical change is likely to encompass a very different dynamic compared with incremental change processes. Radicalness of a change can both be driven by substantial changes in the social or market structure, or the technological or operational structure of a company. The literature shows that the degree of required changes, or the need to abandon strongly profitable business models, or assets in which substantial investments were made, can be indicators of potential radicalness (Geels 2004, Avadikyan, Llerena 2010). Active resistance or clear negative consequences for some of the incumbents are also signs of radicalness from the perspective of the incumbent.

For relevant case selection, it is important to establish from the incumbent's perspective whether the transition is radical, but also whether it is likely to accelerate in the next period. Transitions are often long-term processes and often start with a long period of limited actual change. Also, some transitions can stall completely because of strong resistance from the regime, lack of solutions, or shifting public attention. From a theoretical point of view capturing data in and around the breakthrough phase of a transition (in which much innovation and context influencing behavior can be seen) is most relevant. Transitions, due to their evolutionary nature, are difficult to predict upfront. The seriousness of the consequences of the issue, current public (landscape) pressure and clearly framed contribution of the sector (in contrast to focus on other actors or sectors to solve the issue) are seen as indicators of the likeliness of a potential breakthrough in the transition. Additionally, fierce debate on the positive and negative consequences of the transition, increasing speed of change, and growth of new solutions and new entrants who gain traction are indicators that a transition breakthrough can be near.

When a transition related to a certain sustainability issue is judged likely, it remains relevant to see whether a (pro)active contribution of incumbents can be expected. The literature notes that, considering the radicalness of the issue, reactive strategies of incumbents are likely, because transitions often mean abandoning a currently profitable position (Smink, Hekkert & Negro 2013, Chandy, Tellis 1998). Transitions might even involve a total change of regime, and because of that, incumbents might show no proactive behavior at all during the transition and eventually not survive the process. Because of the theoretical interest in the active role of the incumbents, and especially in the proactive behavior, it is relevant to consider both the intentions and actual behavior of incumbents. Intentions can be considered by looking at official statements and strategy documents. Behavior can be judged by considering the innovation portfolio in relation to the transition (e.g. by analyzing the CR report). Symbolic behavior from incumbents with reactive strategies can be expected.

Therefore, in terms of behavior, it is relevant to consider the significance of the activities. Significance can be judged by considering the quantitative scale of innovations (e.g. volume, revenue, etc.) and also by the presence of more radical innovations in the portfolio, even when they are still on pilot scale.

Table 4.1 below summarizes the indicators. Because of the context specificity of transitions, indicators are formulated in a qualitative way. Selecting the right case requires a considerable level of judgment and insight in transition theory to understand transition dynamics and interpret corporate strategies in the transition on their level of pro-activeness.

Table 4.1 - Case selection criteria.

Category	Criterion	Indicators
Transition likeliness	Radicalness	<ul style="list-style-type: none"> - major changes in technology required - major changes in business model and/or market structure (customer groups or intermediaries) - divestment of irrelevance of substantial investments needed - incomplementarity with current assets and/or profitable business models - evidence of resistance or negative consequences for some of the incumbents
	Likelihood of breakthrough	<ul style="list-style-type: none"> - major public consequences and potential impact of non-transition - required contribution of sector clearly framed in debate - considerable public pressure (media attention, political attention, changing public policy and regulation) - signs of turbulence and change: fierce debate, increasing speed of change and new entrants who gain traction
(Pro)active behavior seen	Strategies and statements	<ul style="list-style-type: none"> - issue acknowledged by incumbents in official statements - included in official strategies of company (preferably not only the CR strategy)
	Behavior	<ul style="list-style-type: none"> - substantial incremental innovation seen (in terms of scale and scope) - at least experiments or pilots with more radical solutions

Category	Criterion	Indicators
Scoping possible	# players	- limited number of incumbents - comparable and substantial market share
	Institutional context	- same or comparable home markets - public engagement and reporting on selected level
Information available	CR reports	- CR reporting available with substantial information of strategy, actual initiatives, and impact
	Media coverage	- substantial media coverage either in newspapers or sector news of incumbents and relevant context
	Interview access	- access to interviewees on key positions within incumbents and relevant stakeholders (engaged NGOs, government bodies)

Besides selecting potential cases based on these criteria, further strategic sampling will improve the relevance of the outcomes. As a base strategy, an exemplary case is selected, which is likely to result in a data-rich case of incumbents showing (pro)active behavior in the context of a transition with radical impact. This data-rich case is used to obtain a holistic view of potentially relevant causal relationships (as judged relevant by the literature). Further replication might either focus on extreme cases, focus on specific causal relationships to be replicated, or sample other contexts. Extreme cases could mean a case of a (potentially) successful transition in which an incumbent is present with an evidently proactive behavior, or a case in which transition is stalled and is to be related to a clearly inactive, reactive or defensive strategy of an incumbent. A second possible strategy to further replicate is a sample, based on a specific causal relationship, which was shown to be relevant in the first case study. For example, if the position in terms of asset lock-in proves a key driver of pro-activeness cases, extreme cases in terms of position can be sampled. In terms of contexts, other sectors and national contexts are relevant as potential replications. Furthermore, the first case study can provide insight in which other case characteristics might be relevant for sampling.

4.4.3 The electricity sector as case

The Electricity sector in the Netherlands fits all the four criteria and, as such, is a good base for a case study. The sector is confronted with a radical transition to renewable energy sources, which impacts the core process of the sector. This type of innovation can be considered radical and systemic. It is radical because the renewable energy sources still

require considerable time and investment to reach market competitiveness. But this type of innovation is also radical because the implementation of these technologies has potentially a large impact on the infrastructure and business model of the firms. The transition is likely in the sense that the contribution of the sector is perceived by the public as key to solving climate change. There is considerable media attention, and NGOs actively engage the sector and challenge or stimulate them to take responsibility. Also, there are several signs of an accelerating transition, considering, for example, the increasing fierceness of the debate, increasing scale of implementation of radical solutions such as local grids or offshore wind energy, and also many new entrants with new business models (e.g. facilitating local generation instead of centralized grids).

The incumbents are all investing substantially in renewable energy generation and have strategies in place to shift to renewable energy by 2050. Also, their portfolios include both incremental activities (such as biomass co-firing) and radical innovation (such as developing renewable generation and introducing new business models). More interestingly, their strategies also differ considerably, which is a good starting point from which to learn more about different strategies, their antecedents, and potential impact.

The scope of this case is defined as the Dutch Electricity sales sector¹². It has the advantage that this is a sector with a limited number of players (3 large incumbents and approx. 15 smaller players). Within the sector the top three players are selected for in-depth analysis. These players together control 85% of the Dutch Electricity market, which makes them representative for the dynamic of the sector as a whole (NMA 2011). Three different firms also form a good basis to make a comparison of different starting positions, strategies, and their impact. The primary context in terms of regulation and market is national, although European regulation and interconnections with the global market are evident. The interaction with other countries is only included as far as it is mentioned in the studied sources or interviews. With this definition, the gas and (bio)fuel market are excluded for practical reasons, and relevant dynamics are only included as far as they clearly interact with electricity generation and supply. Two of the three incumbents are part of MNCs (RWE and Vattenfall) with other home markets. Because the incumbents have a clear national embedment (based on their history as local and national companies) and report on a national level, it remains possible to study them on the national level. Interaction with the parent companies will be included by studying the parent company reporting as well.

The final criterion is the information availability. All the large firms publish extensive sustainability reports and a lot of public information is available in the media and from

¹² Although most of these companies also produce electricity, the scope will be defined by whether the company sells electricity on the Dutch market.

different regulatory and research institutes. Contacts with most of the leading firms and important stakeholders are available, which makes it a good case in terms of information availability.

4.4.4 Generalizability of the findings

Based on the theoretical sampling and conceptual framework derived from theory, findings are likely to be linked back to these theories. In this process it is essential to consider special case characteristics and their impact on the generalization potential. Although this is only fully possible when discussing the findings of the completed case study, some notes can be made already.

This research focuses on incumbents in radical transitions. It is likely that the findings will only be partially applicable to SMEs and new entrants, because they are less embedded in the current regime, less affected by stakeholder pressure, and less locked in to current practices and institutions. Findings are likely to be only partially applicable to transitions and/or innovation processes with less radical impact on the incumbents, because, for example, these processes often require less ambidexterity of the firm and less concurrent change of institutions on the regime level.

The specific characteristics of the Dutch electricity market as case should also be taken into consideration when generalizing the findings. First the sector (as most utilities) has been privatized only since the 1990s. The utilities, because of the remaining public attention, are still rather carefully regulated. Also, because of their history as a public company, they tend to have a lesser track record of innovation. Finally, the Dutch Electricity sector is dominated by three incumbents. As such, the dynamic might be different in sectors with less consolidation. All these specific case characteristics are considered further when discussing the generalization potential of the findings.

4.5 INFORMANT CONSULTATION AND VALIDATION

4.5.1 Function in the data source mix

Informants are selected based on prolonged engagement in a sector and a relatively independent position. With these unique characteristics, they are expected to both inform the approach of the project as well as to validate intermediate findings.

Table 4.2 - Summary of the informants' role in the research process.

Objective	<ul style="list-style-type: none"> • Validate the conceptual framework • Discuss interview long list and ask for introduction when relevant • Validate intermediate and final results
Profile	<ul style="list-style-type: none"> • Scientist or expert with good overview of the transition and limited direct involvement or stakes • At least two experts with broad knowledge of technological side and potential solutions • At least two experts with broad knowledge of the role of incumbents and their profile (possibly overlap with technological knowledge)
Number	4
Involvement	<ul style="list-style-type: none"> • At the start of research process in a sector • Validation after each stage in the research approach

4.5.2 Involvement strategy

Four informants were selected to provide a relatively independent but knowledgeable and comprehensive view on the transition and the role of incumbents and validate the data analysis. Considering this profile these were likely to be found among scientists with focus on the sector or experts working for knowledge institutes. When selecting informants their stakes and ties with sector actors (e.g. earlier employment or paid assignment) were considered explicitly.

Input from informants had a specific function at three moments in the research process. First of all, in the early phase, before starting the analysis of the secondary data, informants were interviewed to validate the conceptual model and develop hypotheses based on their perception of relevant causal relations. Second, after completing the analysis of secondary data, their validation of preliminary conclusions was requested, also to sharpen the actor interview questions. Finally, they were asked for feedback on the final case analysis.

Informants were asked to apply their sector knowledge to validate both the causal model as well as provide important information. Specifically, some informants were selected and requested based on their knowledge of the available solutions to validate the solution mapping and related technological questions. Second, some informants were selected based on their knowledge of the incumbents to validate their profiles.

The personal identity of the informants is kept confidential so that they could speak freely. Informants are listed below with their organization and functional area (as long as this was

not easily traceable to one or a few persons, which was asked in the introduction) but not with names or exact function titles.

Profile of the informants for the Electricity sector case

- A lead scientist from an applied energy sector research agency
- A partner from a leading strategy consultancy practice with focus on the energy sector
- A former CEO of one of the incumbents, now active as academic, supervisory board member, and consultant
- A consultant focused on multi-stakeholder energy policy dialogues

The notes from the conversations were documented and integrated systematically in the case study database, and recordings were made for consultation when necessary. As a starting point, feedback from informants was systematically integrated in the approach and analysis. When differing views existed (e.g. with other informants or the researchers' analysis) on aspects central to the case analysis that cannot be triangulated with factual data, these differing views were noted in the case description.

4.5.3 Discussion

Engagement of informants at multiple stage of the research process is acknowledged as an important factor to improve the validity of qualitative data (Eriksson, Kovalainen 2008, Yin 2008, Graebner 2009, Greenwood, Suddaby 2006, Smets, Morris & Greenwood 2012). It provides for unique access to the actual mindset aspects underlying the causal patterns in the case, as well as perceived causal inferences by actors (Yin 2008). Validating the approach and analysis by knowledgeable persons, with an internal perspective, improves the internal validity of analysis considerably (Graebner 2009, Greenwood, Suddaby 2006, Smets, Morris & Greenwood 2012). Finally, insights of the informants help to focus on the most relevant aspects. They may point at new aspects not yet included based on the literature, as well as help to focus on the most relevant linkages in the broad set of potential relevant variables.

Using interview data also has several specific risks and biases, which are discussed more extensively in the discussion section of the actor interview section (4.7). Specifically, it is very important to consider the relative objectivity of the informants and to make potential ties and stakes transparent.

4.6 SECONDARY DATA COLLECTION

4.6.1 Newspaper analysis

The applied conceptual model pays specific attention to the interaction between contextual influences and firm level dynamics. This requires a data set with a rather holistic perspective. Newspapers as data source are primarily used to obtain sufficient data on contextual dynamics. A secondary goal is to enrich firm level data and triangulate the firm's own report on its activities and impact.

Table 4.3 - Circulation of Dutch national newspapers in 2013 (source: HOI)¹³.

Title	2013
<i>De Telegraaf</i>	533.227
<i>AD</i>	411.772
Metro	387.404
Sp!ts	299.069
<i>De Volkskrant</i>	255.097
<i>NRC Handelsblad</i>	189.979
<i>Trouw</i>	102.768
NRC.Next	62.965
<i>Het Financieele Dagblad</i>	53.861
Reformatorisch Dagblad	48.361
Nederlands Dagblad	23.761

The way the sample was selected is a key determinant of the quality of media analysis based on newspapers. In line with conventions for qualitative research and case selection, the sampling approach is theoretical and matches the case scope (Patton, Johns 2007). The sampling in terms of sources and keywords is discussed below. The geographical sampling scope is the Netherlands with focus on the national news, in line with the definition of scope.

Based on circulation, the top 5 paid newspapers were selected and supplemented with the Dutch Financial Times. It is common practice to select the most circulated newspapers because of their impact and representativeness for the public debate (Mazza, Alvarez 2000, Humphreys 2010, Liu 2010). Two free newspapers were deliberately excluded because they tend to publish mainly news and fewer background articles. News in general is less differentiated per newspaper and therefore, adding the paid newspapers instead of the free

¹³ Based on 2013 data retrieved from <http://www.hoi-online.nl/> on July 23rd 2014. HOI is an independent institute documenting newspaper circulation. The data was crosschecked and found comparable with the data of sector organization NDP. Regional newspapers were excluded from the selection.

ones is expected to increase the richness of the data. Next to the top 5 newspapers also *Het Financieele Dagblad* (Dutch equivalent of the *Financial Times*) was selected because of its differentiated focus on the corporate perspective, which could add to the other selected newspapers. The selected top 5 newspapers are in line with the selection of Vreese & Boomgaarden (2006), the only paper in the top 20 most cited media analysis papers that uses Dutch newspapers as data.

Based on the case scope a keyword search was executed to select news discussing sustainability innovation in the electricity sector. The keyword search used in Lexis Nexus was:

("sustainable" OR "green" OR "renewable") AND ("energy" OR "current" OR "gas" OR "electricity" OR "Essent" OR "RWE" OR "Vattenfall" OR "Nuon" OR "Eneco") (translated to English, Dutch version: ("duurzaam" OR "groen" OR "hernieuwbaar") AND ("energie" OR "stroom" OR "gas" OR "elektriciteit" OR "Essent" OR "RWE" OR "Vattenfall" OR "Nuon" OR "Eneco"))

This keyword combination aimed to select news articles that discuss dynamics in the energy sector or the focus companies and include focus on sustainability related topics. An even broader search excluding the specific focus on sustainability related topics was considered, however this triggered a lot less relevant information. Therefore, it was decided to follow the implicit selection of the journalists of what is relevant and only specifically search for more information outside this focus when triggered by the conceptual framework (e.g. searching for financial data), or when preliminary findings reveal the need for more background.

After retrieving this data with Lexis Nexis, a screening based on titles and, when needed, content was done. Inclusion criteria were:

1. Discusses dynamics in or clearly related to the Dutch Electricity generation sector
2. Includes focus on sustainability related aspects

Table 4.4 lists a total of 5221 articles retrieved from Scopus. Based on the screening mentioned above, 1345 articles were selected for further analysis. Initial screening resulted in 2156 relevant articles. A large number of the articles excluded in the screening process consisted of articles referring to energy with other meanings (e.g. personal energy). Furthermore, a smaller number of articles was excluded because they referred to other energy sectors (e.g. oil & gas). The selected articles were categorized in thematic subsets. At a later stage it was decided to exclude the datasets that primarily discussed adjacent sectors such as the construction sector, mobility, and waste incineration, as well as the subset that included articles mainly discussing dynamics in the electricity sectors of other countries.

These articles were considered of limited added value over the already rather broad and rich dataset available. An additional measure to prevent missing relevant data was to execute a text search in the excluded subset, based on the mention of the three focus incumbents, which resulted in including another 42 specific articles, leading to a total of 1345 relevant articles.

Table 4.4 - Number of articles retrieved from Lexis Nexis and number of articles selected after screening.

	2010	2011	2012	2013	2014	Total
Retrieved articles	1088	1079	1057	1005	992	5221
Selected articles	298	279	249	283	236	1345

While retrieving the data, the articles were systematically numbered to allow for reference in the case description. An Excel database was also developed to allow for systematic capture of screening and analysis.

Discussion

In this section, the methodological strengths and limitations of using newspaper data as source are discussed. Methodological aspects of content analysis are discussed in section 4.8.

Strengths

Newspaper analysis is an efficient method to gather much data with substantial validity, because of the characteristics of the method. It is used in several areas of business research such as PR, Marketing research, and CSR research. The most commonly mentioned strengths are:

- Easy to replicate method because of structured method and documented search definitions (Harris 2001).
- Triangulation between the six sources in the newspaper selection (and also later on with other data sources) is possible (Harris 2001).
- Data can be considered representative to analyze public debate (and as such a good source for information of the landscape factors, especially government and stakeholder contextual influences) (Humphreys 2010).
- Newspaper data is least sensitive to reporter bias because journalists usually use relatively high standards to limit subjectivity (Humphreys 2010).
- The method is unobtrusive and therefore might trigger fewer socially desirable answers that could be triggered by researchers’ presence and objectives (Harris 2001, De Vreese, Boomgaarden 2006).

Limitations

The strength of the data obtained is mostly related to sampling as executed, based on the search definition and screening protocol. Therefore, two potential selection biases should be taken into account:

- It is possible that *selection bias* is at work where facts that are relevant to this conceptual model are omitted from news reports (De Vreese, Boomgaarden 2006). Newspapers are a strong source for information on governmental influence and stakeholder pressure, as relevant variables in the conceptual model. Considering market and technological contextual influence as well as regime level dynamics, information might be more limited. However, as the energy sector overall, and especially transitions therein, receive widespread public attention and broad media coverage, this risk is generally mitigated in practice. Further mitigation is achieved by seeking out further data and relevant information. Such cross-checking with other sources of data and information heightens the probable validity of the conclusions drawn.
- Another potential *selection bias* is due to exclusion of relevant data when selecting and screening articles that focus on both the electricity sector and sustainability issues (Reber, Berger 2005). This might lead to the exclusion of relevant data, especially when journalists and/or their interviewees are unaware of the relevance of a certain factor in relation to sustainability issues. For example, journalists might not relate bad financial performance to sustainability issues and thus they are excluded during the keyword search or screening. This is sufficiently mitigated by triangulation, and when relevant additional information was searched via specific conceptual factors.

4.6.2 Corporate reporting analysis

The primary aim of collecting corporate report data was to obtain a comprehensive view of the companies' goals, activities, and their effect. Although the content of these reports is not necessarily complete, corporations' own reports are the richest source available with information of the activities of individual companies. A second purpose for collecting these reports was to use the text to analyze the discourse and mindset of the company in relation to corporate responsibility.

Method & operational procedures

For both the company under consideration and, when applicable also for the parent company, the following information was collected:

- *Corporate responsibility report*: this is the basis information source and usually contains information about the vision & motives (e.g. in the CEO introduction), strategy and goals, activities and results. In some cases, the report is integrated in the annual report. The information about the reporting standards and assurance statement was considered when evaluating the quality of the information and mentioned in the final report.
- *Corporate annual report and financial statements*: this information is supplementary to the corporate responsibility report. The focus is on the corporate, general strategy (and the place CR issues have in this strategy) and financial performance. In the case of Eneco, and in some years Nuon, the CR and annual reports were integrated in one integrated annual report.
- *Key corporate responsibility or sustainability strategy documents, webpages and presentations*: sometimes more extensive presentations or strategy documents are available on the website of the company; webpages containing this information were also downloaded and stored.
- *Power labels and emission overviews*: two key documents relevant to study outcomes in terms of supplied energy mix and emissions were also retrieved, in case they were not yet integrated in the other corporate reports.

Press releases were not systematically included in the sample to be analyzed, because they were not expected to reveal significantly more information than was already presented in the documents listed above.

Systematic retrieval from the websites led to a dataset of 109 documents as summarized in table 4.5. The main sources are the CSR and annual report (or integrated annual report which includes both). Besides these, a limited number of “Other” documents includes some key press releases, strategy and R&D documents, information on shareholder structures, and credit ratings documents.

It was possible to retrieve these reports for the three focus incumbents in the studied period, with some exceptions as summarized in table 4.6. Due to a centralization dynamic in Vattenfall and especially within RWE, the reporting over 2013 and 2014 is less extensive

Table 4.5 - Documents in the firm level dataset.

Firm	Type	2009	2010	2011	2012	2013	2014	2015	2016	Total
Essent	CSR	1	3	3	7	5	6			25
	Financial		1	1	2	2	2			8
	Other			1						1
Nuon	CSR		2	1	3	1				7
	Financial				1	3	2			6
	Other					1				1
Eneco	CSR		2	2	2	2	2			10
	Financial				1	1				2
	Other			1			3			4
RWE	CSR		1	2	2	1	7			13
	Financial		2	1	1	1	2	1	1	9
	Other					2			1	3
Vattenfall	CSR		2	4	3	1	2			12
	Financial		1	1		1	1			4
	Other			1	3					4
Total		1	14	18	25	21	27	1	2	109

for Essent and to a lesser degree for Nuon. Besides this, Essent already ceased publishing financial reports after 2010. For this reason, the reporting of parent companies RWE & Vattenfall was systematically analyzed with focus on information discussing their subsidiaries and dynamics within the Netherlands (with help of text search). As is discussed more extensively in chapter 7, the dataset can – considering these limitations – still be considered rather complete. However, as will be done in discussing the data, the quantitative analyses including 2013 and 2014 need to be considered especially with reference to this limitation.

Table 4.6 - Availability of CSR & annual reports in the period studied.

Firm	Completeness
Eneco	<ul style="list-style-type: none"> Eneco has an extensive integrated annual report for all the years studied
Essent	<ul style="list-style-type: none"> Extensive CSR report available for 2010-2013 Annual financial report only for 2010
Nuon	<ul style="list-style-type: none"> Extensive integrated annual report for 2010-2012. 2013 & 2014 only a less extensive annual report, which does discuss some key sustainability indicators in the management report

Discussion

In this section, the methodological strengths and limitations of using corporate report data as source is discussed. Methodological aspects of content analysis are discussed in section 4.8.

Strengths

Analysis of corporate responsibility reports (which is the main source) is applied broadly in the CSR and accounting literature (Abbott, Monsen 1979, Guthrie, Abeysekera 2006, Chen, Bouvain 2009). The most commonly mentioned strengths are:

- *Rich source* of data which gives insights in plans, activities, and results of the company's activities. In fact, for many of these activities, the company's reports might be the only publicly available data source.
- Company reports have also been used to analyze the *company's discourse as an indicator of the shared mindset of the corporate leadership* regarding corporate responsibility (Bansal, Roth 2000, van Tulder et al. 2014).

Limitations

Corporate disclosure on social and environmental issues, as well as the use of this information, has a long history. Uncritical use of this information has been judged as lacking in validity, since this data should not be considered as necessarily complete or objective (Deegan, Rankin 1996, Holcomb, Upchurch & Okumus 2007, Jones, Comfort & Hillier 2007, Roca, Searcy 2012). Therefore, consideration of the limitations is critical when using this data to draw conclusions. It should, however, be noted that the quality of information is likely to have improved in recent times, due to improvement in reporting standards, as well as a shift in the corporate mindset towards a more transparent and proactive attitude (Chen, Bouvain 2009, Kolk, Pinkse 2010). This also the case for the three studied incumbents which, for example, have all received GRI certification of their reports and apply (limited) external assurance to their CSR reporting. Nevertheless, the limitations to be taken into consideration are:

- *Motivation and completeness bias*: companies might have motives (such as reputation protection and profit maximization) to misrepresent or leave out information (Jones, Comfort & Hillier 2007, Holcomb, Upchurch & Okumus 2007, Tate, Ellram & Kirchoff 2010, Cowper-Smith, de Grosbois 2011). Much information cannot be checked due to lack of transparency. However, it should be noted that the studied incumbents nowadays voluntarily apply certain reporting

standards (GRI) and use both internal auditors and accountants to provide assurance statements for the information. From this perspective, it seems reasonable to assume that in such cases factual information is unlikely to be purposively misrepresented, because of the reputational risk of misrepresenting factual information. More likely is the risk of not revealing information about unsuccessful activities or issues which are not proactively addressed by the company. Because in the applied method the information from the corporate reports were triangulated with information from media reports and stakeholder interviews, this risk could be minimalized. However, the information should still be treated with care, considering this limitation.

- *Comparability bias*: especially when considering quantitative data, lack of comparability should be considered (Idowu, Towler 2004). Since the studied incumbents apply GRI reporting standards for their KPI's, they are less prone to comparison errors. To limit this risk, especially when comparing quantitative data, the actual definition of the indicators used was considered. As will be discussed in more detail in chapter 7, significant effort was made to edit and combine data so that the used outcome comparison applies comparable definitions in terms of geographic scope as well as technical matters, such as whether to include long term contracted capacity.
- *Reporter bias*: corporate reports might be drawn up by staff departments or even external consultants. This might lead to a lack of understanding of the actual work floor situation (Jones, Comfort & Hillier 2007, Holcomb, Upchurch & Okumus 2007, Tate, Ellram & Kirchoff 2010). The methodology provided no method to prevent this potential bias, so it should be considered when evaluating the conclusions.
- A special case of the reporter bias is applicable when considering the corporate leadership shared *mindset* based on official reports and statements of senior executives (Plowman et al. 2007). This might certainly not be an indicator of the average or shared mindset of the company and its employees as a whole. However, the official strategy and vision of senior executives is certainly influential and therefore relevant to study. Again, this methodology did not provide insight into differences in mindset and perception across different layers within the company. Therefore, the discussion of mindset data refers systematically to the data as representing the incumbents' leadership shared mindset
- *Plans vs. practice gap*: it is much easier to present an inspiring vision or a long-term plan, than actually realizing it in practice (Jones, Comfort & Hillier 2007, Holcomb, Upchurch & Okumus 2007). Especially when there is a lack of transparency, and when the primary motive is to defend the legitimacy of the

company, it could be attractive to just present plans without clear consideration and execution of the implementation. Therefore, when analyzing the reports, the difference between goals, plans and actual activities were to be clearly accounted for.

- *Reporting centralization*: as discussed before, centralization of reporting processes on group level affects the data availability for Nuon and Essent, especially for 2013 and 2014. Therefore, this limitation was mentioned when discussing data affected by this bias and comparison over the period 2010-2012 was used when relevant to validate or supplement conclusions.

4.6.3 Other relevant secondary data

The dataset was further enriched with other documents. The basis of the dataset was the combination of corporate reports, newspapers, and interviews, which were retrieved systematically. Often however, when reviewing these sources, references to other sources were found. Sometimes relevant information was found in other locations. The most important additional data sources were:

- *Energy Agreement documentation*: the Agreement itself as well as some supplementary documents were used in the context creating behavior analysis (chapter 6).
- *Dutch energy statistics and projections*: as a means of benchmarking the firms' performance, statistical information from the Dutch statistical office (CBS) on the Dutch energy balance and renewables production, as well as annual energy system projections (NEV, by PBL & ECN) were used in the firm level analysis (chapter 7).
- *"Topsector Energie" documentation*: when discussing the impact of the incumbents, their contribution to knowledge creation was also considered (chapter 7). For this analysis, a text search analysis of all *Topsector* documents over the studied period and more recently (64 in total) was done.
- *Energy policy documents*: policy evaluations of e.g. energy saving policy and *Topsector* policy (as published most times by the National Government) were used as a further data source when evaluating the qualitative impact of incumbents (chapter 7).
- *Regulator market reports*: the market regulator (ACM) publishes annual market reviews which were utilized especially to consider the market share dynamic regarding the top 3 incumbents (chapter 7).
- *SDE support scheme reporting*: RVO/Agentschap NL publishes annual reports on the renewable energy support scheme, which were utilized to understand how the

support scheme influences the market (chapter 5), and to benchmark acquired subsidies by incumbents (chapter 7).

Discussion

The acquisition of these documents was not done systematically and as such representativeness and completeness was only guaranteed because of the combination with the main data sources. When reviewing the content, general conventions were considered, including the objective of the document, the motives of the writer, and the objectivity of the claims. News reports were considered with comparable considerations as with newspaper analysis. Reports, especially when published by sector organizations or platforms, were carefully examined upon the motives and agenda of the organization. The same held true for political documents.

4.6.4 Reference to translated secondary data

When referring to specific quotes from the secondary data (or interview quotes) in the text of this thesis, a number starting with a Q is included at the start of the quotation (Q###). The quotes included in the main text of this thesis are translated from Dutch when relevant. The original quotation and translation are presented next to each other in Appendix B.

4.7 ACTOR INTERVIEWS

4.7.1 Function in the data source mix

In complementing the secondary data, the primary role of the interviews was to gain understanding of and validate the underlying causal patterns. To achieve this, interviewees were questioned about their mindset regarding the transition and the role of incumbents, as well as the causal relationship they perceived between enablers (internal and external), behavior, and outcomes. It was not an objective to validate all factual data on behavior and contextual factors, because this would have required too much time from the interviewees and their input on the underlying causal patterns was more relevant and valuable. The interviewees were, however, kindly requested to validate the most relevant conclusions from the earlier analysis of media- and firm-level document analysis. In combination with the role of the informants, the overall picture, and especially the conclusions on relevant causal relationships, can be considered validated from a knowledgeable internal perspective.

4.7.2 Interview strategy

Type of interviews: semi-structured

Semi-structured interviews are defined as interviews with a prepared outline of topics to discuss, but freedom to vary the order and wording in the interview. This provides space to have a more informal interaction and probe more in-depth responses. It is likely to provide richer data on underlying causal patterns, compared with structured interviews (Eriksson, Kovalainen 2008). Compared to unstructured interviews, the outline of topics and basic questions provide some basis for comparison and ensures that the relevant aspects of the conceptual model are covered.

Confidentiality

To be able to speak freely, confidentiality of the personal identity was ensured. In the case report, the interviewees are listed with their organization and functional area (as long as this was not easily traceable to one or a few persons) but not with names or exact function titles. In the case report, quotes from the interviews were included and referred to as personal perception from someone within the organization (instead of the formal or shared position of the organization). This was to ensure transparency of the underlying evidence, without harming confidentiality.

Selected interviewees: incumbent actors & stakeholders

Interviewees from both incumbents as well as other stakeholders were included in the interview strategy to ensure an optimal mix of perspectives. Interviewees from within the incumbents can provide an internal perspective on their behavior and underlying reasoning as well as comment on relevant data that was highlighted from the analysis of secondary data. Interviewees representing other stakeholders, such as NGOs and the government, are relevant to triangulate the perceptions from incumbent actors and obtain insight (limited though) in their objectives and interventions as well. The most relevant interviewees to approach were selected based on their key role as evident from finding their name repeatedly in the media and/or firm-level dataset.

Table 4.7 lists the interviewees by affiliation on which the interview focused. Some of the interviewees had switched jobs in the meanwhile, but held senior positions in the studied period (or an important part of it). All interviewees occupied senior level (senior manager/director/partner) positions. In case of the incumbents, the aim was to interview at least one executive board member and one senior employee with responsibility for strategy or innovation. This was realized for Nuon and Essent, while Eneco was not able to provide access to a board member (but an interview with a senior employee working closely to the

board did provide access to comparable information). The complete list of names is known to the whole research team.

Table 4.7 - number of interviews per organization based on the primary affiliation of the interviewee in the studied period. All interviewees were senior employees.

Incumbents	<ul style="list-style-type: none"> • Eneco: 2x • Essent: 3x • Nuon: 2x
Challengers	<ul style="list-style-type: none"> • Greenchoice: 1x • Qurrent: 1x
Government	<ul style="list-style-type: none"> • Ministry Economic Affairs (EL&I): 1x
ENGOS	<ul style="list-style-type: none"> • Stichting Natuur & Milieu: 1x • Greenpeace: 1x
Stakeholder bodies	<ul style="list-style-type: none"> • VNO-NCW (general employer organ): 1x (2 interviewees interviewed together) • VEMW (large electricity & gas users): 1x • Energie-NL (electricity & gas suppliers): 1x • NVDE (renewables sector): 1x
Other	<ul style="list-style-type: none"> • CE-Delft (consultancy/applied research): 1x

Place in research process

After completing the descriptive and causal analysis of secondary data, incumbent actors and stakeholders were interviewed. This had the advantage that knowledge from the secondary data analysis could be used to obtain their comment and validate causal relationships that seemed evident from the data.

Questions: mindset, enablers, outcomes

The questions, in line with the mentioned objectives, were targeted at understanding the underlying mindset and strategies as well as obtaining information on perceived causal relationships between behavior and enablers, as well as impact. This fits the general assumption in methodology literature that interviews are best used to understand “how” and “why” questions (Eriksson, Kovalainen 2008, Yin 2008). It also complements the secondary data, which is most useful in understanding the formalized strategies and factual behavior. The question list is composed of three parts. First, a set of open questions to reveal the perspective of the interviewee on the transition and the role of incumbents. Second, a set of questions probing for specific insights from the secondary data analysis to validate them with interviewees and especially, to capture their explanations of the causal dynamics

underlying the observations. Finally, interviewees were provided the space to make open contributions towards the research question and stress which questions and findings were relevant to them. In figure 4.3 the questions are listed. The question list included the preliminary conclusions to be validated. Before the interviews took place, they were fine-tuned in discussion with the research team and informants.

Actors' perspective (open questions)

1. Which sustainability challenges have influenced the development of the Electricity sector in the past five years? Can you reflect on how strongly these challenges influenced the sector?
2. What are your expectations on the development of the Electricity sector in the next two decades? Which solutions are central in the energy system in 2036? Which role do you expect that conventional power plants play in 2036? Which role do you expect that incumbents play in two decades?
3. Can you reflect on which factors determine the effectiveness of incumbents in innovating with regard to renewable energy? (divide 100 points over the following factors: government policy, public support & pressure, availability of solutions, market demand, investor pressure, vision & strategy of firm, innovation capabilities, partnership & dialogue capabilities, complementarity with current assets & business model, financial resource availability).
4. What are the most important motives of incumbents to innovate with regard to renewable energy? (divide 100 points over the following factors: accidental result of profit-driven actions, societal pressure and license to operate, focus on opportunities to concurrently create societal & shareholder value, focus on collaborative solutions for structural issue and enablers of a sustainable future).
5. With which practices have incumbents – in the past five years – mostly impacted the sustainability of the Electricity sector? (divide 100 points: R&D, renewable asset development, improving efficiency conventional generation, marketing & product development, business model innovation, phasing-out conventional assets, policy advocacy, coalition building, example setting, partnerships).

Validation and reflection on research insights

6. Our analysis shows all incumbents invest considerable amounts in developing new renewable assets. Which factors influence how much resources incumbents can invest in renewable asset development?
7. Analysis shows incumbents report a substantial number of experiments with new business models, however, transparency on the scale, materiality, and impact is lacking. As far as you have insight, what is the scale and impact of these activities? Which factors determine incumbents' success in this regard?
8. In 2012, the incumbents seemed to be (greatly) surprised by the development in the market. Our analysis shows reactive statements in the media, large write-offs and strategy changes. Do you share this observation? Can you reflect on which factors made

this dynamic hard to foresee? Part of the dynamic is that a situation of overcapacity develops. Can you reflect on whether incumbents anticipated this dynamic when investing in the last generation of conventional power plants?

9. What would have been the most effective and robust strategy for incumbents in the Electricity sector in the past decade based on the knowledge of today?
10. Analysis shows that the (lobby of) the energy intensive industry has a dominant voice in Dutch energy policy. Policies such as the surplus of ETS rights, construction of new coal power plants, expanding international grid interconnectors and voluntary nature of energy efficiency policies are accredited to their influence. Do you agree on the observation with regard to their dominance? What determines the effectiveness of their lobby? What is your vision on the transition of the energy supply for the industry?
11. The electricity sector seems rather divided as we analyze their contributions in the public debate. Do you share this observation? What is the origin of this division? How did this affect the position of the sector in the policy debate and the transition towards sustainable energy?
12. Several actors praise the Energy Agreement (EA) as creating much needed policy stability. What is your appraisal of the contribution of the EA? Do you expect the EA to remain the central policy framework until 2020? Can you reflect on the multi-stakeholder negotiation process that led to the EA? What factors or dynamics were determining in arriving at the EA as it was finally adopted?

Space for additions and final remarks

13. The central question in this research project is the role that incumbents play in sustainability transition. Do you have anything to add or emphasize with regard to the contribution of incumbents and what can be done to increase the effectiveness and impact of their contribution?
14. Which research question or resulting insight would be of interest for your practice?

Figure 4.3 - Interview question list.

Based on the question list (and the more extensive interview protocol based on the case study protocol), each interview was semi-structured (see also start of this section). Based on the responses of the interviewees, the interviewer responded with further questions with the objective of triggering further reflection on the interviewees' perspective on underlying causal processes. For each interview a selection was made of the most relevant questions and the most logical order of questions customized to the knowledge and position of the interviewee. It is, however, important to note that except for question # 6 all questions were answered by at least 75% of the interviewees (question #6 was addressed by four incumbent actors, based on their specific knowledge with respect to this question).

Documentation

Systematic interviewer notes as well as transcripts were documented in the case database for analysis. Directly after each interview the interviewer noted the relevant input per question, when necessary referring back to the recording. These notes were used to make a systematic comparison of the interview findings. At a later stage the recordings were also fully transcribed and documented in the case e.g. to retrieve literal quotes for reference in papers. Therefore, it was considered not necessary to send a written transcript for approval. Next to practical reasons (this takes much time), this was also desirable because this process might have afterwards triggered the dynamic of bringing interviews in line with the formal positions of the organization.

4.7.3 Reference to interview quotes

When referring to interview quotes (or literal quotes from secondary documentation) in the text of this thesis, a number starting with a Q is included at the start of the quotation (Q###). The quotes included in the main text of this thesis are translated from Dutch when relevant. The original quotation and translation are presented next to each other in Appendix B.

4.7.4 Discussion

Strengths

Several strengths underline the function of the interviews in the data source mix:

- *Focused*: the interviews provide information focused specifically on the case (Yin 2008).
- *Semi-structured*: the semi-structured approach provides balance in ensuring comparability of data while still being able to gain unique, in-depth responses from the personal perspective (Eriksson, Kovalainen 2008).
- *Unique access*: provides the best way to gain insight in the actual mindset aspects underlying the causal patterns in the case, as well as perceived causal inferences by internal actors (Yin 2008).
- *Validation from internal perspective*: because of the consultation with the interviewees, the data can be validated by knowledgeable persons with an internal perspective, which improves the internal validity of analysis considerably (Graebner 2009, Greenwood, Suddaby 2006, Smets, Morris & Greenwood 2012).
- *Stakeholder triangulation*: the mix of interviews with corporate employees and other stakeholders allows for triangulation of the internal perspective of the incumbent with the potentially more critical evaluation of e.g. NGO actors.

Limitations

The methodology literature suggests several biases both from the side of the interviewee as well as the interviewer, which makes the interview method a delicate one. In general, semi-structured interviews require experienced and knowledgeable interviewers (Eriksson, Kovalainen 2008). The specific biases and the required mitigation tactics are discussed below.

Interviewee biases

- *Personal objectives, stakes and perspective*: persons as well as the organizations they work for are likely to have their own objectives and stakes and frame their answers as such (Yin 2008, Graebner 2009). These might be explicit, but also implicit frames. A strategy to partly mitigate this bias is triangulating the answers, for example, with responses from other stakeholders or secondary data (Graebner 2009), as provided by the rich dataset collected in this project. It remains, however, important to interpret the interview data as personal perceptions and explicitly note inferences based on personal perceptions which cannot be triangulated when writing the case report.
- *Elite bias (esp. in relation to mindset)*: it is noted that perceptions of corporate or regime elites might not necessarily be representative for companies as a whole (Plowman et al. 2007). Specifically, in the case of the mindset analysis it is important to consider that it is based on a small sample of personal perceptions. For practical reasons it is not possible to interview or survey a broad cross-section of employees. Therefore, this limitation should be considered when interpreting the data. Triangulation with the other interviews provides some potential for validation. Hypotheses resulting from the case study on the influence of mindset should be validated further by either replication in other case studies or surveys.
- *Retrospective bias*: when recalling events from a relatively long time ago, the risk of a bias increases (Yin 2008, Plowman et al. 2007). Triangulation can be used to minimize this bias risk (Plowman et al. 2007, Graebner 2009, Gilbert 2005). Also, comparing findings from longer ago with more recent findings can be used to mitigate biases (Graebner 2009), as well as not insisting on an answer (Plowman et al. 2007, Graebner 2009). Especially when interviewees are discussing events of a longer time ago, this bias should be explicitly considered and triangulation should be attempted. Considering that the interview questions referred to a relatively recent period and were posed by partly factual data and findings, this risk could be limited in the context of this project.
- *Social desirability bias*: interviewees are likely to be influenced by different kinds of social pressures resulting in socially desirable answers. This might take different forms. Interviewees might want to please the interviewer, as discussed below under steering bias (Yin 2008, Graebner 2009). Secondly, interviewees are likely to be influenced by public relations stakes of the company or organization they work for,

or in general give socially desirable answers. Especially in the case of context-influencing activities in the context of reactive strategies, there is an incentive to limit the public transparency. This is partly mitigated by including stakeholders such as NGOs in the interviewee sample and triangulating the corporate perspectives with their perceptions (Graebner 2009). Also, ensuring confidentiality, interviewing executives or employees directly (and not spokespersons or communications staff) and explicitly asking for personal perspectives are known tactics to limit this bias (Graebner 2009).

Interviewer biases

- *Question bias*: the questions might steer the interviewee to frame their interpretation or trying to please the interviewer (Yin 2008). To limit this bias, the introductory information describes the intentions (Plowman et al. 2007) and explicitly frames the research question from a neutral perspective. Open-ended questions are asked, and evidence from the secondary data analysis is presented, before probing interviewees with targeted questions. Findings might also be biased due to poorly articulated questions (Yin 2008). To prevent this bias, a basic question list was developed and included for use.
- *Interpretation bias*: either due to retrospective biases or because the researcher frames the interviewees' answers in his own mindset, the interpretation might be biased (Plowman et al. 2007). This bias was minimized by making notes directly after the interviews and using the recording and transcripts (Smets, Morris & Greenwood 2012). The use of multiple interviewers is also proposed as a strategy to mitigate this bias (Greenwood, Suddaby 2006). However, this was impossible for practical reasons.

4.8 DESCRIPTIVE ANALYSIS – AN INTEGRAL PERSPECTIVE ON MULTI-LEVEL TRANSITION DYNAMICS

4.8.1 Goal and literature connection

The objective of the descriptive analysis is to develop a rich dataset and comprehensive understanding of the Electricity sector incumbents in the context of the transition dynamics. This objective first of all defines the firm, specifically the incumbent, as primary unit of analysis. Inspired by the multi-level perspective in the transition literature, the scope of relevant dynamics to capture is explicitly defined from a multilevel perspective. This improves the understanding of the behavior of firms in transitions, because the dynamic of the landscape and regime influences and limits firms' behavior (Geels 2004, Markard, Raven & Truffer 2012). One of the additions to the multilevel perspective of this protocol is the

enrichment of the conceptual model to understand how leadership and capabilities on the firm level interact with the context to drive the firms' behavior.

This descriptive analysis is the basis for more focused, causal analysis as outlined in the next section (4.9). The descriptive analysis as first step provides for a rich dataset. Furthermore, utilizing this rich data set provides for understanding the conjunction in contextual dynamics. To arrive at reliable and valid conclusions, more focused causal analysis is done utilizing this dataset, which is also the basis for how the empirical analysis is presented in this thesis.

The underlying conceptual model is based on a systematic literature analysis of the sustainability innovation literature (see Appendix A.1). This review focuses specifically on the knowledge available on firm-level innovation in the context of sustainability transitions within the business literature. The literature available is mainly influenced by three schools. First, the *corporate responsibility* literature, which studies how firms react to, or anticipate societal demands put to the business community. This field in literature provides insight in how firms can react to, and anticipate differently, these challenges and what organizational arrangements drive their effectiveness. Second, the *corporate innovation literature*, which studies how firms invent and implement new solutions that represent a change to their current market or technology, and what drivers influence their performance in this respect. The third influence comes from the *transition school* which, based on a sociotechnical perspective, tries to capture the multilevel dynamics of radical changes in technological and institutional structures of society. While the corporate responsibility and innovation literature provide much insight on a firm-level dynamic, this school adds understanding of how the change at the firm level is embedded in, and influences changes on, landscape and regime level.

4.8.2 The method: Content analysis

The methodological foundation of the descriptive analysis is the content analysis tradition (Krippendorff 2012). Qualitative content analysis is a method to systematically code and analyze the data to ensure that sufficient reliability and validity in the analysis is achieved. Developing a code book that clearly states the definition of all codes to be used is crucial. Afterwards, sufficient effort is taken to train coders to ensure that the code book will be used consistently.

4.8.3 Coding framework

Based on the framework for systematic analysis of incumbent behavior in transitions, outlined in chapter 3, a coding framework with 15 categories was specified. The underlying

code book (which can be found in Appendix C) specifies for each variable the definitions, specific notes on what, and what not to code, as well as literature references to other studies using or specifying this variable.

The coding framework encompasses five meta-categories including the 15 categories of the conceptual model. First the *landscape* which is the macro level, societal context which influences the behavior of the firm with regard to the transition. Second is the *regime dynamic* on the meso level, which describes how different coalitions interact to ensure their current and future stakes, and limit or drive institutional change in the sector studied. These two contextual dynamics are studied in interaction with the *firm-level enablers*. The firm's mindset and capabilities moderate its ability to react to, or anticipate, societal issues. Together, these three driving dynamics are expected to influence *innovation & context creating behavior* at the firm level. Finally, the coding framework includes direct and indirect *outcomes*.

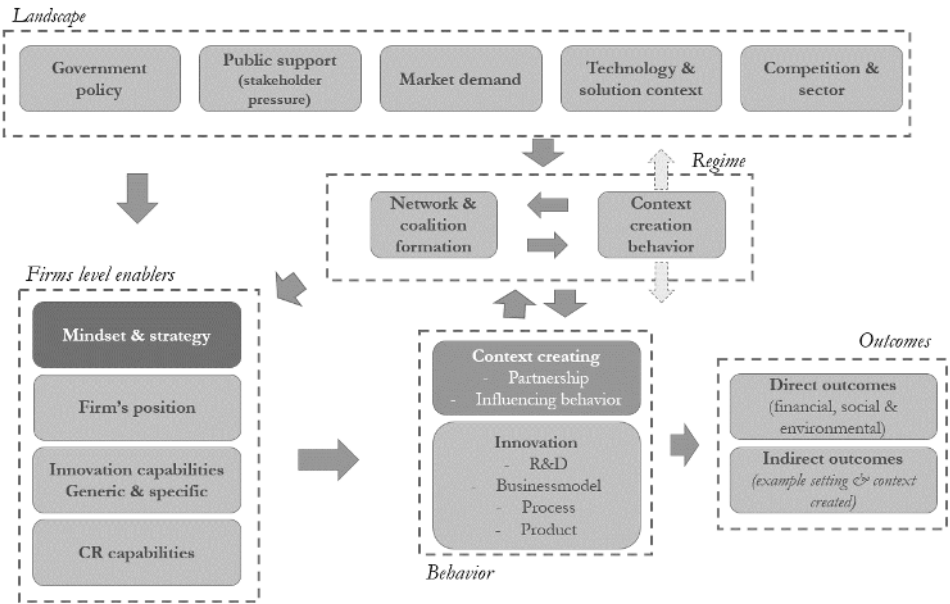


Figure 4.4 - Multi level framework to understand the influence of incumbents on transitions.

While the primary unit of analysis is the firm and the effect on the firm of the regime and landscape level dynamics, this coding framework explicitly includes the contra-wise influence of firms and regime-level coalitions on their context. Transitions happen by concurrent changes at all levels. Incumbents especially have substantial institutional power to influence the contextual dynamic. The reactive and proactive mindset influence the context as an important aspect of the firm's role in the transition. These mindsets are likely

to engender context creating behavior, such as cooperative vision casting and advocacy dynamics at the regime level, as well as example setting and context change as relevant, indirect outcomes. Including these dynamics is one of the distinct features of this coding framework, enriching the understanding of what actually drives innovations. All these three dynamics encompass influences of individual firms, coalitions of firms, and other actors to actively influence the context needed for innovation. Especially in the context of radical innovation, a supportive context can be determining. Therefore, the inclusion of these factors was expected to provide new insights in why transitions happen, and how incumbents could influence them.

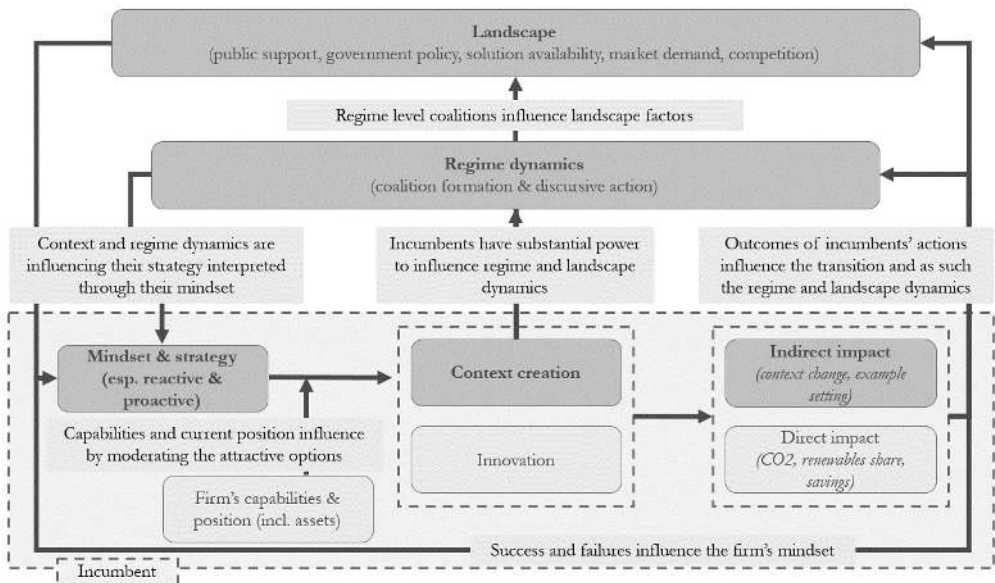


Figure 4.5 - Highlighting the context creating influence of incumbents as an important dynamic is a distinct feature of this conceptual model.

4.8.4 Coding approach

Systematic coding is essential for the reliability of the data used for further analysis. Considering the broad conceptual framework, this requires considerable diligence and care.

Coders profile

Sufficient knowledge of the conceptual framework is required to ensure that the coder is able to interpret the data in the appropriate manner. Therefore, the case study protocol includes a coder profile and, when applicable, a list of key papers to utilize for familiarization. In practice, the descriptive coding was executed by only the primary

researcher. In the causal analysis phase, two other researchers joined the operational team, who had become familiar with the conceptual roots of the approach, based on earlier discussions within the team.

Data analysis tools: NVivo and Excel database

QSR NVivo is used as the primary qualitative data analysis tool. The main function of the program is to facilitate the systematic coding and retrieval of the coded data. The documents and coding framework are loaded into the program upfront to allow easy coding. The program also allows auto-coding of, for example, the mentions of firm names. A second important use is the retrieval of the coded data for analysis. The program allows for retrieval of information coded for a specific variable or firm and as such facilitates the descriptive and further analysis of the information. During the descriptive coding, an Excel database was also developed, including references to each coded fragment (e.g. in media article # x on page y a fragment of “mindset” data regarding Essent is coded) as well as a short summary. With the help of some programmed macros, this Excel database was developed so that the underlying primary data could be retrieved by just pressing one button. The primary advantage of supplementing the NVivo database with the Excel database is that Excel allows for easy and flexible reformatting and analysis.

Reliability measures

Several generally recommended measures to ensure reliability of the coding analysis were applied and at specific crucial stages (in the analytical coding phase), dual coding was applied. Generally accepted measures to ensure reliability of qualitative data such as a detailed protocol and systematic triangulation as applied in this case study provide considerable guarantees that the findings are reliable even when coding is not fully consistent across raters. A structured case database, showing data quotes in the memos and case reports, provide transparency and enable a potential reproduction of the analysis by other researchers. From a positivist position, coder agreement is a requirement for valid conclusions. The author’s view is that this is indeed an important indicator of sound definitions of the variables and decent execution. However, considering the large resource claim that it produces, it should be applied specifically at the critical stages of the analysis and when analyzing more abstract concepts (i.e. in the analytical rather than descriptive analysis phase).

Background: author's view on reliability and the importance of intercoder agreement

Reliability is defined as one of the four traditional evaluation criteria of the quality of research (Yin 2008, Gibbert, Ruigrok & Wicki 2008). A method is reliable when two researchers would arrive at the same conclusion when analyzing the same dataset. Several measures have been proposed to improve the reliability of qualitative researchers. Among them are using a case study protocol and database (Yin 2008, Gibbert, Ruigrok & Wicki 2008), recording and transcribing interviews (Yin 2008), using an explicit content analysis method with a transparent code book as well as applying intercoder agreement tests on the content analysis (Krippendorff 2012, Miles, Huberman 1984).

Intercoder agreement shows that multiple coders interpret data in the same way using the specified code book. Several reasons might lower the coder agreement (Krippendorff 2012). Among them are inaccuracy (missing important fragments), lack of understanding of the code definitions due to lack of background knowledge (leading to inability to interpret data), ambiguous code definitions, and complexity of the coding scheme (leading to difficulties to remember all codes when interpreting the data by unfamiliar coders). Besides these four causes, latent meaning in the text might also lead to different interpretations by different coders (Krippendorff 2012). Consequently, it is advisable to improve intercoder agreement by recruiting coders with sufficient accuracy and training them regarding the required background knowledge for the coding scheme (Krippendorff 2012). Second, specifying exact code definitions and creating an overview by developing quick reference sheets and introducing a logical structure in the coding scheme (Krippendorff 2012). Finally, testing coding schemes and improving the code definitions by discussing them with other researchers and improving them based on a discussion of different interpretations (Krippendorff 2012).

There are several conditions which reduce the importance of intercoder agreement as reliability criterion. First, the reliability of coding is most important when using quantitative interpretations of the data. Because the conclusions depend directly on the calculations, and readers of the results will not be able to check with the data, dependability of coding is of key importance. In case of qualitative case analysis and when the case report directly shows and discusses key evidence for the conclusion (e.g. by directly citing from the data or referring to the source of evidence), the reader can more easily verify the interpretation of the researcher (Corley 2011, Pratt 2009). Second, in case the method uses multiple data sources and allows for triangulating results, the chances of different interpretations due to inaccuracy are significantly lower (Eriksson, Kovalainen 2008, Yin 2008).

In the context of this research project, the importance of intercoder agreement is both emphasized as well as nuanced. There are several reasons why the reliability is important: (1) a multi-step data analysis method is used, making the underlying data for the descriptive analysis not fully transparent; (2) the approach is extensive and rather complex. It could, however, also be nuanced because the method allows for extensive triangulation, verifies accounts with informants, and analyzes the data such that critical evidence can be referred to when writing up the case analysis.

Considering the foregoing, and the time-consuming nature of executing a full intercoder agreement check it was decided to apply only a partial dual-coding approach. Several aspects have been included in the protocol to improve the potential reliability: (1) defining a coder profile and prescribing training material for unfamiliar coders, (2) developing a detailed code book with references to background material and coding notes, (3) discussing the code book with other researchers to critically evaluate the clarity of the definitions, (4) segmenting the coding process in two steps to reduce the complexity, (5) using references to original evidence in all analysis steps in preparation to be able to show and refer to the original evidence when writing up the case study.

In support of this choice to apply only limited intercoder agreement checks, it can be said that several of the media analysis top-cited papers used intercoder agreement checks on a smaller sample of the data (Patton, Johns 2007, Liu 2010, De Vreese, Boomgaarden 2006, Reber, Berger 2005). This possibility is mentioned in one of the key methodological books (Miles, Huberman 1984). Other comparable holistic, longitudinal case study projects did not apply intercoder agreement checks at all. For example, the comparable Ph.D. of R. Bohnsack, which is based on a longitudinal case study of the automotive sector based on media data, uses single coder data for practical reasons (Bohnsack 2013). Many of the holistic case studies from the transitions studies school, which were studied as part of the systematic review of sustainability innovation, include limited or unstructured methods of discussion and spent most space on both the conceptual foundations of their approach and the rich description of the case (for example Raven, Geels 2010, Romijn, Caniëls 2011, Oltra, Saint Jean 2009, Monaghan 2009). Although this is an interpretation, it is assumed that the limited attention to methodological reliability in the transition school studies occurs because of a more interpretive epistemological stance and consequently more focus on a rich narrative, member check, and transparent reflection as criteria of research quality (Eriksson, Kovalainen 2008).

This study intentionally applies a multi-level, longitudinal, multi-firm case study, to capture the complexity of the interaction between incumbents and the transition, and to understand the underlying mechanisms. This produces challenges in terms of realizing

sufficient reliability. It is, however, stressed that in this project several tactics are used to ensure sufficient reliability, as well as to reduce the need for full intercoder agreement checks (as mentioned just before). From an epistemological perspective, the applied approach can be positioned as intermediate or balanced, drawing from traditional methodological insights to maximize the reliability, but without forsaking the holistic view and allowing for inductive insights to improve the understanding of the complex transition dynamics.

Code book and quick reference sheet

An extensive code book was developed defining and operationalizing the 15 categories. Also, by specifying the relevant variables, earlier literature was embedded within these categories (based on the systematic review of sustainability innovation literature). Although the descriptive coding did not code the specific variables on the lowest level (but coding was done at category level), the definitions of the underlying variables were used to consider whether a certain observed variable fits a category. As also recommended in the methodological literature, a quick reference sheet was developed, see table 4.8.

Descriptive analysis memos

After coding all the data of the media and firm-level datasets, the data was systematically analyzed and summarized in case study memos. Table templates and quantitative analysis of the coding were used to support systematic analysis of the data per category, actor, and year. This resulted in a descriptive memo with a system level analysis based on the media analysis dataset, three memos specifying the relevant findings per incumbent, as well as a descriptive memo listing the relevant findings per interview question.

4.8.5 Discussion

This section discusses the relative strengths and limitations of the descriptive analysis protocol based on content analysis method. The methodological qualities of the data gathering methods are discussed in sections 4.6 and 4.7. This discussion focuses on the relative qualities of the conceptual model and the content analysis method compared to alternatives, as well as the tactics to reduce the limitations.

Strengths

The conceptual model used provides the basis for a rich and valid understanding of the role of incumbents in sustainability transitions (Eriksson, Kovalainen 2008, Yin 2008). One key strength is that the model is *based on a systematic analysis* of the literature. Combined with

Table 4.8 - Coding categories quick reference sheet.

Landscape	<i>Scope: electricity market (sector) in general</i>
Government	<ul style="list-style-type: none"> Information regarding government policy making and influence on the electricity sector including fiscal policy, innovation policy, environmental policy, and public procurement.
Stakeholder	<ul style="list-style-type: none"> Information on pressure and campaigns of secondary stakeholders (NGOs, citizens), evidence of changes in (general public) issue awareness & urgency and evidence of (increasing or decreasing) media attention.
Technology & solutions	<ul style="list-style-type: none"> All information of solutions to electricity generation available or in development, including their (relative) characteristics (strength, weakness, risks, both from commercial and technical perspective), potential path dependencies, application potential, complementarities and lock-in risks. Specific mentions of effect of technological uncertainty.
Market	<ul style="list-style-type: none"> Information on characteristics and dynamics of the market in general, including size, growth, trends, customer characteristics, firms and their competitive position (market shares etc.) and market segments. Specific focus on awareness & receptiveness of sustainable solutions & products, and relation to consumer values.
Regime	<i>Scope: all relationships, actions and collective actions which include electricity firms and/or are targeted to influence institutions (norms/ rules/ regulations) of the electricity sector.</i>
Networks & coalitions	<ul style="list-style-type: none"> Any network, cooperation, partnership, or coalition directed (partially) at the sector & issues. code information on participants, objectives, actions, effects.
Context creating behavior	<ul style="list-style-type: none"> Actions to actively influence institutions & context for transition including <ul style="list-style-type: none"> - developing shared vision - legitimacy building & lobbying - knowledge developing & experimenting - co-developing & implementing - (cooperative) learning, reflection and common sense making - setting/developing standards
Firm level enablers	<i>Scope: for each focus firm</i>
Mindset & strategy	<ul style="list-style-type: none"> Statements of firm or representatives including motives, role perception and future vision in relation to the transition, CR and sustainability. Reports on individual (leadership) behavior of persons related to the focus firms regarding the transition, CR and sustainability as well as entrepreneurial behavior in general (appetite for bold moves, radical change and innovation). Changes in CR goals & strategy. Content of CR goals & strategy.

Innovation capabilities	<ul style="list-style-type: none"> Information on innovation track record (past success/failure and resource endowments), both sustainability innovations as well as innovation in general. Structural arrangements regarding innovation activities (budget, separate unit or not, taskforces, knowledge sharing networks). Information on firm's culture in relation to innovation (e.g. openness to experiments & failure, flexibility and freedom etc.). Evidence of cross functional, customer & supplier cooperation. Information on continuous improvement systems (including TQM, LEAN, ISO, 6sigma) and use of life cycle analysis (LCA). Information on market position (including competitive advantage, customer focus, customer satisfaction, and differentiation).
CR capabilities	<ul style="list-style-type: none"> Management systems (formal and informal, certification, KPIs, measurement, plans). Evidence of stakeholder focus and engagement. Evidence of partnerships focus and track record. Reference of links to firm's general strategy. Arrangements of responsibilities for CR matters (line vs. staff etc.).
Position	<ul style="list-style-type: none"> Information on current production & supply totals & mix. Information on asset base & investments. Mentions of complementarities or lock-in of current asset base in relation to future sustainable solutions. Financials (both balance position & profitability) of the firm as well as analyses of the current business model and where the firm earns its money.
Behavior	<i>Scope: for each focus firm, all innovations with more sustainable characteristics</i>
Innovation	<ul style="list-style-type: none"> Each mention of specific sustainability innovations, knowledge created (patents), new activities, changes, business models as well as extension of products and processes with more sustainable characteristics in relation to the transition, both activities in development or planned, as well as implemented activities. Information on characteristics of these innovations including introduction time, newness, resources involved (human & financial), barriers or drivers, expected and realized outcomes.
Context creating	<ul style="list-style-type: none"> Any mention of activities of the focus firms to influence the context for sustainability innovations. This includes the formation and joining of partnerships and coalitions, cooperating with other actors in developing or implementing innovations and the advocacy with relation to the sustainability innovation.
Outcomes	<i>Scope: for each focus firm, all innovations with more sustainable characteristics</i>
Direct outcomes	<ul style="list-style-type: none"> Information of the performance regarding sustainability of the focus firms (GHGs, renewable energy shares & capacity, energy saving, or other relevant data on sustainability impact of the firm). Data on financial effects of sustainability initiatives. Information on the impact of specific innovations.
Indirect outcomes	<ul style="list-style-type: none"> Evidence of impact of innovation and context creating activities on the landscape, regime, or individual firms with focus on example setting and context influence.

a theoretical sampling of the case, this provides a valid base to contribute to the discussion in literature. Moreover, the model is rather *comprehensive* in several respects. First, the multi-level perspective, which provides understanding of the socio-technical change process in which the firm's own transition is embedded (Markard, Raven & Truffer 2012, Geels 2005). On the firm level the conceptual model documents both innovation as well as context creating behavior and direct as well as indirect outcomes. Finally, the model includes the whole causal chain from context and internal enablers, through behavior to outcomes. The content analysis method as elaborated in the protocol provides for considerable reliability (Krippendorff 2012, Miles, Huberman 1984). The extensive code book, including a large number of coding notes, provides the basis for consistent coding. Second, discussion with several researchers from both the transitions, innovation, as well as the corporate responsibility research communities provides for improved clarity of the code book. The two-step coding approach (descriptive and then analytical) reduces the complexity and as such enables accurate use of the code book. Fourth, the use of NVivo as the coding tool provides for systematic coding and retrieval. The coder profile and familiarization instruction check reduce the risk of cross coder differences. A final tactic to improve the reliability is the use of table templates for the analysis.

Krippendorff (2012, p. 334), as key methodological author for content analysis, adds a different set of empirical validity criteria for use with content analysis. First is *sampling validity* which considers the representativeness of the sample. Considering the use of theoretical case sampling, and the fact that no stratified sampling is used to reduce the number of articles to be analyzed, this criterion applies less to the applied qualitative content analysis procedure. Second, *semantic validity* is defined as the degree to which the analytical categories accurately describe the meanings and uses in the chosen context. This is largely ensured by the use of interviews, informants, and feedback on the case description. Third, *structural and functional validity* refer to the validity of the concepts used, which is ensured by the use of concepts drawn from a systematic literature review. Finally, *correlative and predictive validity* refer to valid causal inferences, which is in fact not the goal of this descriptive step and is discussed further in the next section.

Limitations

On the conceptual level, the used model is rather comprehensive, but it does make some choices in terms of conceptual focus. First, although the landscape dynamic is included in the conceptual model, this is not the prime focus. Other authors place more focus on the policy dynamic (e.g. Safarzyńska, van den Bergh 2010, Popp, Hafner & Johnstone 2011), or the issue life cycle at macro level (Van Tulder, Van der Zwart 2006, Conceição, Heitor & Vieira 2006). The choice to focus on incumbents implies a limited focus on the development of niches and entrants that might develop into a part of the future regime

(Schot, Geels 2008, Nill, Kemp 2009, Hekkert, Negro 2009). Finally, the conceptualization of the firm-level process has limited focus on the intra-firm processes. Although the firm level enablers do, for example, conceptualize mindset change and firm level enabling structures, the data sources and level of detail implies less focus on the intra-firm process. In fact, intra-firm processes can even be conceptualized to the individual employee (and his mindset and behavior) as a unit of analysis, which might indeed be an additional enlightening focus for further research (e.g. Schaltegger, Wagner 2011, Hoffmann 2007).

The comprehensive conceptual model can be compared to more focused conceptual designs. In fact, many concepts or combinations of concepts used in the conceptual model could be used in more focused research designs. For example, the relationship between individual enablers and innovation behavior, or the relationship between innovation behavior and specific outcomes. It was an explicit choice to develop this comprehensive conceptual model to study the interaction of multi-level dynamics and between the different enablers and outcomes. The systematic data gathering and analysis does allow for more focus in the causal analysis and follow-up research. However, although the focus is broad, this study does have a rather structured protocol and analysis method. Combined with a careful causal analysis including sufficient triangulation of the findings, this should lead to internally valid conclusions.

The descriptive analysis protocol is a balanced alternative in between more structured, but as a consequence scoped, quantitative content analysis, and less structured holistic or inductive methods. Quantitative content analysis with its rigidity (Krippendorff 2012), would less likely meet the goal for more understanding of the why and how of the role of incumbents in transitions (Yin 2008, Eisenhardt, Graebner 2007). On the other side of the methodological spectrum, many studies in the transition school use holistic and inductive approaches for content analysis, which do not upfront specify the conceptual model, or have more open definitions (for example Raven, Geels 2010, Romijn, Caniëls 2011, Oltra, Saint Jean 2009, Monaghan 2009). This would limit the potential to add to the literature debate and has considerable challenges in terms of reliability.

Two limitations directly induced by the comprehensive approach are the high level of complexity and time-consuming nature of the method. Complexity does provide a challenge to arrive at reliable conclusions. Several tactics have been integrated in the protocol to ensure reliability even with the complex conceptual understanding of the case (Krippendorff 2012). However, it requires sufficient knowledge and competency from the researcher as well as a great deal of time. Due to the time-consuming nature, it has been decided not to use two coders for the whole dataset (refer to section 4.8.4 for a more extensive substantiation). Also, replication is more expensive compared with less comprehensive methods. Based on the

causal understanding gained during the case study, more focus might be introduced for later replications, reducing these disadvantages for future research.

Finally, latent meaning and hidden motives remain a challenge for content analysis in such real life, competitive settings (Krippendorff 2012). Triangulation of the findings and validation with informants and interviewees provide more certainty that hidden dynamics are also captured. It remains important to have a knowledgeable and competent researcher to discover and capture this added meaning.

4.9 CAUSAL ANALYSIS – SYSTEMATIC SEARCH FOR EVIDENCE ON THE ELEVEN PROPOSITIONS

The objective of the causal analysis is to systematically analyze the rich, comprehensive and descriptive dataset (4.9) upon evidence of the relevant causal relationships as identified in the propositions formulated in chapters 2 and 3.

4.9.1 Focus: systematic evidence gathering for the propositions

The three empirical chapters of this thesis (5-7) each explore a specific subset of the propositions defined in chapter 3. Chapter 3 has defined a comprehensive, multi-level framework to explore incumbent behavior. These propositions concretize the more general propositions defined in chapter 2 (see table 3.8 for an overview of these linkages). The challenge of such a framework is to capture the system-level dynamic, while still achieving a sufficient level of reliability and validity. By starting the empirical survey with a comprehensive descriptive analysis, the method ensures a broad system-level perspective. To arrive at valid causal inferences within this context, more focused analytical work is needed. Therefore, the causal analysis phase builds on this rich dataset to analyze and present the empirical data in three focused analyses.

As table 4.9 summarizes, chapter 5 discusses specifically the contextual antecedents of incumbent behavior in the transition and how interpretation by the incumbents of these factors matter in their response. This analysis uses the categorization of contextual antecedents developed in the systematic literature review on sustainability innovation as it is engrained in the descriptive analysis coding framework. During the descriptive analysis, relevant evidence for each of these contextual antecedents has already been identified. The understanding of contextual antecedents as reported in the media analysis is further enriched with data from the actor interviews. In the causal analysis, specific attention is paid to the differentiated impact of the contextual antecedents on incumbents with a different level of pro-activeness of their leadership mindset and strategy. Furthermore, attention is paid to the

perspective that pro-activeness influences the ability of incumbents to adopt emerging cognitive and normative institutions implied in transition, as was asserted in proposition 11b.

Chapter 6 focuses further on the ability of incumbents to influence their context within meso-level advocacy coalitions. Policy evolution and how this is influenced by advocacy coalitions is chosen as the anchor, because it is a highly influential and central factor in the contextual antecedents. Other contextual factors either materialize in policy evolution (especially public support) or are also strongly shaped by policy evolution (such as market demand and solution availability). Since policy is captured in concrete documents, it is also a reliable measure to map. Building further on section 3.5 the context creating behavior is operationalized with help of a method from the policy analysis literature, which allow for the specific mapping of coalitions and discursive strategies. This provides insight in the coalitions and discursive strategies (narratives, discursive positions) of actors. This will be mapped on the Energy Agreement as the central policy document that embeds many of the earlier policy making processes in a comprehensive agreement and is meant to be the anchor for energy policy in the period 2013-2023. To link this back to the overall approach of this

Table 4.9 - Conceptual and methodological approach of the three empirical analysis chapters.

Chapter	Conceptual focus	Methodological approach
5	<ul style="list-style-type: none"> • Influence of contextual antecedents. • Moderating and mediating role of the mindset with regard to the contextual influence. 	System analysis approach based on media analysis data & actor interviews; differentiated impact based on theory and triangulation with data.
6	<ul style="list-style-type: none"> • Context creating behavior (coalitions; discursive strategies) > Policy evolution. • Influence of leadership mindset on context creating behavior. • Projected impact of policy evolution on the transition. 	Discourse & coalition analysis based on the Advocacy Coalition Framework; mapping findings on policy evolution (Energy Agreement); discussing relevance of Energy Agreement with actors.
7	<ul style="list-style-type: none"> • Leadership mindset > Innovation behavior > Impact & financial performance. • Strategic position as mediator (capability to a lesser degree). 	Systematic analysis of leadership mindset, strategic position, innovation behavior and outcomes for three focus incumbents; contrasting the three incumbents.

thesis, the meta-narratives employed by the different coalitions as well as in the Energy Agreement are linked to the characteristics of the four distinct incumbent (leadership) mindsets, as outlined in chapters 2 and 3. Finally, based on discussions during the actor interviews, the projected impact of the Energy Agreement is discussed to allow for some preliminary insights into how the Energy Agreement will influence the evolution of the Electricity sector and the transition dynamics within the sector.

The focus in the third analytical chapter is innovation behavior of incumbents, its incumbent-level antecedents and outcomes. Innovation behavior is operationalized, building on the framework from section 3.4, which is rooted in the innovation literature. Based on a systematic analysis of the leadership mindset, the linkage between mindset and behavior is analyzed. Furthermore, the chapter studies strategic position as a key moderator of this relationship, building on the literature discussion preceding proposition 12 in chapter 3. Although, due to limitations of the empirical approach, capabilities are mapped only to a limited extent, the analysis does provide for observations on the importance of capabilities as mediator. Finally, the evidence for outcomes both in terms of impact as well as financial performance are investigated. In conjunction, this approach provides for a rich understanding of the causal dynamic on the incumbents from antecedent, to behavior, to outcomes and provides evidence of the importance of linking planned and actual behavior, as outlined in proposition 1.

These three causal analyses provide observations on all the 12 propositions outlined in chapters 2 and 3. In chapter 2, four propositions on pro-activeness were outlined. In chapter 3, eight further propositions were specified, which contextualize and embed these in an integral framework for understanding incumbent behavior (see table 3.8 for the relationship between the proposition in chapters 2 and 3). Table 4.10 maps these propositions on the empirical chapter as described just before. As can be seen, the combination of these three analyses will allow for observations on all of the propositions.

4.9.2 Methods for pattern finding and discovering causal linkages

Inspired by the methodology source book of Miles, Huberman & Saldana (2014), two core analysis angles are used to explore relevant causal linkages, besides direct causal evidence. Please refer to the relevant sections of chapters 5 to 7 for a more detailed description of the analysis approach.

Method 1: Company comparison

The first method to find potentially relevant causal linkages is the comparison of the data of the different incumbents (for one year). This can be done by combining data summarized in a table per incumbents in one table. After combining the tables, the common values (which

Table 4.10 - Linking the propositions to the three empirical analysis chapters of this thesis.

#	Proposition	Conceptual focus	Causal analysis inclusion
1	There exist four distinct ideal types of CSR strategies; they can be linked to stages of CSR engagement, but in a non-linear mode; the distinction between the effectiveness on firm level and on societal level as well as planned vs. actual behavior is crucial to gain further understanding of the proactive stage.	Pro-activeness as ideal types; impact focus	Embedded in overall approach
2	A proactive approach is equally triggered by internal as well as external drivers; internal drivers are based on a timely combination of core capabilities, the nature of the industry, values, and mindsets related to leadership; external drivers, which especially differentiate the proactive from active approach, depend in particular on the potential to engage external stakeholders in positive change.	Antecedents: internal: capabilities, sector nature, leadership mindset external: stakeholder collaboration (as key differentiator)	Chapters 6 (stakeholder collaboration, link with mindset) & 7 (capabilities, link with mindset)
3	A proactive strategy produces superior financial performance when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector. A proactive strategy can only be financially viable if mediated by the build-up of specific internal capabilities, mindsets and strategic leadership.	Financial performance (long term). Capabilities & leadership as mediators	See proposition 10. Chapters 6 (context creating) & 7 (innovation)
4	A proactive strategy produces superior impact (on the societal issue) especially when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector.	Impact (long term)	See proposition 9. Chapters 6 (context creating) & 7 (innovation)

#	Proposition	Conceptual focus	Causal analysis inclusion
5	<p>The higher the level of pro-activeness (of the incumbent's leadership mindset), the higher the impact of the incumbent.</p> <p>5a: The relationship between pro-activeness of the mindset and impact is mediated by context creating and innovation behavior.</p>	<p>Multi-level iterations; innovation and context creating as unit of analysis; pro-activeness as key antecedent</p>	<p>Embedded in overall approach</p>
6	<p>Four types of incumbent mindsets can be distinguished in practice based on the motives, role perception, and transition vision of incumbent leadership.</p> <p>6a: The inactive ideal type is characterized by its explicit positioning of sustainability aspects as irrelevant to business and ignoring activities which do not fit their general profit-focused strategy.</p> <p>6b: The reactive ideal type is characterized by its focus on external demands and activities targeted mainly at sustaining public legitimacy.</p> <p>6c: The active ideal type is characterized by its focus on implementing the internal strategy and capturing opportunities for value creation with incremental sustainability innovations.</p> <p>6d: The proactive ideal type is characterized by its focus on leading systemic change and embracing collaborative and radical change.</p>	<p>Leadership mindset</p>	<p>Chapters 6 & 7</p>
7	<p>7a: A proactive mindset leads to relatively less incremental innovation.</p> <p>7b: A proactive mindset leads to relatively more innovations of intermediate and radical (highest) level of radicalness, as well as a higher average scale for these innovations.</p>	<p>Leadership mindset > innovation behavior</p>	<p>Chapter 7</p>

#	Proposition	Conceptual focus	Causal analysis inclusion
8	A proactive mindset leads to creating cross-sectoral, multi-stakeholder coalitions around sustainability-centered, future-oriented visions.	Leadership mindset > context creating behavior	Chapter 6
9	Proactive innovation and context creating behavior increases the impact of the incumbent's behavior on the transition in the long run.	Proactive behavior (innovation + context creating) > impact (LT)	Chapters 6 & 7
10	Proactive innovation and context creating behavior increases the survival chance and future competitive advantage of an incumbent's behavior, especially from a long-term perspective.	Proactive behavior (innovation + context creating) > financial performance (LT)	Chapter 7 (chapter 6 with regard to indirect effect via context creating)
11	11a: The influence of (a) stakeholder pressure, (b) supporting government policy, (c) market demand, (d) solution availability, and (e) competition is moderated by the pro-activeness of the incumbent's mindset. 11b: A proactive mindset positively influences embracing specific emerging cognitive institutions implied in a transition and, as such, a mindset change mediates the proactive behavior in anticipation of the transition.	Differential impact of contextual antecedents	Chapter 5
12	The incumbent's capabilities and strategic position moderate the relationship between a proactive mindset and innovation and context creating behavior.	Capability & strategic position as mediators	Chapter 7

Table 4.11 - Example of summary table to list common and exceptional values per variable.

	Common values	Exceptional values
Variable A	• All companies have comparable structures.	• Company C employs a new type of behavior.
Variable B	Etc.	Etc.
Variable C	Etc.	Etc.

are comparable variables for each company) and exceptional values (one or two companies show significant differences from others) are noted in a table. Based on this exercise, relevant linkages between commonalities and exceptionalities in behavior, outcomes, and enablers might emerge. When analyzing the sequence, going backwards is likely to yield most insight, i.e. from the outcomes, to behavior, to enablers.

Both commonalities and exceptionalities are relevant to devise causal linkages. In fact, on an abstract level there are four possible scenarios (as depicted in table 4.11) of the variable values and all are relevant to consider. Exceptional enabler values in combination with differences in outcomes, but also common enablers' value and comparable outcomes, produce the hypothesis that a variable has a significant causal linkage. This could be potentially relevant for understanding incumbents' behavior and should be investigated further to validate that this is not just co-variance. However, evidence for the insignificance of a variable is also relevant to consider, because the variables included in the conceptual model all are rooted in earlier evidence and this might be relevant evidence negating the earlier findings.

		Relative outcome	
		Comparable	Difference
Enabler value	Common	Significant	Insignificant
	Exceptional	Insignificant	Significant

Figure 4.6 - Insignificance or significance of a variable depending on the possible combinations of enablers and outcomes.

Method 2: longitudinal comparison

Comparison of values over time has a large potential to discover relevant causal connections (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014, Pettigrew 1990). To execute

the temporal analysis, the templates of two consecutive years are compared. In line with the company comparison, the changes and consistencies in variable values can be noted both on sector level as well as on firm level. Again, the focus is on finding linkages between outcomes, behavior and enablers. Both changes as well as consistencies can be relevant in terms of interpretation. Especially temporal sequences in changes can point to relevant evidence: e.g. a strategy change leading to many new innovations and positive outcomes, or introduction of an innovation leading to follower behavior by others.

Three potential causal patterns are the core focus in this study:

- *Enabler > Behavior > Outcome*: this is the basic causal pattern engrained in the conceptual model and many potential causal linkages are included in the model to find potential evidence. Also, partial sequences (enabler > behavior etc.) are relevant.
- *Context creating behavior > Context change > Behavior change*: this causal pattern is an important addition to the basic causal pattern. In this pattern, an incumbent or a coalition has indirect impact by bringing about a context change leading to behavior change within the sector.
- *Invention & implementation of new behavior > Follower behavior*: this is the second type of indirect impact, which might reveal a broader impact of the incumbents in the sector. Note that this type of relationship is most likely to be discovered in a longitudinal analysis.

4.9.3 Validation of causal evidence

Whether evidence for causal linkages results from actor perceptions or from pattern analysis, all evidence should be validated. Five validation tactics, to be applied sequentially, should ensure sufficient validity of causal inferences.

1. *Try to understand causal chain*: the first step to validate a causal assertion is to establish a clear causal chain. Is the perceived relationship logical and in line with earlier research? For example, if a more flexible structure seems to lead to more positive outcomes, it is relevant to see whether evidence of specific innovations leading to the positive outcomes can be found after the new structure was introduced. When needed, going back to theory for more nuanced conceptual frameworks and to benchmark with earlier findings can provide more insight in individual linkages. Finding more supportive evidence by gathering additional secondary data can also be employed as a tactic in this stage. If this is done, it should be mentioned in the memo and rival explanations should be carefully considered to prevent bias by targeted data search.

2. *Consider hidden motives*: it is important to explicitly consider potential hidden motives, which might alter the perspective on certain behavior. This is especially relevant because of the reputational dynamic surrounding corporate responsibility, which might make a biased presentation of facts attractive to actors (Jones, Comfort & Hillier 2007, Holcomb, Upchurch & Okumus 2007, Tate, Ellram & Kirchoff 2010, Cowper-Smith, de Grosbois 2011). For example, a firm might be tempted to attribute new innovations to a new CR strategy to gain legitimacy, while there might be other important motivations.
3. *Rival explanations*: the conceptual model includes several potential rival explanations of behavior of incumbents (such as context vs. strategy) and potentially more might become relevant (Eisenhardt 1989, Miles, Huberman & Saldaña 2014, Yin 2008). Explicit consideration of rival explanations further improves the validity.
4. *Triangulate with secondary data*: data from newspapers and CR reports could help to validate the facts underlying certain causal statements (Miles, Huberman & Saldaña 2014, Yin 2008, Graebner 2009, Gilbert 2005). For example, can temporal patterns be observed to make causality likely and are perceived facts supported by data from trusted sources?
5. *Triangulate actors & informants perceptions*: the research design enables further triangulation of both facts and especially causal linkages with interview data and by validating with informants (Miles, Huberman & Saldaña 2014, Yin 2008, Graebner 2009). The inclusion of interviewees from different spheres, including NGO and government actors, allows for critical validation of corporate perspectives.

A clear causal explanation, after surviving dual triangulation, provides clear evidence for a causal linkage, at least in the context of this case. It is also possible, however, that more ambiguous evidence emerges, or only limited evidence can be found. In this case, the ambiguity should be made transparent in the case description, by showing contrasting evidence or mentioning that only limited evidence was available.

In the causal analysis phase, focusing on specific causal relations with potentially high relevance improves the validity. The holistic nature of the conceptual model is a clear advantage in the descriptive phase and allows to identify the most relevant aspects to focus on. However, to build strong evidence for an important causal relationship, more focus improves the validity of the conclusions.

4.9.4 Discussion

The applied case protocol has several strengths to arrive at valid conclusions, but overcoming limitations is also considered.

Strengths

- *Cross company and longitudinal analysis*: the research design allows for contrasting characteristics and behavior across companies and across time. This provides a good basis to find relevant patterns and discover new causal relationships (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014, Pettigrew 1990).
- *Triangulation with actors from different spheres*: the design allows for triangulation, which is a key strategy to improve the validity of qualitative research (Miles, Huberman & Saldaña 2014, Yin 2008, Graebner 2009). In this design, the inclusion of actors from different spheres (business, government, NGO) allows for critical validation of perspectives.
- *Triangulation with secondary data*: a second type of triangulation possible is the triangulation with secondary data (newspaper and CR reports), which allows for fact checking (Miles, Huberman & Saldaña 2014, Yin 2008, Graebner 2009, Gilbert 2005). The longitudinal design also allows for sequence over time, and as such, establishes strong chains of evidence.
- *Clearly documented and transparent chain of evidence*: the coding of data in NViVo and systematic analysis allows inclusion of the data when summarizing the causal analysis. This enables the composition of a clear account of the chain of evidence while showing the most relevant data (Miles, Huberman & Saldaña 2014, Yin 2008).
- *Check for rival explanations and hidden motives*: the rich conceptual model and data set intrinsically allows for checking rival explanations and possibly discovering hidden motives. This is an often-recommended tactic to improve the validity of qualitative findings (Eisenhardt 1989, Miles, Huberman & Saldaña 2014, Yin 2008).
- *Informant validation*: finally, the conclusions from the causal analysis are validated with informants and participants, which strongly improves validity and reduces the risk of a researcher bias or a bias induced by external perspective (Eriksson, Kovalainen 2008, Miles, Huberman & Saldaña 2014, Pettigrew 1990).

Limitations

- *Missing data for variables*: although the mix of data sources used allow for a rich picture of the ongoing dynamic, for some variables the relevant data might be limited. In this case, causal inference should only be made with caution and the limited quantity of data should be clearly mentioned. When judged relevant,

additional data might be collected. Selective collection of data should be clearly mentioned and judged for validity.

- *Motivational ambiguity*: considering the enablers of behavior of incumbents in transitions, motivational ambiguity often exists. This can be partly overcome by critically evaluating secondary evidence and triangulating statements and perceptions.
- *Outside perspective*: a consequence of the methods used is that intra-firm processes are only transparent when either reported by the company itself, or revealed in interviews. When this happens, a clear limitation with regard to potentially relevant linkages is found. Follow up research might be necessary.
- *Ongoing transition*: transitions are often multi-decade processes and of evolutionary nature in the sense that end goals and pathways (solutions) change along the process (Geels 2005, Farla, Alkemade & Suurs 2010). While others have applied research to historical transitions (Geels 2007a, Geels 2007b), considering the current challenges and the idiosyncratic nature of transitions, it is relevant to research ongoing transitions as well. It is important to consider the potentially changing perspective on the transition and, when relevant, consider facts from different perspectives. This is especially the case when considering outcomes and their relationship to the transition as a whole. For example, an innovation leading to significant reductions of GHG might also lead to lock-in, or be incompatible with an attractive future pathway. It might be difficult or impossible to objectively evaluate this outcome, considering the divergent perspectives. In this case, mentioning the divergent evaluations of certain outcomes is important.
- *Limited to one sector and national context*: the case-based method implies limitations to external validity. Although findings could be linked back to theory and replicated, it is important to consider the specifics of the case when considering the external validity of the findings (Yin 2008, Eisenhardt, Graebner 2007). When discussing the case selection several specifics were already mentioned. Especially the sector and national context has specific characteristics, which need to be taken into consideration when applying findings to other incumbents in radical transitions.

4.10 DISCUSSION AND CONCLUSIONS

In this section, methodological strengths and limitations of case study approach as whole are summarized. This discussion builds on and summarizes the earlier discussions of each individual aspect of the methodology.

Conceptual and case focus

The conceptual approach is characterized by the integration and elaboration of three schools in literature. This combination has a potentially strong contribution to greater understanding of incumbents' role in transitions, as was theoretically discussed in chapter 3. The protocol integrates corporate responsibility and innovation literature with the transition literature. This provides the opportunity to understand the interaction between firm level behavior and the evolution of landscapes and regimes. While transitions involve concurrent technological and institutional change and individual actors such as incumbents play a crucial role in this change process, this multilevel perspective provides most perspective on understanding the complex dynamic. While earlier approaches studied either the context dynamic or the firm level situation, the combination of the two is a significant contribution to earlier work.

Besides the concurrent study of firm level and context dynamic, the theoretical approach can be characterized on several aspects. First, the study of the role of incumbents contrasts with much focus in literature on the role of niches, challengers, and start-ups. Although these are important in transitions as well, the role of incumbents is as relevant and not extensively studied. Second, this approach focuses on radical change processes, while much literature in the corporate responsibility school has focused on incremental innovation, or failed to differentiate between these. While many of the current transitions produce radical change and this process is even more difficult, there is a need to specifically study radical change processes. Third, the aspect on which this approach can be characterized is the focus on the concurrent dynamic of context creating and innovation behavior. While most literature focuses on innovation and the direct impact of the firm by changing its own core business, it is expected that the incumbents' role in creating the context for broader change in the sector has as much impact on the transition and interacts with the internal process. Finally, the focus in this approach is on the impact of the transition as outcome. In the language of the corporate responsibility literature, this might be positioned as focus on environmental or social impact rather than financial performance. The former is the topic of study in most outcome-focused studies and the systematic review showed that the environmental and social impact of corporate responsibility is, strangely, insufficiently studied. While this protocol also includes capturing data on financial outcomes, the focus is on impact. This can also be nuanced, because in radical transitions the firm's survival in the market is at stake. Therefore, impact on the transition is correlated with business stakes as well as from a long-term perspective.

The selected case of the electricity sector in the Netherlands provides a potentially enlightening case. Studying ongoing transition as long-term change processes is a challenge, because the process is unpredictable and in some phases insufficient change might happen to make valid inferences on causal linkages. The electricity sector in the Netherlands was

selected because there are several indications that the transition is in an accelerating phase, and all the incumbents are actively approaching this transition. Another challenge is to concurrently build insight into the context dynamic and firm level process. The case is also attractive from this perspective. Because of the public relevance of energy, there is broad coverage of the process in the media, but the incumbents also publish extended reports on their own actions.

Although the case has much potential, several specificities are to be considered in generalizing the findings. First, the findings might be less applicable to challengers than to incumbents and in more incremental adaptation processes. Second, the sector is characterized by its former public roots and is consolidated to a high degree with three players controlling 85% of the market.

Methodological approach

The qualitative, case-study research design fits the focus on understanding the why and how of incumbents' behavior in transitions. Rather than just describing the behavior of incumbents in transitions, the explicit goal in this approach is to understand the underlying motivations and causal linkages. The protocol starts from a large base of potentially relevant causal linkages. Studying these relations integrally is likely to unveil more about the interaction and eventually the relative significance and causal sequence of the proposed causal relations. While the approach attempts to concurrently capture the process at multiple levels and the interactions between them, a quantitative approach such as a survey would be virtually impossible. The qualitative approach comes with challenges, especially with regard to the reliability and external validity, which have been carefully considered and mitigated when possible. The potentially improved understanding of a rich and internally valid description of a potentially enlightening case was, however, preferred in selecting this method.

A longitudinal, embedded case study is the basis for further causal understanding. This approach provides two opportunities for structurally uncovering causal patterns. First, the behavior of three incumbents is contrasted and differences or similarities in enablers, behavior, and outcomes can be contrasted. Second, the change of the factors over time can be used to understand relevant sequences of change. This structured approach to study the secondary data set is supplemented with validation and discussion of the uncovered patterns with interviewees. The combination of structured pattern analysis and actor validation provides for valid conclusions. Probably the biggest disadvantage is that it is very expensive to execute, due to its complexity. This might limit replication. However, future replications could focus on a specific aspect of the conceptual model and thus make replication less expensive. Another risk of the longitudinal approach is discontinuities in the data over time

(e.g. the bankruptcy or acquisition of an incumbent). Other than careful case selection this risk cannot be prevented, nor is it theoretical, because of the radical nature of transitions.

A well-documented content analysis method is the basis for sufficient reliability of the data. An extensive code book, including references to literature and coding notes, guides the content analysis. A coder profile and familiarization approach is also included, recognizing that the coders' competence strongly influences the reliability of this technique. A two-step analysis approach, in which the data is first coded in fifteen categories and utilizing this understanding and the developed dataset for more in-depth causal analysis, provides for strong reliability and validity. A strategic approach to apply partial dual coding in causal analysis phase provides for a balance between reliability and practical feasibility. The use of NVivo as a computer-assisted coding tool improves the structured retrieval of the data, while the use of structured summary tables allows for systematic analysis of the data.

Construct validity of the analysis is ensured by triangulating a set of different data sources, which mitigates several limitations of the individual sources and methods. The analysis of CR and financial reports of the incumbents provides a detailed view of their behavior. The analysis of newspaper data adds a comprehensive picture of the context dynamic. Supplementing both data sources with interviewees and incumbents as well as stakeholders provides for more understanding of the underlying motivations and actor perspectives. Triangulating the facts from the company reports with media analysis data, as well as validating the most important findings in interviews, allows the potential bias of selective or misrepresented data in the corporate reporting to be overcome. Conversely, statements of interviewees can be triangulated with the factual and pattern analysis from the secondary data, but also by triangulating the perspectives of different stakeholders. While it will remain a challenge to overcome bias due to latent meaning or hidden motives, the multiple triangulating potential allows this risk to be minimized. A semi-structured interview approach which starts with open-ended questions before validating outcomes of the earlier analysis, limits the danger of a question bias. Providing confidentiality and explicitly asking for personal perspective, limits the risk of socially desirable answers in the interviews. When analyzing the data, it is explicitly considered that this approach has a certain risk for elite bias (because of interviewing leaders) and outside bias (because most data is from an outside perspective). The longitudinal character of this resulting data set also allows for matching plans with actual behavior and outcomes, and in that way to overcome the plans vs. practice bias. Because the process is studied while the transition is still ongoing, this limits the retrospective bias. This is in contrast to the historical method often applied in transition studies.

In terms of construct validity, the extensive conceptual model provides a challenge as well. The broad focus provides the basis for an internally valid and potentially enlightening causal

analysis. However, it poses a clear challenge in collecting sufficient data for each concept. While the multi-data source approach provides a rich data set, for some variables insufficient data might be available. When there are indications of potential relevance but insufficient data to sufficiently triangulate findings, a focused search for additional data supplements the base dataset. Because clearly mentioning this is prescribed, and considering the limitations of the selective data search, the protocol accounts for the methodological limitation of this approach.

The rich data set, combined with structured causal pattern-seeking and validation, provides potential for a strong internal validity of the conclusions. Based on the rich data set, both analysis of the differences between the companies, as well as changes over time, allows for a structured search for causal linkages within a comparable context. Validating the findings in interviews provides for additional evidence for potential conclusions. The conceptual model includes different theoretical perspectives, such as context, capabilities, and mindset (behavioral) explanations of corporate behavior. As such, it allows for explicit comparison with rival explanations. Another way to include rival explanations, especially relevant when studying ongoing transitions, is the inclusion of perspectives of multiple stakeholders which might diverge in the midst of a transition. The approach is likely to yield rich and robust evidence for causal linkages. The protocol and resulting case database also enables the quick tracing of the chain of evidence and therefore allows for inclusion of the source data for specific evidence in the final case description. This allows the reader to judge the strength of the underlying evidence. A potential risk of the broad conceptual approach is that the evidence for specific causal relationships is less strong because of the divergent focus. The protocol does include a sound approach to validate conclusions by utilizing triangulation, considering rival explanations, and informant validation of all conclusions. Further validity of the conclusions might be achieved by a more focused study of specific variables or relationships e.g. in future replications. Potential interference from outside of the case scope requires explicit attention to ensure validity. For practical reasons the case is scoped on the national level and focused on one sector-issue combination. Interferences from other sectors (e.g. gas or oil sector) and beyond the national level should be considered when found to be relevant from the data.

A case selection and conceptual model based on earlier literature makes the findings externally valid. In line with the recent methodology debate, it is argued that the external validity of qualitative studies is not rooted in statistical representativeness, but in the ability to link the findings back to theory. To allow for this type of generalization, the case was selected based on a theoretical logic. The conceptual model underlying the code book was developed based on a systematic review of the relevant literature. The protocol provides for many opportunities to link the findings back to the literature. As was argued before, besides

the testing of earlier findings, the protocol also contributes by explicitly elaborating the theory. Based on this generalization logic, it is rather important to consider the case specificities as they were mentioned before when generalizing the findings. Based on the relevant findings, replication in other contexts and with extreme cases might further improve the external validity of findings in the future.

Part III – Empirical validation – Dutch Electricity sector as case study

Chapter 5 Disruption in slow motion – how incumbents’ misinterpretation of structural, contextual trends leads to disruption

5.1 INTRODUCTION

5.1.1 Relevance and context

Transitions are turbulent processes which may lead to disruption for incumbents. Markard et al. define a socio-technical transition as “a set of processes that lead to a fundamental shift in socio-technical systems, which involves far-reaching changes along different dimensions: technological, material, organizational, institutional, political, economic, and socio-cultural.” (Markard, Raven & Truffer 2012). That incumbents tend to fail to adapt in the face of such radical change has been extensively documented in both the innovation and transition literature (Geels 2004, Unruh 2000, Cooper, Schendel 1976, Henderson, Clark 1990, Christensen 1993, Chandy, Tellis 1998, Christensen, Bower 1996, Turnheim, Geels 2013). In this first empirical chapter, the disruptive dynamic as it becomes visible in the Dutch Electricity sector in the timeframe 2012-2013 is analyzed. As is discussed more extensively in section 5.3, the incumbents show a high degree of discomfort in their participation in the public debate in this period. Furthermore, impairments made by the top 3 incumbents add up to more than €6 billion over a period of four years. The high impact is visible as well in the radical strategy and organizational changes made by these incumbents and their parent companies in the same period.

Incumbents tend to blame their failure to proactively innovate on contextual causes. A key question considering this value-destroying dynamic – also visible in the case of the Dutch Electricity sector – is whether incumbents could have anticipated the dynamic by proactively innovating and transforming their business. It is remarkable that when participating in the public debate, incumbents position their failure to anticipate as a consequence of contextual factors. They adopt strong words to describe the dynamic such as “dumping,” “strong market disturbance,” and blaim their problems on “being forced out of the market,” and the support schemes of the government. Moreover, they refer to “crisis” events such as the Fukushima meltdown and Atomausstieg as the root cause of the challenges they face. In this chapter a structural analysis of the contextual situation is made to validate the relevance of these claims.

The incumbents’ lack of a timely response can, however, also be related to their interpretation of the contextual dynamics. In the framework presented in chapter three, the mindset of incumbents was positioned as a central variable to gain understanding of

incumbents' behavior in the context of transitions. Earlier literature points to the fact that the incumbents' response is often an interaction between the contextual influence and the interpretation guided by their mindset. First, specific contextual stimuli might have most influence on incumbents with a specific ideal type of mindset. For example, an uncertain policy situation might reinforce players with a reactive mindset in their strategy (Meijer, Hekkert & Koppenjan 2007, Markusson et al. 2012), while proactive players might seek to advocate policy stability or other means to hedge this risk. Second, the mindset of the incumbent is likely to influence its willingness to embrace new cognitive models and norms which are at tension with the current dominant way of thinking. The mental lock-in which has often been documented with regard to incumbents (Christensen 1993, Danneels 2004, Christensen, Bower 1996), is likely to be related to the reactive mindset. To investigate the relevance of these effects in the case, the analysis specifically analyzed whether the context predominantly reinforced a specific mindset, as well as the tensions between emerging institutions and the dominant way of thinking.

5.1.2 Research focus linked to the propositions

The primary focus of the analysis presented in this chapter is the influence of contextual factors on the behavior of incumbents in the context of the transition. Utilizing the relevant variables identified in literature and theory, it is investigated whether these contextual influences can be identified in the case under investigation. The direct influence is visualized in model 1 in figure 5.1.

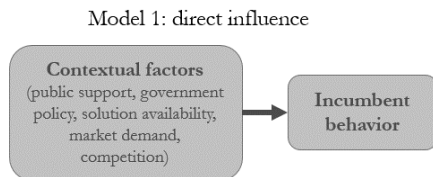


Figure 5.1 - Model 1 the traditional approach of mapping the direct influence of contextual factors.

A specific attention point in doing so is the differential influence of contextual factors moderated by the leadership mindset of the incumbent. As was explained in chapter 3 when discussing proposition 11a, literature provides evidence that the influence of contextual factors is not linear, but contingent on the leadership mindset. Rephrased, it is of interest to see whether the context mostly stimulates a certain type of behavior and how a different mindset can lead to different responses in the same situation. This is illustrated in model 2. In this analysis, the specific hypotheses as presented in table 3.6 are validated by applying them to the context of this case and comparing them with the observed behavior of the incumbents.

Proposition 11a: The influence of (a) stakeholder pressure, (b) supporting government policy, (c) market demand, (d) solution availability, and (e) competition is moderated by the pro-activeness of the incumbent's mindset.

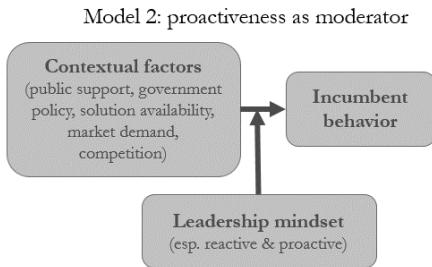


Figure 5.2 - A second model which stresses the moderating effect of the mindset on contextual influence.

This chapter also gives a third explanation of contextual influence; it highlights how the dominant mindset of the incumbent’s leadership influences whether they embrace or reject contextual influences on cognitive and normative level, as is visualized in figure 5.3. This understanding emerged clearly from the actor interviews. It can also be linked to earlier literature, especially on institutional logic and disruptive innovation, as is done in section 3.7.2. Following from this discussion, the research focus is summarized in proposition 11b.

Proposition 11b: A proactive mindset positively influences embracing specific emerging cognitive institutions implied in a transition and, as such, a mindset change mediates the proactive behavior in anticipation of the transition.

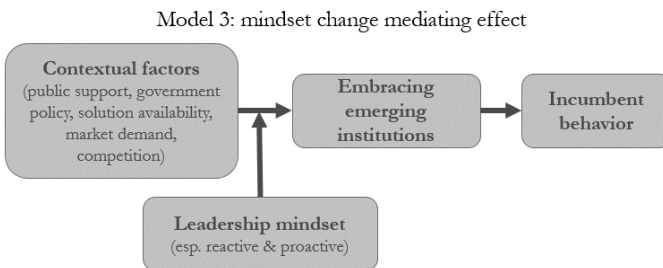


Figure 5.3 - A third, alternative model which proposes that embracing emerging institutions mediates the response.

5.1.3 Link to theory and literature

The relevance of contextual antecedents for sustainability innovation is a well-established theme in literature. Innovation literature has studied innovation as a result of push (technology development/solution availability, Farla, Alkemade & Suurs 2010, Avadikyan, Llerena 2010, Hekkert, Negro 2009) and pull (market demand, Dangelico, Pujari 2010, Horbach 2008, de Marchi, Grandinetti 2013, Jansson 2011) factors. Especially in the context of societal and sustainability issues, the influence of governmental interventions (Smith, Crotty 2008, Hills, Lam & Welford 2004, Hillman, Sandén 2008, Blum-Kusterer, Hussain 2001) and pressure of diverse stakeholders (Miles, Munilla & Covin 2002, Henriques, Sadorsky 2007, Elzen et al. 2011) has received considerable attention. Finally, the proposition that competition influences the ability to innovate both in positive (competitors as triggers to innovate) and negative sense (profit margins are lowered, leaving fewer resources to invest in renewal) has been extensively studied (Pinkse, Kolk 2010, Rothenberg, Zyglidopoulos 2007). The conceptual framework utilized for the system analysis is founded in a systematic analysis of the literature on sustainability innovation (see chapter 3 for more detail). In the context of this review, within 139 articles 65 relevant contextual variables were identified¹⁴. In interaction with the data of the pilot case study, these factors were clustered in five categories to provide a comprehensive and useable structure to understand the contextual dynamics¹⁵.

The influence of the contextual factors is likely to be more sophisticated than a unidirectional influence. The proposition (11a) that the contextual factors have a differential impact moderated by the incumbent's mindset is a theoretical innovation developed in this thesis and supported by reorganizing earlier evidence. It builds on the notion that contextual stimuli are differently interpreted, based on the leadership's mindset (Valente 2012, van Tulder et al. 2014) and that incremental and radical innovations have different antecedents (Danneels 2004, Geels 2004). A set of hypotheses is formulated on which type of contextual influence mostly reinforces and empowers each one of the four ideal types of mindsets and corresponding behavior. For example, the literature provides evidence that policy uncertainty and instability causes more hesitant reactions of firms and is likely to stimulate reactive behavior (Meijer, Hekkert & Koppenjan 2007, Markusson et al. 2012). It is emphasized that the mindset moderates this influence. Earlier experiences and convictions captured in the mindset can shape different reactions by incumbents on the same contextual influence. For a more extensive discussion please refer to sections 3.7.1 and 3.7.2.

¹⁴ See Appendix A.1 for a short summary of the review methodology and relevant findings.

¹⁵ See Appendix A.2 for a short summary of the review methodology and relevant findings.

A third explanation further enriches the understanding of how the contextual influence interacts with the incumbents' mindset. The literature has already demonstrated that cognitive models are important in the way incumbents understand opportunities and threats in their context. Tensions between the current dominant logic and new models can explain the more reluctant attitudes towards new developments (Geels 2004, Christensen 1993, Danneels 2004, Christensen, Bower 1996). Transitions besides technological change often encompass major institutional changes (Markard, Raven & Truffer 2012, Geels 2005). This might include government policies stimulating new roles and responsibilities for businesses, but also new business models arising from how transitions shape customer needs and available solutions. Incumbents, especially those with a reactive mindset, are likely to reject these changes if they are less compatible with their current assets and business model (Chandy, Tellis 1998, Turnheim, Geels 2013, Richter 2013, Richter 2012). In contrast, proactive incumbents, because of their future-oriented attitude and openness to more radical change, are likely to embrace these changes more easily.

5.1.4 Methodological approach

This research utilizes a combination of a media analysis dataset and actor interviews. The basis for the system analysis is a media analysis dataset representing the sustainable energy debate as it was found in six leading Dutch newspapers in the period 2010-2014 (see section 4.6.1. for more extensive discussion). This dataset provides a rich collection of data mentioning and discussing the influence of the five categories of contextual factors. This is supplemented with data from 17 actor interviews with incumbent leaders and key stakeholders (see section 4.7 for more information). While relevant data can be found across the interviews, two questions are especially relevant. First is the question of the relative importance of different internal and external antecedents of incumbent behavior (question 3, see section 4.7.2). Second is the question that asked incumbents to reflect on the disruptive contextual dynamic in the period 2012-2013, and which aspects of this dynamic they did and did not anticipate (question 8). Finally, at several stages in the process four knowledgeable informants validated the approach, the outcomes, and the preliminary conclusions.

The analysis of the direct influence (model 1) presented in section 5.2 builds primarily on the content analysis of the media analysis data. This was done with help of a code book and systematic procedure as discussed in section 4.8. For this analysis, a single coder approach was applied, also considering the broad and exploratory nature of the analysis. It is argued that the reliability and construct validity were secured to a sufficient level. This is because the coding categories represent only a limited level of abstraction from the actual observed dynamic, and the summary was validated by the informants. To make the connection with the underlying data at several stages in the discussion of the data, fragments of the underlying

data were included. When relevant, references were made to specific media sources (xx_yyyy format, xx represents the year of publication) and interview sources (referenced as interview #).

The interpretation of the underlying dynamics presented from section 5.3 to 5.5 builds strongly on the actor interviews and is supplemented with statistical data. The question of how the contextual dynamic had a disruptive influence on the sector in the period 2011–2013 is analyzed further in Section 5.3. With the help of statistical data on key drivers of the Electricity sector’s business model, it is clear how these trends developed over time, and which perceived explanation could be validated with quantitative data. Sections 5.4 and 5.5 continue to reflect on whether conceptual models 2 and 3 (figures 5.2 & 5.3) provide additional understanding of the contextual dynamic and how it became disruptive, utilizing especially the interview data.

5.2 MODEL 1: INVENTORYING DIRECT INFLUENCE OF CONTEXTUAL FACTORS

5.2.1 Government influence

This category in the analysis framework concerns how the government influences the energy transition and the role of the incumbents in the transition. For analytical purposes, the focus is on implemented policies and not on the policy debate preceding the adoption of policy measures. The policy debate and the incumbents’ influence are discussed in chapter 6.

Types of influence: a broad array of influences interacting

One of the reasons for the complexity of the energy transition is that so many different government interventions interact. This reflects the fact that a running system is being changed and while doing this, different stakes need to be balanced as well. The diversity and complexity are illustrated below, by listing the most relevant policy dynamics influencing the transition dynamic in the energy sector.

Environmental target setting & planning

Setting environmental targets and evaluating the progress of implementation play an important role. Influenced by its international agreements (Kyoto, Copenhagen), the EU set a clear set of 2020 goals: greenhouse gas emissions are to be cut by 20% compared to 2005, renewables are to account for 20% of gross final energy consumption, and energy efficiency

is to increase by 20% compared to 1990¹⁶. As part of this agreement, the Dutch government agreed to save 16% CO₂, realize 14% renewable energy, and improve the energy efficiency by 1,5% per year. As a consequence, as part of the national policy debate, the actual national targets were discussed and changed several times during the period. An overview of the dynamic of targets is included later in this section in the discussion about the evolution over the years. A key dynamic within this policy debate is the publication of *future scenarios & progress research*. The government commissioned several policy studies, for example, by ECN & PBL on both the progress as well as potential future scenarios, which afterwards influenced the positions of other actors, or were used as arguments to defend their position.

Innovation policy

Both the national government (especially the Topsector) and the EU (Horizon 2020, Climate-KIC) commission run several innovation support programs, which include a focus on the energy sector as the domain of innovation. Some of them stimulate research, but others include facilities to stimulate pilot level projects.

The Rutte I government at the end of 2010 drafted a new “*Topsector*” *industrial policy*, which is meant to focus on the innovation stimulation and align it with the economic potential for the Netherlands. The program enabled >€500m of investment in energy related R&D projects in the period 2012-2014, including €200m co-investment of the private sector (source: CE Delft 2014, p. 51). In terms of energy technologies, the focus is on: biomass, solar (panel production & machinery), and offshore wind (construction and technology) (10_0432, 10_0434). Beyond these three top priorities the program includes in total seven program lines, however 80% of the budget is clustered in the top three priorities mentioned before (see table 5.1). A systematic text search on the 64 public documents (e.g. plans, leaflets, progress reports) available from the Topsector website reveals strong participation of the incumbents, especially in the bio-based, gas, offshore wind, and smart grid program lines¹⁷. The solar program line is mainly dominated by actors focusing on manufacturing of panels and/or equipment.

A relevant specific support program to mention is the *CCS research program* (CATO), which focuses on the technological side, but also on creating societal support (10_0350, 11_0007). Second, several *early stage energy technology developments* are supported by the government including: plant & bacteria based energy generation, kite (wind) power, several forms of blue energy (tidal, osmosis), and smart grids as is more extensively discussed in the section on solutions (5.2.3). In most of these projects no incumbents participated or at least there is no evidence of leading roles for them. A contrasting example is Nuon’s

¹⁶ Overview of legislation governing Germany's energy supply system, Federal ministry of Economic Affairs & Energy – Germany, LAST UPDATED: December 2014 www.bmwi.de/go/gesetzeskarte

¹⁷ See Appendix G (section knowledge creation) for more details about the approach.

acquisition of a thin film solar producer (Helianthos), which received subsidy but was closed down in 2012 due to lack of progress (12_0056). It is relevant to consider that the Electricity sector traditionally *builds on public funded and collaborative research programs*. Before privatization, the sector had clustered its research activities at the publicly funded KEMA Institute. Also after privatization, the incumbent's involvement in bio-mass, smart grid, offshore wind, and CCS projects has often been part of broader consortia and coordinated and supported in the context of the Topsector program structure.

Table 5.1 - Topsector energy innovation program budgets 2012-2014 (source: CE Delft 2014, p. 51).

(m €)	Total budget	Private contribution
Bio-based	€ 187,0	€ 68,9
Gas	€ 119,4	€ 55,6
Solar	€ 99,8	€ 46,3
Offshore	€ 47,7	€ 12,6
Buildings	€ 30,6	€ 11,3
Industry	€ 26,7	€ 9,4
Smart grid		
Total	€ 511,2	€ 204,2

Electricity sector regulation and grid policy

Rooted in the history as utility and government-owned sector, the government still has a rather active role and intervenes in both generation and distribution in several ways. In the 2000s the government *privatized the sector*. This included opening up the sector to new entrants since 2001 (see also competition, section 5.2.5), resulting in many new (mainly supply-focused) start-ups. It also included the forced separation of the distribution network operators (DSOs) from the generation and supply activities. This separation is, however, still contested by Eneco and Delta, which have not yet executed the separation. As part of the privatization process, the provinces and municipalities who owned Nuon and Essent sold their shares in both companies to (respectively) Vattenfall and RWE in 2009 (13_0056, 14_0086). Part of the sale agreements were specific sustainability goals, which resulted in controversy several times, as the former shareholders contested the actual implementation of these agreements (13_0454). The *transmission grid* is still a public utility, executed by Tennet as state-owned corporation. Tennet continues to emphasize that it is a company that is there to serve the public stake and that the strategy to improve the international connection of the Dutch grid is clearly related to public demand (12_0272, 10_0365). An important role Tennet has today is connecting offshore wind parks to the grid. However, in this case the government is hesitant to make the necessary investments (14_0142). Although the influence is less than before, the government is still involved in the *coordination of*

generation capacity planning. Before privatization, the Electricity sector was accustomed to a centrally coordinated capacity planning system (named SEP, Verbong, Geels & Raven 2008, Raven 2005). In the privatization process this was dismantled. As also the interviews revealed, the free market capacity planning dynamic was new for the sector and this lack of experience is one of the key explanations of the overcapacity which materialized in the market (Interview 16 & 6). It is also important to note that the government, especially as part of their “Energierapport” (a central policy document published each 3-4 years), does provide some guidance and as part of this dynamic actively supported the construction of new power plants in the late 2000s (e.g. with spatial planning (11_0307).

Another mode of influence is via the *spatial planning* process. Conventional power plants and especially wind turbines are sensitive in terms of their location. Based on its energy and industry policy goals the national government takes an active role in this respect. Both for onshore and offshore wind several targeted planning processes have been launched. For onshore wind the national government started a dialogue on how to realize 6000 MW of wind capacity in 2020, which is rooted in several multi-stakeholder dialogues dating back even to 1991 (11_0015). In several consultations, especially with the provinces, this resulted in designating areas in 2014. This was a process with several tensions between the government actors as well (e.g. 12_0258). The “crisis law” was used to provide an additional mandate to the government to push priority projects (10_0201, 11_0015, 11_0365, 12_0410, 14_0121). As such, this dynamic is a clear example of the heavy top-down planning (re-constellation) side of the energy transition.

Although this interacts with spatial planning, it is relevant to specifically mention *environmental regulation* as a means of influence. From this role norms are given with regard to allowed emissions (especially power plants) and noise (also relevant for wind turbines). Furthermore, since 2013 utilities (conventional power plants) are part of the EU emission trading scheme (ETS) and have to balance their emissions with rights, either by influencing the emissions or procuring rights (11_0385).

Different governments also actively influence the uptake of renewable energy. In 2010 regulation was adopted to give priority to renewables on the grid, meaning that when e.g. wind peak production results in temporary overcapacity, other assets should be switched off (10_0352, 10_0388). Another part of the active influence of the government is the direct stimulation of all kinds of renewable energy developments. In fact, there are at least four ways the government has stimulated this through the years. (1) *direct subsidizing*: since 2003 the government has awarded on average €1,5-2b subsidy per year (see overview table 5.2) in several consecutive schemes (MEP, SDE, SDE+). This has taken the form of an “exploitation” subsidy, which subsidizes an amount per supplied kWh (based on the difference between the market price and the total cost) for a substantial period (15 years). (2) *Investor support*: the government has two schemes to provide deduction possibilities to investors in renewable energy assets (EIA – focused on businesses, Groenproject regeling –

focused on private investors). (3) *Greendeals*: this type of stimulation introduced in 2011 in essence provides non-subsidy support (e.g. support to comply with or adapt regulation) to developers of green assets. (4) *Local and regional governments* have also introduced specific subsidy schemes which can add up to considerable amounts (e.g. Overijssel €250m participation fund, Amsterdam €100m fund). Municipalities especially have actively supported local energy cooperatives/companies to enter the market, with differing degrees of involvement.

Large user market regulation

The government clearly intervenes in the large user segment of the demand side of the electricity market. Most energy intensive industries are part of the *ETS* scheme of the EU and have to procure rights for their relevant emissions. This is meant to influence their decision making towards investing in energy efficiency and using renewable energy sources. However, it can be concluded that due to the availability of vast numbers of rights, the influence is lower than expected (10_0232, 12_0144, 13_0048, 14_0139).

As *energy tax* is the largest part of the retail price of energy, the relative taxing strategy is highly influential on the energy price. This instrument is used for active industrial support policy and the energy intensive industry is totally exempted from energy tax. Several reports have stated that this adds up to €4,5-7,5b of support for the industry (and as such for fossil fuels & conventional power plants) (10_0154, 11_0226, 12_0097). As many countries apply this approach, the amount of the EU even adds up to € 66b per year (13_0380).

Furthermore, the government actively influences the energy consumption by large users via its *energy efficiency policy*. Although the dataset is not comprehensive in respect of this sector, it can be concluded that the government has specific goals for energy efficiency improvement for the industry and also subsidizes specific projects which enable this development (14_0188). Since the early 1990s, the government has coordinated three consecutive covenant-based efficiency improvement programs (MJA 1/2/3 & MEE). The scope of these programs include in total 1082 firms which represent approximately 80% of the industrial energy use in the Netherlands (and 25% of the total energy use, RVO 2015). The government is also a *substantial customer* of the electricity sector. The national government alone uses approximately 1 TWh (which equals 300.000 households, 13_0436).

Table 5.2 - (National) Government support for renewables (source: RVO/Agentschap NL annual reports).
OV-MEP

(m €)	2008	2009	2010	2011	2012	2013	2014	Total
(>='03)								
Wind	€ 1.896	€ 6.738	€ 866	€ 194	€ 2	€ 629	€ 310	€ 10.706
Solar	€ 3	€ 99	€ 65	€ 13	€ 1	€ 108	€ 678	€ 1.010
Hydro	€ 79	€ 0	€ 54			€ 13	€ 0	€ 147
Biomass - electricity	€ 2.473	€ 445	€ 478	€ 195	€ 2	€ 13	€ 12	€ 3.807
Heat & CHP					€ 1.356	€ 1.641	€ 1.154	€ 4.151
Biogas	€ 0	€ 156	€ 121	€ 779	€ 39	€ 267	€ 470	€ 1.831
Total	€ 4.450	€ 7.438	€ 1.584	€ 1.181	€ 1.400	€ 2.671	€ 2.624	€ 21.652

Although the government has an active sustainable procurement policy and procures “green current,” this is scrutinized by several actors as ineffective because of the malfunctioning certificate trade practice (13_0435, 13_0436). Several municipalities apply a more active “locally or nationally generated” procurement practice (14_0091, 11_0151, 10_0038). Finally, the government influenced the dynamic by *closing Greendeals* with large energy users. The set of Greendeals includes at least one deal focused on applying renewables and transition the energy supply for the industry: the proposed deal between Akzo, Nyrstar, and Eneco (11_0025). This deal was, however, not executed after a feasibility study returned negative results¹⁸.

Retail/consumer market regulation

The government is also active in regulating the retail segment of the demand side of the Electricity market. *Energy taxes* amount to the largest part of the retail energy price in the Netherlands (37% for an average household end of 2013, see figure 5.4). Based on several agreements (discussed later), the cost of the renewables subsidies is directly added to this tax as well (it is being phased in stepwise since 2013, 13_0110). Another important part of the retail price is the *network distribution fee*. This is a regulated fee which is used to finance both the central grid provider (Tennet) and the regional operators (Enexis, Stedin, Alliander, Delta). In 2010 the regulator allowed an increase of 5-7% per year to improve the grids towards decentralized generation, while in 2013 the regulator indicated that the rates should decline due to the low interest rates (10_0278, 13_0396).

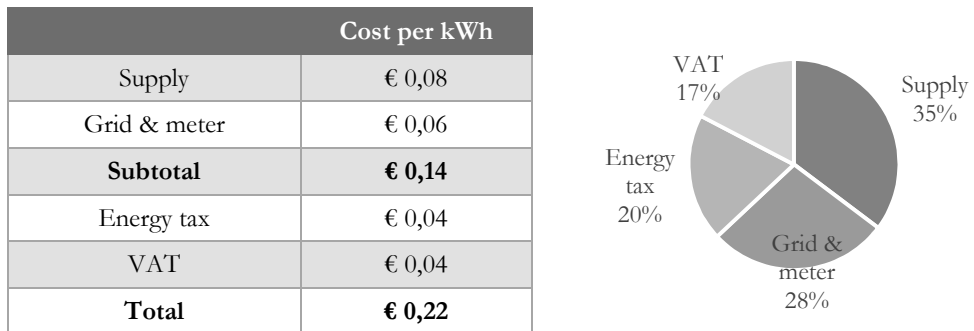


Figure 5.4 - Electricity cost for average household December 2013 (ACM 2014).¹⁹

The government also actively stimulates energy saving and renewable energy generation by consumers. Consumers are allowed to *feed-in their surplus of generated renewable energy* (most often solar) back to the grid with a limitation of 3000/5000 kWh per year. This

¹⁸ <http://www.greendeals.nl/gd003-duurzame-energie-centrale/>, last accessed December 7th 2016.

¹⁹ Source reports energy tax & VAR on combination of gas & electricity bill, these have been allocated based on the subtotal of supply & grid cost. Usage of average household is 3312 kWh.

strongly improves the business case for local generation as the fluctuating output can be used more optimally. As of 2013 – based on a recurring debate – local netting in which surplus energy can be supplied to other local users (within a limited radius) is allowed and stimulated with a reduction of 50% of the energy tax (which adds up to 7,5 ct per KWh, 13_0423, 14_0204). This makes locally generated, renewable current rather attractive in terms of pricing. This limitation to the area, however, still constrains the netting so that a considerable number of business cases are not still feasible (13_0423, 14_0240).

Also, due to its positive effect on the construction sector, several measures were taken to *lower the VAT on solar panels* and their installation. Interestingly, in 2012 a proposed lowering of the VAT on panels caused negative reactions from the sector, while the business case also functioned without the VAT support and the announced measure led to postponed purchases (12_0097). Finally, the government runs several programs to *support energy saving* in residential areas, which include measures to proliferate information, provide subsidized advice, and support specific measures such as insulation (10_0081, 10_0200, 13_0265, 14_0088, 14_0240). For newly constructed buildings mandatory energy efficiency standards are applicable. A planned schedule will make them stricter over the years.

The government regulates the way *renewable energy is traded via certificates* in the market. Based on an EU directive, the Netherlands has implemented a renewable energy certificate trade system. For each generated MW of renewable electricity, the operator receives a certificate which can be traded. These certificates serve as an alternate approach for suppliers to sell renewable electricity without having to generate it. As the certificate trading scheme introduces a kind of green current that is broadly acknowledged not to stimulate the addition of new renewable capacity, more or adapted regulation in this respect has been debated several times. Due to cheap certificates available, especially from Norway, the green current can be sold with no premium price and no impact on the national renewable generation capacity. Considering that the Norwegian market does not value renewable certificates, the prices stay low and no impact on renewable generation capacity can be observed in Norway either (13_0033, 13_0150). In 2010, the EU announced a formal investigation (10_0149). The dataset, however, does not reveal any change implemented in this respect in the period that was studied.

Finally, the government actively tries to *protect consumers* with respect to aggressive marketing practices. For example, Greenchoice was fined in this respect (11_0074) and Atoomstroom and KPN were ordered to adapt their advertisements (11_0342, 12_0414).

Government actors: multiple levels interacting

As was already evident from the previous overview *all levels of the government participate* actively in the transition. The overview in table 5.3 outlines the most relevant measures per governmental actor.

Policy from different governmental actors sometimes *interact in a counter-productive way*. For example, an intensely debated problem is the interaction between the sustainability targets (% of renewables, energy saving) and the ETS. As several actors have stressed, improvements realized by the sustainability targets and attached support are at least partly mitigated by a rebound effect on the demand side of the market (as more emission rights become available on the market) (e.g. 10_0143, 14_0276, 14_0278).

Table 5.3 - Government actors and their most relevant interventions in the dynamic.

Government actor	Most relevant policy instruments
EU	<ul style="list-style-type: none"> - ETS - market regulation - international goal setting
Ministry EL&I	<ul style="list-style-type: none"> - industry competitiveness - energy sector regulation (privatization, market rules) - innovation programs - renewables subsidies
Ministry I&M	<ul style="list-style-type: none"> - sustainability targets - environmental regulation - spatial planning
Ministry Finance	<ul style="list-style-type: none"> - fiscal regulation: large-user exemption, netting, VAT, investment deduction (EIA, Groen projecten)
Provinces	<ul style="list-style-type: none"> - spatial planning - subsidies
Municipalities	<ul style="list-style-type: none"> - subsidies - local firm/collective support - local stake lobbying

Intra- & inter-governmental tensions also influence the effectiveness of the government in a specific policy. For example, it is mentioned that Economic Affairs (in representing the stake of industry competitiveness) is often dominant over the Environmental policy (11_0411), especially with regard to the energy sector (Interview 6). Another example is the ministry of Finance which was strongly advocating the limitation of local netting because of

“fiscal risks” (13_0178, Interview 9 & 12). In fact, this intra-governmental dynamic closely resembles the different stakes as they are visible within the public debate (see chapter 6). Another dynamic is the tension between different government levels in the implementation cascade of policy. In this respect, the lower government advocates a specific local stake and resists policy of a higher-level government. This is visible between the national government and provinces (e.g. Noord Holland’s wind power ban) as well as between provinces and municipalities (both in terms of local opposition to, or support of, local renewables development).

The evolution of policy: energy transition as hyper-turbulent environment

The data on governmental influence reflects a broad array of policy measures and can be considered highly dynamic in the studied period. Table 5.4 shows the result of an exploratory content-wise labeling of government influence data in the media analysis.

In fact, much of the political dynamic is driven by the government agreements. These agreements between the political parties supporting the government frame the policy development in terms of target setting as well as the most prominent measures to be adopted in that period. Table 5.5 lists the most important agreements in which the targets, energy policy (generation & grid), industrial support policy, and bottom-up (decentralized generation) support measures are listed separately. The period covers the terms of three governments. Balkenende IV (which only actively governed in the first two months of 2010 and handed over the power in November 2010) is included only as far as the dataset covered the measures. Besides the three governments the so called “Lente Akkoord” (Spring Agreement), which is a policy agreement between several parties to ensure that the budget rebalancing did not lie idle in a crucial period between the Rutte I and II administrations, as well as the multi-stakeholder Energy Agreement, are included as well as crucial policy governing agreements.

Although the subject of energy transition is consistently on the policy agenda, it should be remarked that content-wise there is *continuous policy change*, as, for example, is illustrated in the overview of the different political agreements (table 5.5). To list a number of the more important changes:

- Targets: the 2020 target levels have alternated and been a topic of consistent debate during the period, starting at 20% renewable energy and ending at 14%.
- Renewables support: the subsidy program has fundamentally changed at least 4 times in 10 years (12_0246). Besides this, the current auction mechanism and the fact that there is a budget cap makes the system unpredictable for project developers. As can also be seen from the SDE overview (table 5.2), the focus in terms of technologies shift each year.

Table 5.4 - Top 15 most mentioned government measures per year based on a content-wise labeling of the government influence data.

	2010 #	2011 #	2012 #	2013 #	2014 #				
SDE+	20	SDE+	7	Spatial Policy	7	Spatial Policy	9		
Targets	11	Spatial Policy	7	Spatial Policy	6	Innovation Subsidy	6	SDE+	4
Grid Priority	7	Court Decision	5	Coal Tax	4	Municipal Policy	4	Offshore Permits	4
Energy Bill Surtax	6	Marketing Practices	4	Separation	3	SDE+	4	Targets	4
Subsidy	5	Greendeads	4	Court Decision	3	Local Netting	3	Industry Support	3
Investment Deduction	4	Subsidy	3	Wind Resistance	3	Energy Agreement	3	Energy Agreement	3
Rutte I Agreement	4	Wind Resistance	2	Rutte II Agreement	3	Targets	3	Innovation Subsidy	3
Innovation Subsidy	4	Government Investment	2	SDE+	3	Network Rates	2	Local Resistance	3
Court Decision	4	Innovation Subsidy	2	Local Netting	3	Privatization	2	Subsidy	3
Local Energy Firm	4	Netting	2	Targets	3	Large User Exemption	2	Loan	2
Separation	4	Nuon & Essent Sale	2	Gas Tax	2	Fire Risk	2	Provincial Policy	2
Industry Development	3	Power Line	2	Investment Deduction	2	Participation Fund	1	Local Energy Firm	2
Municipal Policy	3	Privatization	1	Local Energy Firm	2	Tennet Stake	1	Local Netting	2
Ministry Merger	2	Kyoto Targets	1	Supplier Obligation	1	Industry Competitiveness	1	Marketing Practices	2
Privatization	2	Local Energy Firm	1	Energy Bill Surtax	1	Industry Lobby	1	Separation	2

- A coal tax was introduced as part of the Spring Agreement, but cancelled again a year later in the Energy Agreement.
- The supplier obligation was introduced as part of a Greenddeal in 2011, endorsed in the Rutte II government agreement as a measure to be investigated, but disappeared again in the Energy Agreement.
- Green investment deduction is cancelled/limited by Rutte I, but reinstated by the Spring Agreement.
- In 2014, the government retracts earlier permits for offshore wind farms (as part of an attempt to optimize/lower the cost).
- Additional subsidies, for example for solar and energy savings measures introduced in the Spring Agreement, are cancelled again in the Rutte II Agreement.

Besides the actual changes, several topics are *highly contested* while they did not (yet) result in policy changes. However, the high degree of controversy ensures that there is always a *latent risk of policy change*. Chapter 6 zooms in on the most important tensions in the debate and how they result in a fragile balance in the policy debate.

Although one might remark that (almost) all actors are guilty of continuously proposing diverging policy changes, there is also a shared opinion that the current policy inconsistency is *damaging* for the speed of the transition (e.g. 14_0239, 14_0155, 13_0184, 12_0330, 12_0286, 12_0220, 11_0165, 10_244, 10_0095). Several actors illustrated the damaging effect of the policy inconsistency in specific cases. In 2010, in the context of the often changing SDE support scheme and especially with regard to offshore wind, E.ON and Eneco, among others, noted that it was likely that they would shift their investments abroad (10_0017, 10_0085, 10_0393). Secondly, in an argument to plead for the supplier obligation, van Laethem (Essent) noted that biomass co-firing investments were postponed as result of lack of subsidy (12_0220). Third, it was mentioned that pension funds avoided investing in renewables (currently <0,5% of their portfolio) due to policy inconsistency (13_0196). Another example are the 2012 solar subsidy measures as part of the Spring Agreement, which were criticized by several actors as damaging to a market already taking off on its own without support (12_0139, 12_0166). Eneco (among others) reacted very negatively on the offshore wind permit retraction in 2014. This measure rendered substantial investments obsolete and delayed the process unnecessarily (14_0267). A final example is that offshore wind permit owners were mentioned as awaiting clarity about offshore grid connection (14_0142).

Causal relationships: divergent policy causing divergent effects

Based on the previously discussed policy mix, several causes and effects in the sustainability transition in the Electricity sector and incumbents can be documented. First, it should

Table 5.5 - The five most important policy agreements in the studied period.

Period	Balkenende IV			Spring agreement		Rutte II		Energy Agreement
	Feb 2007 - Feb 2010	Oct 2010 - Apr 2012	Apr 2012 (- Nov 2012)	>= Nov 2012	>= Sep '13			
2020 targets	Feb 2007 - Feb 2010 -30 % CO ₂ 20% Renewables	Oct 2010 - Apr 2012 -20% CO ₂ 14% Renewables	Apr 2012 (- Nov 2012)	>= Nov 2012 16% renewables	>= Sep '13 14% renewables (16% in 2023) 4500 MW offshore goal 6000 MW onshore goal 100 PJ energy saving			
Energy policy	<ul style="list-style-type: none"> 6000 MW onshore planning process started Grid priority renewable SDE started (09), specific facilities (<i>much not included in dataset</i>) 	<ul style="list-style-type: none"> New nuclear PP CCS postponed SDE cap on €1,4b, shift to energy bill, auction mechanism, no specific facilities Greendeals, supplier obligation part of one greendeal Grid priority renewables adopted Using crisis law for centralized onshore wind planning 	<ul style="list-style-type: none"> Coal tax introduction Added gas tax 	<ul style="list-style-type: none"> SDE+ grows to €2,4b, biomass also subsidized Coal tax sustained Offshore wind cost reduction program Supplier obligation introduction (not implemented) 	<ul style="list-style-type: none"> SDE: biomass cap, specific offshore wind facility Closing 5 coal PPs €1b energy saving subsidy Coal tax cancelled Supplier obligation cancelled 			
Industry policy		New industrial policy: focus on bio-based, offshore wind & solar (panel production)	Added gas tax (additional focus on large users)	Industry compensation for increased SDE+ cost	50% of SDE freefall (€500m) due to reduced targets is allocated to businesses			

Balkenende IV		Rutte I		Spring agreement		Rutte II		Energy Agreement	
Local solar/collectives support	<ul style="list-style-type: none"> Solar VAT lowering (shift from investment deduction scheme) 		<ul style="list-style-type: none"> New solar & energy saving subsidy Supporting rental cooperatives Lower VAT 	<ul style="list-style-type: none"> Solar & energy saving subsidies cancelled Local netting reduced tax rate 	<ul style="list-style-type: none"> 50% tax reduction in limited local netting area 				
Other		<ul style="list-style-type: none"> Green investment deduction cancelled Merging ministries (including Economy & Agriculture) 	Green investment deduction sustained	Green investment deduction sustained					
Key media source	10_0145, 10_0281	10_0315, 10_0316, 10_0326, 10_0333	12_0125	12_0348, 12_0395	13_0265, 13_0267, 13_0271, 13_0312, 13_0313, 13_0316, 13_0330				

certainly be emphasized that the energy transition (climate change, energy) policy of the government has stimulated the development of new renewable capacity in the market. The overall target setting, active spatial policy (especially regarding onshore & offshore wind), and the rather substantial (€21 billion awarded, a large part still to be used in coming period) national renewables capacity development support program (combined with substantial local and regional support) do add up to a material causal force from policy in the direction of a more renewable or at least CO₂ neutral energy system. Also, the Topsector innovation policy facilitated and stimulated R&D into energy related topics with €500m in the period 2012-2014.

Second, there is considerable evidence that the continuously changing, and sometimes alternating, nature of policy has damaged the speed of the transition. This is clear in the listed examples, but probably has a much broader effect. This is likely to induce a more hesitant (reactive) approach with incumbents as well as investors in the sector. A counter-argument stresses that uncertainty is inherent in transitions, and that the counterfactual scenario of a stable policy regime also has considerable inherent risks (as follows from the thesis that transitions are unpredictable due to inherent uncertainties and better fit with experimental and reflexive approaches to policy, Rotmans, Kemp & Van Asselt 2001, Loorbach, Rotmans 2010). Further, it is important to remark that, in a way, the Energy Agreement was a reaction to both the perception of lagging behind, as well as the need for consistent policy and was an attempt to develop a “Delta plan” for the energy transition (10_0261, 10_0296, 12_0255, 12_0330, 12_0311). The system also reacted to the negative effects of the uncertainty and tried to evolve in this respect. However, considering the large array of issues emerging in the first year and the continuing controversy, the success of this attempt remains to be seen (13_0353, 14_0240, 14_0137). As chapter 6 reveals in more detail, the underlying future narratives are far from aligned, which leads to a certain degree of latent instability.

Third, the different interventions might be characterized as divergent. As has become clear there was a large array of government interventions with effect on the energy sector. Especially due to the interaction of different policy stakes (such as industry support, financial health/budget savings, grid stability, as well as renewables transition), a comparable divergent array of measures and effects also developed. These divergent and complex effects revealed the need for more advanced approaches to understand divergent influences of policies (and other contextual antecedents). In section 5.4 an attempt is made to understand the divergent effects of this policy mix on incumbents with specific mindsets and strategies.

It is relevant to consider four potential disruptive effects of the policy development as it evolves: (1) on system level the *fluctuating output of the renewables remains an issue*. The agreements are still mainly based on upscaling renewables capacity, but the need for either

flexible back-up capacity, dynamic demand management (including smart grids), or storage receives less attention. (2) The mix of different measures *affect the core of the incumbents' business model*, as is reflected in, for example, the write-offs of power plants and the idled facilities. This also points to the fact that predominantly attention is paid to the build-up of new capacity and much less to the phase out or transformation of the current assets (although the EA includes the phase out of the oldest coal PPs). (3) Due to the large-user exemption and the loose ETS stimulation, the *business case in the wholesale segment remains unclear* and the divergent evolution of the retail and wholesale segment of the market might create unexpected scenarios. (4) As policy goals do not always relate to the long-term effect on the underlying policy goal (especially decarbonization), but target midterm solutions such as renewables capacity build-up or energy saving, the *policy and its outcomes may drift from solving the underlying issues*. As the consequences of a lack of addressing climate change become more visible, this may lead to a fertile ground for more radical shifts in policy. Also, counterproductive interactions between misaligned policy schemes (e.g. ETS & renewables support) induce unpredictable and undesired results. The disruptive dynamic as it has been visible since 2012 in the sector is further analyzed in the next sections.

5.2.2 Public support

Public support in the analytical framework refers to the stakeholder pressure of the broader public on the regime actors. This is often mobilized through the campaigns of NGOs or local action groups. Please note that the role that NGOs have in the energy policy debate is discussed in the next chapter.

A clearly framed issue

First it should be remarked that the energy transition, as central sub-issue of the *climate change and fossil energy dependency issues*, is *clearly framed* in the public debate and receives considerable media attention. This becomes evident from both the number of media articles (1345 in total, 236-297 per year in the period 2010 to 2014, see table 4.4) as well as the fact that (almost) no actor denies the perspective that a kind of transition needs to happen (the debate is about the pace & solutions, not about the need). This, of course, has a history before the period studied. It can, however, be concluded based on these facts, that there is a direct or indirect pressure on the incumbents to *at least* engage with a reactive approach to these issues.

NGO activism: towards the constructive mode

Although NGOs engage actively in the dynamic, it is remarkable how *limited the number of traditional protest and media campaigning activities* are. This mirrors the engagement of the NGOs in more constructive modes of action as well as the fact that many other actors

(firms, government etc.) have already moved beyond the inactive or strongly reactive modes of activity (Interviews 12 & 9). A number of high profile actions of the NGOs targeted at public support are still found in this dataset.

First a number of protest actions focused on the construction of new *coal power plants* in Eemshaven. Greenpeace attacked both Essent and Nuon with a media campaign. Several NGOs (Greenpeace & SN&M were most often mentioned “among others”) were also engaged in court cases against both the Eemshaven (Essent, Nuon) & Maasvlakte (E.ON & Electrabel) coal PPs. In both cases, this approach proved successful at first, in the sense that the highest court (Raad van State) terminated the permits (11_0150, 11_0278). In both cases, however, eventually the governments were able to issue improved permits which included the judges’ comments and the construction of three of the four PPs continued. An interesting case is the planned Nuon multi-fuel (coal & gas) PP in Eemshaven, since these plans were altered in the process to postpone and later cancel the coal module. Other causal dynamics also played a role in these decisions (Interview 10). Terium (RWE, probably with a stake, 11_0151) argued that Nuon altered its plans for economic reasons.

Another example of a high profile protest action is the NGOs’ campaign against the construction of a second (or more) new *nuclear power plants*: public protests (Milieudefensie & Groenlinks mentioned, 11_0123, 11_0085) were organized as well as a symbolic waste disposal in front of public buildings (Greenpeace, 12_0014). These plans were eventually cancelled. However, a broader public debate, economic reasons, and a government shift seem to have contributed to this dynamic as well.

A broader coalition of environmental and development NGOs and consumer organizations (SN&M, WWF, Greenpeace, Hivos, Consumentenbond, VEH, WISE in 2014, 14_0057, the coalition might have changed over the years) is engaged in a campaign to alter the *green current* framing based on certificate trade (see section 5.2.4). They publish an annual benchmark on company level, engage in the public debate on this matter and actively engage its supporters and the broader public with switching campaigns (14_0059). It should be noted that another NGO (HIER) publishes a benchmark on product level (and as such the best niche products are highlighted) and this leads to a controversy on whether to judge sustainability on product, or on company level. This remains a highly-contested topic and the debate has not yet come to a resolution.

At the end of 2012, Urgenda announced a *court case against the Dutch government* because of their failure to implement sufficient policy measures to mitigate climate change effects (and also not living up to its international agreements in this respect) (12_0378). In 2015 Urgenda won the case, although the government still appealed to a higher court. This case

can potentially have a significant effect on the public policy regarding climate change, but this remains to be seen.

In the period during which the EA was created, Greenpeace launched a media campaign to *engage sustainability frontrunners* from the industry (Unilever & DSM) to influence the industrial lobby towards more constructive engagement (13_0194). In this campaign citizens were mobilized to submit messages to the CEOs of the engaged companies. It is difficult to separate the effects of this action from the intense context creating dynamic around the EA.

Mirroring the previous comments, it should be noted that NGOs are engaged in all kinds of more constructive activities. They participate constructively in the *public debate*, including publishing scenario studies or visions, as well as debating policy measures and solutions. Most environmental NGOs were also actively involved in the EA and other complementary *public negotiation* processes. Especially WWF (with its climate saver program at least clearly influencing KPN & Eneco within this dynamic) and SN&M have developed *partnerships* with market actors to influence and endorse their market activities. Several NGOs engage in *entrepreneurial actions*. Most prominent is probably Urgenda's solar panel action (see section 5.2.5), however also SN&M was engaged in several comparable product sales schemes (mostly partnering with Eneco in this respect). NGOs were also actively involved supporting new start-ups with the ambition to change the market. For example, Greenpeace is mentioned to have been involved in the early start-up of Greenchoice (10_0038) and WWF was involved in Vandebron's funding (14_0132). Finally, most NGOs actively try to *educate* their supporters regarding potential actions they can take. Although the database does not allow for a complete overview, it does provide some relevant examples. This is evident in, for example, National action day on energy saving (14_0047, Greenpeace among others involved), but probably happens much more widely below the radar in their own communication channels.

Local activists: NIMBY in action

Next to the core NGOs, a diverse spectrum of local citizen protest groups influence the transition dynamic. These often protest against specific plans to implement a specific solution in their local context. In some cases, local authorities are also involved. In most of these cases they complement the usual protest actions with more formal protest actions (e.g. court cases or engaging national politicians).

Onshore wind triggered the most local resistance. "Horizon" pollution, noise, health effects and impact on house values were the core arguments for citizens to resist onshore wind turbine plans. The protest was present in all years, but increased in intensity as the 6000 MW upscaling plans emerged and resulted in debates on the provincial level in 2014 (e.g. in 14_0146 & 14_0109 *100-135 protest groups* are mentioned). While it remains difficult to

track specific effects, due to the distributed nature, two effects are evident: (1) plans are often delayed due to court cases and in some case adapted to (e.g. in the case of the Noord-Oostpolder windfarm, from 93 to 86 turbines, 11_0015), (2) the presence of the local resistance clearly influences the public debate and also the choices of politicians (e.g. in the case of Friesland, where the provincial political parties ignored a plan developed by a broad stakeholder committee on its own request because of fear for the local resistance, 14_0342). As the local protests often targeted the politicians, the indirect effect on incumbents is more difficult to establish.

However, several other energy related activities also triggered controversies. CCS plans in Barendrecht triggered local resistance, primarily because of safety fears (10_0139, 10_0350, 10_0360). These plans were eventually cancelled, because the Rutte I government put a ban on CCS “with a lack of local support.” A third trigger for local resistance was the plan to construct a new nuclear power plant. Citizens protested in Middelburg (the provincial capital) against the plans for a second nuclear power plant (11_0085). It is remarkable that the local community also included supporters of the plans, because of the economic importance of the energy industry and the “fact” that safety risks are limited (11_0008). Health risks and impact on house value were reasons for local citizens to protest against power grid extensions (10_0445, 11_0050). A plan for gas storage in Bergen triggered local resistance because of safety fears (11_0268, 11_0172). Although only included in this dataset up to a limited extent, considerable local citizens protest was also present in Boxtel, where a shale gas extraction pilot was planned.

Causal relationships: influence of local resistance and some NGO activism effects

To summarize, three relevant causal influences have been identified. *NGO activism* seems to be limited, but have had influence in especially the coal PP and the nuclear PP cases. Establishing the effect in the green current debate is, however, much more complicated. Besides activism, ENGOS engage in a broad array of more *constructive actions*. Chapter 6 documents how a cross-sector advocacy coalition emerged to argue for a proactive transition approach, in which both NGO and business actors would have a crucial role. Third, *local resistance groups* have had substantial effects on retarding and adapting specific project plans, especially for onshore wind and CCS.

5.2.3 Solutions & technologies

The data in this category reveals how solutions play a role in enabling the transition dynamic. This is considered from the perspective of the (dis)advantages of specific solutions, as well as the interaction between solutions.

The solution sphere: advantages & disadvantages

A large part of the discussion in the media focuses on advantages and disadvantages of specific solutions. There is a rather broad spectrum of characteristics that play a role in the debate:

- *Competitiveness/cost*: most of the time discussed in terms of price per kWh supplied. Considering the price of electricity supplied (especially in the retail market) is for a large part determined by tax and grid/distribution cost, decentralized/local solutions have a cost advantage if they are exempted from these costs.
- *CO₂ efficiency*: when discussing this, questions can arise about which emissions are to be taken into account (e.g. emission in the supply chain and when constructing the power plant).
- *Capacity & potential*: especially the potential plays a role. Different solutions have different aspects which determine the potential. For onshore wind, for example, space is the limiting factor, and for solar the availability of roofs with a sufficient sunlight/energy intercept.
- *Energy efficiency*: different solutions have a different conversion rate of potential energy to output. This especially plays a role in comparing different applications of energy, e.g. using gas in power plants, in boilers, in greenhouse CHPs etc.
- *Fluctuating output/flexibility*: considering the fluctuating output of especially wind and solar energy, the degree of fluctuation as well as the flexibility of the output of other power sources (e.g. conventional power plants) plays an important role in the debate.
- *Local resistance/horizon/health*: especially for onshore wind energy, the impact on the local community is contested.
- *Nature impact*: the impact on the local eco systems of especially onshore and offshore wind is a topic of research.
- *Safety risks*: especially in the case of underground storage (CCS, gas) and nuclear power, safety risks are a crucial part of the debate.
- *Resource availability & supply chain sustainability*: the depletion of fossil fuels (vs. renewables) is an (often implicit) part of the debate. Also in the picture are the limitations and sustainability aspects to the supply chain of biomass (also competition with other food & non-food applications). For solar and wind power there are also issues with rare materials needed in the production of these assets.
- *Industry & economic potential*: a central topic in the national debate is the spillover of specific solutions with regard to job creation and strengthening of the local industrial eco-system.

- *Foreign dependence*: with regard to many fossil energy sources, the dependence on a limited number of less stable countries is a key issue. This argument is also mirrored as a large advantage of decentralized and renewable sources of energy.
- *Space competition*: especially wind energy competes for space with other applications.
- *Consumer empowerment/engagement, farmer benefits*: decentralized solutions have specific spill overs in terms of engaging consumers (e.g. triggering more initiatives such as energy saving). They can empower local communities (but also create tensions) and can generate new sources of income (especially for farmers).
- *Waste*: as is broadly known, the waste of nuclear power is a key issue related to this energy source.

When considering the debate on solutions it is relevant to consider that solutions at different stages of maturity are discussed. Some are mature solutions (such as conventional power plants or onshore wind), some are approaching this stage and are now applied in pilots on considerable scale and some are still in the early stage of research. The research stage solutions play a limited role in the actual transition dynamic, however they might become relevant later on.

Table 5.6 list the solutions as they are mentioned in the debate with their relative (dis)advantages and stage of maturity.

The solution dynamic from system perspective: meta-paths & lock-in

Part of the solution discussion focuses *on system level*. Within this debate, the interaction is between the components of the system (generation, storage, demand management and grid) and what would be the resulting performance on system level in terms of affordability, reliability and sustainability. Central in the debate is how to balance the fluctuating output of renewables (e.g. with flexible generation, storage or demand management) and whether the introduction of new technologies will lead to a lack of affordability (energy poverty, industry competitiveness). This, of course, functions besides the general discussion about sustainability, mainly driven by reducing dependency on fossil fuels and mitigating climate change risks.

Complementarities between solutions from a systems perspective link solutions in four meta-paths. One set of complementary solutions are coal power plants combined with either CCS or biomass co-firing to improve the sustainability. Another cluster or path is characterized by the application of renewables combined with gas power plants as base load and flexible back up. It is proposed that the role of gas PPs could be partly replaced by either storage or demand management solutions (e.g. smart grids). The perception of these two

Table 5.6 - Solutions and their relative (dis)advantages as discussed in the public debate (source: summary of (perceived) (dis)advantages mentioned in media sources).

Index	Category	Solution	Dev. Stage	Advantages	Disadvantages
SO-1	Nuclear	Nuclear 3rd gen	Mature	Limited CO ₂ impact (construction), less resource depletion	Inflexible output, waste, safety risk, cost not commercially coverable (incl. insurance), foreign dependence, connected to nuclear weapons, long construction lead time, no contribution to EU renewables targets
SO-2	Conventional	Gas PPs	Mature	Lowest CO ₂ (of conventional), flexible output, CHP option	Highest cost (of conventional, depends on CO ₂ /gas price), fuel depletion, foreign dependency
SO-3	Conventional	Coal PPs	Mature	Low energy cost (depending on CO ₂ /coal price), can be combined with CCS or biomass co-firing	Inflexible output, highest in terms of CO ₂ output, fuel depletion, foreign dependency
SO-4	Bio-based	Coal & biomass	Mature	See coal, lower CO ₂ depending on biomass source, potential new industry for NL	See coal, potential deforestation & limited CO ₂ gain depending on source of biomass, resource competition in bio-based chain
SO-5	CCS	Coal & CCS	Pilot	See coal, neutralizes CO ₂ output, industry potential for North-NL?	Safety risks, local resistance, reduces efficiency of PP by 10-40%, risky investment (E/Ts/CO ₂ price dependence)
SO-6	Bio-based	Biogas - grid injection	Pilot/mature	Generates farmer income, residues can be applied (e.g. fertilizer), higher energy efficiency	Grid connection & processing needed before grid injection, only efficient if resource can't be applied elsewhere
SO-7	Bio-based	Biogas - local CHP	Pilot/mature	Can be done standalone/decentralized, generates farmer income, residues can be applied (e.g. fertilizer)	Profitability meager/mixed, low energy efficiency, only efficient if resource can't be applied elsewhere

Index	Category	Solution	Dev. Stage	Advantages	Disadvantages
SO-8	Bio-based	Biomass standalone	Mature	Lower CO ₂ depending on biomass source, potential new industry for NL	Potential deforestation & limited CO ₂ gain depending on source of biomass, resource competition in bio-based chain, only efficient if resource can't be applied elsewhere (if other resource than wood)
SO-9	Wind	Wind onshore	Mature	Cost: small plus, mature technology, added income for farmer/local community	Space competition, local resistance, health (noise) impact, bird/bat impact, fluctuating output, rare resource need, community tension due to plans
SO-10	Wind	Wind offshore	Upscaling	Scalability, industry potential (offshore, construction), ecosystem impact (mixed)	Cost (grid connection, maintenance), fluctuating output, resistance (nearshore), space competition (shipping, nature, fishery), ecosystem impact (mixed), rare resource need
SO-11	Solar	Rooftop solar	Upscaling	Beneficial for consumer (including tax effect), engaging citizens, industry potential (but in practice mixed success)	Cost (total cost), fluctuating output, rare material need, factory conditions, fire risk
SO-12	Solar	Large scale solar	Pilot	Cost: competitive depending on location	Long-distance grid connection needed, fluctuating output, rare material need, fuel depletion, foreign dependency
SO-13	Grid	International grid connection	Mature	Levels energy prices, enables optimal location of generation & leveling weather & day/night differences	Expensive, local resistance
SO-14	Grid	Decentralized smart grid	Pilot	Enables local energy saving & balancing need & supply	Privacy risks, more difficult to control

Index	Category	Solution	Dev. Stage	Advantages	Disadvantages
SO-15	Heat	Heating nets	Pilot/mature	Optimal energy usage	Requires proximity of heat source (industry, data center) & need (e.g. large residential area), requires stable & guaranteed output
SO-16	Saving	Industrial energy saving	Mature	Concurrently improves industry competitiveness (in case of efficient methods)	Reduces competitiveness (in case of sub-efficient methods), "low hanging fruit" already utilized
SO-17	Saving	Residential energy saving	Mature	Considerable cost efficient saving possible, economic impact for installation sector	Unknown
SO-18	Waste	Sewage CHP	Pilot/mature	Potentially efficient application, depending on local circumstances	
SO-19	Waste	Waste incineration CHP	Mature	Potentially efficient application, depending on local circumstances	Incineration as such is not the most sustainable mode
SO-20	Storage	Storage - gas	Research/pilot	Can be stored for longer term, output can be applied for other purpose (ammonia/methane)	Is low efficiency application of energy, ammonia has safety hazards, storage has potential safety hazards & might trigger local resistance
SO-21	Storage	Storage - hydro	Pilot/mature	Can be stored for longer term, efficient depending on location	Available places limited/used (Norway), flood risk (plan Lierverse), international grid connection needed
SO-22	Storage	Storage EV/Battery	Pilot	Empower decentralized solutions, EV will be broadly available	High battery cost, EV: depends on availability
SO-23	Geothermal	Geothermal/pumps	Pilot/mature	Stable output	Deeper drills are risky in terms of success, fracking needed to open layers (which is risky in terms of support)
SO-24	Hydro	Hydro - tidal	Pilot	More stable output	Ecosystem impact unclear, space competition

Index	Category	Solution	Dev. Stage	Advantages	Disadvantages
SO-25	Hydro	Hydro - osmosis	Pilot	More stable output	Ecosystem impact unclear, space competition, filter cost/maintenance still expensive
SO-26	Wind	Wind - kites	Research/pilot	Unknown	Unknown
SO-27	Geothermal	Geothermal/pumps	Pilot/mature	Stable output	Deeper drills are risky in terms of success, fracking needed to open layers (which is risky in terms of support)
SO-28	Saving	Pumps/heat exchanger	Pilot/mature	Stable output	Energy need for pumps high, risks of groundwater interference (closed systems)
SO-29	Solar	Solar - integrated (including rotating/customized/foil)	Research/pilot	Higher esthetic value, multi applications possible (rotating panels), see solar	See solar
SO-30	Solar	Solar - nano++	Research	Higher energy conversion efficiency & potentially improved competitiveness	Unknown
SO-31	Motion	Motion energy	Research/pilot	Abundant availability	Unknown
SO-32	Solar	Solar plant/bacteria	Research	Abundant availability	Unknown
SO-33	Wind	Wind - mini turbines	Research/pilot	Less horizon & health impact, see wind	Economic feasibility unclear, see wind
SO-34	Solar	Solar - road pavement	Research/pilot	Large potential for application, see solar	Inefficient due to high cost/maintenance, see solar
SO-35	Nuclear	Nuclear 4th gen	Research	Inherently safe, waste radioactivity period, no weapon connection, rest see nuclear	Takes still 15 years to develop to commercial applicability, rest see nuclear (excluding the improved aspects listed with advantages)
SO-36	Nuclear	Nuclear Thorium	Research	Broader material availability, rest see nuclear (probably incomplete)	Still foreign dependence, not yet commercially applicable, rest see nuclear (probably incomplete)

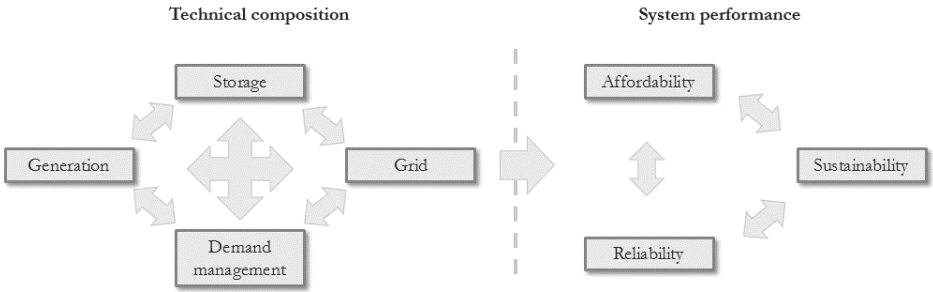


Figure 5.5 - The interaction between system components and outcome criteria underlying the system level dynamic.

“meta-paths” is largely determined by the long-term goal: is the main objective to become “CO₂ neutral,” or to develop a renewables-based energy system? Besides these two paths, there is also the distinction between centralized and decentralized generation, which plays a substantial role in the debate. For some authors, decentralized generation has intrinsic qualities (such as empowering local communities and self-sufficiency), which make it preferable above other solutions. A second important consideration is that decentralized generation in terms of capacity and mindset is less complementary to centralized generation. If this argument is mirrored: decentralized generation might be less complementary to the skills of the current regime, which is predominantly focused on centralized generation. Besides this, nuclear power generation is another meta-path, in terms of skills as well as complementarity with other solutions.

Table 5.7 - Four meta-paths (partly mutually exclusive) underlying the solution dynamic.

	Renewable centralized	Renewable decentralized	Coal path	Nuclear path
Goal/mindset	Renewable	Renewable	CO ₂ neutral	CO ₂ neutral
Dominant solutions	Wind, biomass, combined with storage	Solar, smart grids	Coal, CCS, biomass	Nuclear
Differentiating capacities	Grid management, spatial planning, storage technology	Community engaged, local demand management	CCS, biomass	Nuclear, waste management

From the perspective of the meta-paths described, there are certain *lock-in risks* within the dynamic. While it is not unthinkable to pursue concurrently two or more of these paths, there is some mutual exclusivity in terms of mindset, investments needed, and capacities that need to be developed. This is strengthened because of the relatively long life-span of the assets (30-40 years) as well as the fact that electricity systems should be continuously in balance to be stable.

A key characteristic of the current dynamic is that there is considerable *technological uncertainty*. As many scenario studies explain, most to many of the more mature solutions are needed to make a transition before 2050. However, this does not mean that actual evolution is without risk. There are a few important risks: (1) Technology development: many of the projections depend on assumptions about learning and scaling effects to reduce costs and disadvantages; (2) Subsidy dependence: most solutions depend on subsidies for the R&D needed, as well as to scale the solution. As is discussed more in detail elsewhere (5.2.1) the technology focus of the subsidy schemes is rather volatile and unpredictable; (3) Market risks: as is also evident from the sudden shift in relative coal and gas prices in 2012, developments on the global markets for energy sources can shift the relative cost competitiveness of the solutions in an unpredictable way, (4) Societal acceptance: many of the solutions (in different ways) have societal acceptance risks. The dynamic of explicit or latent societal resistance is rather difficult to predict.

Table 5.8 lists the more mature solutions (excluding research stage solutions) and their relative complementarities as reflected in the public debate and the projected impact on the incumbents.

Table 5.8 - Complementarities and projected impact (research stage solutions excluded, complementarities and path dependencies mentioned in media sourced, impact analysis by author).

Index	Category	Solution	Complementarities and path dependencies	Incumbent impact
SO-1	Nuclear	Nuclear 3rd gen	Inflexible output: less suitable with wind/solar Subsidy competition with renewables	Limited, not a strong interest for focus incumbents
SO-2	Conventional	Gas PPs	Flexible output complementary with renewables	Depends on asset portfolio
SO-3	Conventional	Coal PPs	Inflexible output: less suitable with wind/solar CCS & biomass co-firing improves solution	Depends on asset portfolio
SO-4	Bio-based	Coal & biomass	Coal PP complementarity	Coal asset owners profit
SO-5	CCS	Coal & CCS	Coal PP complementarity	Coal asset owners profit

Index	Category	Solution	Complementarities and path dependencies	Incumbent impact
SO-6	Bio-based	Biogas - grid injection	Requires biogas hub/grid development, capacity competes with the CHP application	Mainly influence the gas side of the market
SO-7	Bio-based	Biogas - local CHP	Capacity competes with the CHP application	
SO-8	Bio-based	Biomass – standalone		
SO-9	Wind	Wind onshore	Fluctuating output makes it complementary with either international grid connection, storage or gas PPs	
SO-10	Wind	Wind offshore	Fluctuating output makes it complementary with either international grid connection, storage or gas PPs With smart grid connection offshore farms can share cost of grid connection	A few players will win
SO-11	Solar	Rooftop solar	Strongly complementary with decentralized storage & energy balancing solutions	Less suited to their centralized model
SO-12	Solar	Large scale solar	Depends on international grid connection & foreign developments	
SO-13	Grid	International Grid connection	Can potentially balance fluctuating outcomes of wind & solar	
SO-14	Grid	Decentralized smart grid	Strongly complementary with local solar capacity, EVs & other decentralized power sources	Less suited to their centralized model
SO-15	Heat	Heating nets	Depends on industry development	
SO-16	Saving	Industrial energy saving		Potential cannibalization
SO-17	Saving	Residential energy saving	Smart grids/meters/solar triggers citizens to explore possibilities	Potential cannibalization
SO-18	Waste	Sewage CHP		Potential new entrants
SO-19	Waste	Waste incineration CHP		Potential new entrants

Index	Category	Solution	Complementarities and path dependencies	Incumbent impact
SO-21	Storage	Storage - hydro	Potentially can balance fluctuating output of renewables, probably requires international grid connection	
SO-22	Storage	Storage - EV/Battery		Less suited to their centralized model
SO-23	Geothermal	Geothermal/pumps		
SO-24	Hydro	Hydro - tidal		
SO-25	Hydro	Hydro - osmosis		
SO-27	Geothermal	Geothermal/pumps		
SO-28	Saving	Pumps/heat exchanger		

Temporary solution dynamic – a tipping point for solar

The timeframe of this study is relatively short compared to the decades needed for the development of new technological solutions. The solutions currently discussed were largely developed before the studied period and the relative (dis)advantages are widely known and do not suddenly shift. However, at least one crucial dynamic in the solution sphere is evident from the data. In 2011-2012 a *tipping point for solar* was reached. Due to the large manufacturing capacity build-up in China and the collective purchase schemes, the price of panels dropped 30-40% and these became attractive without subsidy. This produced (or further enabled) a host of new initiatives from both start-ups as well as local collectives.

Moreover, the evolution of the debate also revealed the interaction of the debate on solutions with other (e.g. political) events. In this respect, 2010 was a year of intense debate, for example, related to the *lack of progress* in light of the goals. Several new scenario studies highlighted the possibility of transition, the need to concurrently develop many solutions, as well as the substantial investment needed. At the end of 2010 and in 2011 a strong debate about *nuclear power* driven by the Rutte I government agreement took place (see section 5.2.1), which settled again partly because Delta as projected operator expressed doubt about the business case (11_0444) and the political balance shifted in 2012. During the years 2012-2014 important triggers of the debate about solutions were the *disruptive dynamics* in the market (see section 5.3). This resulted in a debate about system stability and the need for storage as well as the Energy Agreement and its implementation issues (especially the cost and grid issues connected to offshore wind).

Finally, it is relevant to note that the global resource market dynamics continuously altered the relative competitiveness of the different power sources. Especially the coal/gas price was relevant in this respect (also see section 5.2.5).

Actors: sub-regimes promoting specific solutions

The solution level debate as well as the actual R&D activities revealed some sub-regimes or sub-ecosystems attached to specific solutions with specific actor constellations. In the light of this thesis, the participation of incumbents in these ecosystems was especially relevant.

The applied energy research institutes in the Netherlands played an important role in this debate. In this respect, ECN, Ecofys, and CE Delft, but also PBL and the Rathenau Institute played a central role with regard to the societal relevance of solutions. Specific research/practice groups within these institutes were central part of the “sub regimes” around specific solutions. They often played the role of providing content-wise argument in support of different solutions, however, they were certainly not fully independent in this respect due to their involvement with specific technologies for a long time (e.g. see 14_0286, 13_0071).

In general, technology suppliers did not have an important role in the debate in the Netherlands, reflecting that most technology is imported from abroad (e.g. Scandinavia & Germany for wind, and China for solar panels). There is a (seemingly) waning solar cluster in South Netherlands and some involvement from the construction and barging sector in offshore wind. Both clusters participated in the debate, but their public presence is rather limited. The future perspective of these clusters also played a role, for example, in governmental decisions. However, from a more general perspective it seems relevant to ask whether the Dutch incumbents have a disadvantage, because they do not operate in the home market of the key technology suppliers.

Around the technologies in the less mature stage of development (e.g. solar/nano, hydro power, and kite wind) smaller ecosystems exist that are dominated by academic actors. Although incumbents do play an active role in the Topsector public research program, this mainly considers involvement in programs which focus on incremental solutions (well aligned with current infrastructure and centralized systems, such as gas, biomass and offshore wind, see section 5.2.1). It is remarkable to see that the data did not reveal much attention and participation by incumbents in the research ecosystems of the more radical and early-stage solutions.

Causal relationships: uncertainty & complementarities strongly influence the dynamic

Based on the earlier discussion and especially on the discussion of system-level dynamics, several causal influences were identified. Uncertainty and risks revealed in the solution

sphere were likely to negatively influence the pro-activeness of the incumbents' behavior (Markusson et al. 2012, Meijer, Hekkert & Koppenjan 2007, Alkemade, Suurs 2012). Second, complementarities between different solutions were likely to partly determine the decision making of incumbents. A relationship between their current asset and capacity portfolio and their future behavior was to be expected. Partial mutual exclusivity of the meta-paths could be expected to influence the direction of innovation on a more abstract/aggregated level. The lively discussion that ensued, presented through the media-analysis, reveals the relevance of complementarities and paths as it was proposed in the literature (Farla, Alkemade & Suurs 2010, Avadikyan, Llerena 2010, Hillman, Sandén 2008).

Thirty-six specific energy solutions have been identified with their individual advantages and disadvantages. It is impossible to identify specific effects for each solution. It is, however, relevant to mention the tipping point for solar in 2011-2012.

With regard to the incumbents' activities on the solution side, the data revealed only *limited participation of incumbents in early-stage research eco-systems*, in contrast to the rather strong activity in the Topsector programs with regard to more incremental solutions.

5.2.4 Demand side of the market

The demand side of the market includes all effects on influences on the electricity market by the customers who procure electricity. The discussion is divided into the retail side (consumers, SMEs, and other organizations with limited electricity demand) and the large-user side, because the dynamic differs fundamentally.

Retail market: a commodity market with limited demand pull

In general, the retail side of the electricity market can be considered a *commodity market*. Consumers tend to choose between suppliers based on price comparison. They do have the option to choose between “grey” or “green” current, but almost all suppliers offer both options at (almost) equal prices. Before price competition started to increase in the late 2000s, customers did not switch often and electricity was a “low interest” product category.

Triggered by privatization and entry of the supplier start-ups, a *price-based competition* dynamic emerged and put considerable pressure on the market. This resulted in aggressive marketing (as is discussed in section 5.2.5) and declining prices (e.g. 10_0367). The dynamic was further enabled by emerging online comparison platforms and also consumer organizations launching auction based collective purchasing programs in the market (10_0367, 12_0051). Articles also noticed that an increasing number of customers started to switch (600.000 per year in 2012, 12_0204, in ten years 55% switched, 14_0330) and

demanded shorter contracts (14_0127) induced by this price-based competition dynamic. However, others reported that a substantial part of the market remained unaffected, as customers remained “loyal” (12_0333, 14_0096).

The considerable uptake of *green current* makes an analysis of the *effect of consumer demand* complicated. Forty to sixty % of the consumer segment of the electricity market (10_0149, 14_0118) purchases green current, which was first introduced by Essent together with WWF (11_0305). Although this signals a green preference, it should be nuanced in two respects: (1) the price of green current is almost equal to the price of “grey” current, (2) much of the green current is supplied based on certificate trade. Green certificates are most often procured in Norway, which has an excess in hydro power and which does not have a strong market for certificates locally. As was discussed consistently in the public debate, there is not a strong relationship between the growth of renewables capacity and the sale of green current (10_0149, 14_0096, 10_0026).

Beyond the general green current, the uptake of “*dark green*” *products and local energy generation and saving* signal a clearer green demand and potential influence. First are the “dark green/local” products developed in response to the green current debate. No overall figures are available on the uptake of this product category (in the media dataset), however it seems that this is still clearly a niche segment. These products guarantee that the renewable energy is generated locally or even from a specific source (mostly wind energy) and sold at a price premium, generating additional investment capacity. The second dynamic is the increased activity of consumers to install solar panels or boilers and/or save energy in their own homes (also termed “prosumer trend”). Although exact figures differ, an exponential growth trend is seen, resulting in 160.000-200.000 roofs with solar panels in 2014 (14_0157, 14_0243) (still <1% of total electricity supply, 14_0226). This trend was produced by the improving competitiveness of solar panels and energy saving solutions (including the effect of not having to pay energy tax for one’s own generation and the option to supply energy back to the grid at peak times), as well as the active promotion of these solutions by different actors (ENGOS, start-ups and local energy collectives at first, later also incumbent actors). Energy saving was actively supported by the government with subsidies to provide accessible energy saving advice to consumers. Different articles also mention that this prosumer trend catalytically influenced the market as consumers became more aware and energized, when experiencing and using the products, driven by awareness of energy use as well as the drive to become more self-sufficient (11_0096, 11_0169). During the interviews, actors who were explaining that there was some demand effect, pointed especially at the prosumer trend as positive signals from the market (Interview 16 & 5).

Some mentions are made of *niche segments* with specific and high demand for renewable electricity. More specifically 3.600 churches were mentioned as having a collective

procurement program which awarded a contract to Greenchoice (11_0422). Another church was mentioned in connection with a deal with Eneco to finance wind turbines and procure energy (14_0201).

In contrast to the consumer and larger-user segment, the specific role of the *SME segment* in the electricity market as well as the energy transition was only mentioned a few times. Procuring renewable energy is often part of a broader CSR strategy, but seems to concern only a limited front runners group (10_0170).

On the retail side, the uptake of *Electric Vehicles* as well as increased use of *online devices* was likely to induce *increasing the demand for electricity*. While the scale in this period remained limited (1000-2000 in 2011, 10_0446) many forecasts predicted strong growth in the next decade (e.g. 200.000 EVs in 2020, 10_0446). This trend is also relevant because it provides opportunities for the market actors to develop new services and also to connect EVs to the grid as local storage solution (see 5.2.3). Besides the EVs, the broad adoption of continuous online devices also drives the growth of demand for electricity (14_0206).

Large-user market: some progressive deals among a retarding industry regime

The *energy intensive industry* is traditionally influential in the electricity market. Especially the chemical, food, and metal/steel industries are large users of energy (33% of electricity is used by the industry, 15% by the “heavy” industry, 11_0164). Vice versa, the energy costs have a big influence on the competitiveness of these industries (e.g. aluminum 40% of total cost, chemicals 50%, 14_0009). This is evident in a few high-profile bankruptcies of, particularly, two aluminum smelters during the studied period (Aldel, Zalco, 13_0341). Another consequence is the continuous threat of offshoring of the industry (e.g. 14_0158). The relative high economic importance of the segment explains why this segment is strongly supported by fiscal measures (exempting them from energy tax). The stake of the industry is also mentioned to be highly influential in several dynamics in the market, including the development of many new capacity and large investments in international grid connections (10_0365). In general, the industry and their representatives are key actors in the most reactive advocacy coalition (Pro-economy) in the transition dynamic (see chapter 6). Some signs of more proactive behavior by industrial large users is also visible in, for example, the “green deal” presented by Akzo, Nyrstar and Eneco (proved not to be feasible in practice) as well as the important role accredited to proactive industrial actors on the background of the Energy Agreement negotiation (see chapter 6).

The industry has been engaged in *energy saving* already for a longer period (since the early 1990s starting with MJA1), however in some segments the “low hanging fruit” seems depleted. As energy savings often result in cost savings, there is often a business case to focus on energy saving. As such, the market can realize energy savings on its own. For

example, in the articles, a Unilever plant is discussed that reduced the CO₂ (and in the process the energy use) by 25% (14_0162). However, the whole industry still struggled to realize the negotiated targets (1-2% per year in this period) (14_0188). For the steel industry, it was argued that this was due to the increasing marginal costs of savings when the “low hanging fruit” was depleted. It is noted that the energy efficiency of this industry in Europe has doubled since 1975 and is unmatched on a global scale (13_0451).

An industrial support tendency from the government in interaction with the market development has *limited the impact of ETS*. The ETS was originally designed as the instrument to facilitate the transition to a low carbon industry through a market-based approach. However, a broad provision of rights (resulting from a strong lobby), temporary demand decrease due to the crisis in interaction with the uptake of renewables, marginalized the impact on decision-making in the industry (e.g. 14_0053, 12_0337).

A clear trend in the market is the *rapid growth of the datacenter sector, which also becomes an active player in the renewables segment*. According to an often-cited Greenpeace report, these add up to 1-2% of the global electricity use and will grow 10-15% per year in the next decade (10_0099, 11_0302, 11_0212). Considering the huge potential environmental impact, the sector is actively engaged (by e.g. Greenpeace) and actively works on energy savings as well as developing renewable energy sources. New energy saving techniques can reduce the relative energy need by 50-70% (10_0003, 10_0099, 10_0259), however this still does not negate the large demand growth in this segment. For example, Google has also invested >\$1 billion in renewables (13_0189). This makes the industry an active player in the development of renewables projects or energy assets in general. Microsoft is, for example, quoted to develop a new datacenter in connection with a greenhouse cluster to exploit the heat exchange potential and Google co-located its plant next to the Eemshaven energy cluster (14_0262).

Besides the already mentioned initiatives (industrial energy saving, Akzo/Nyrstar deal, datacenter initiatives), some large users are proactively *using their role as large user to influence the transition*. NS (together with the other railroad companies) launched a tender for its post 2014 contract. Eneco was awarded this contract (1% of total market), based on an approach to allocate newly developed wind capacity (onshore & offshore), adding up together with energy saving by NS to a fully renewable supply in 2018 (14_0164, 12_0137). KPN, triggered by its partnership with WWF, pledged to acquire all its electricity from local renewable sources and engage its suppliers to do the same (11_0120, 11_0122). Thirdly, Rabobank was mentioned as being willing to procure locally (nationally) produced renewable electricity during the debate about lack of impact of the green current product available on the market (10_0395). Heineken was mentioned to neutralize the energy supply of its Zoeterwoude plant, by developing 4 wind turbines on the premise, as well as investing

in other renewables projects (in 2011 the Noord-Oost polder windfarm was mentioned, 11_0395, in 2013 the focus seems to have shifted to biogas, 13_0248). As a last example, the construction firm TBI was mentioned as having closed a €5 million deal with Essent to supply wind energy (11_0062). It is notable – in contrast - that the *national government* was challenged by NGOs for *not using its procurement power* as one of the largest customers (1 TWh) beyond purchasing certificate based green current (13_0435).

Causal relationships: only limited demand pull documented

The overall effect of the demand side of the market seems to be neutral to negative. Only limited demand pull seems to be present in the retail segment of the market. Increasing price-based competition in that segment might also negatively impact the ability of incumbents to innovate. The effects of niche segments including the “dark green/local renewable” products and prosumer segments seem to be limited still, but they do influence the market as a stimulating factor for pro-transition behavior. The overall influence of the wholesale/large-user market seems to be negative, due to the international industry competitiveness argument, which serves as key argument against progressive policies. It seems that the large-user deals mentioned are an exception and have a concrete positive impact on the development of renewables capacity (and might be even bigger, due to example setting).

5.2.5 Competition

The competition category of the system analysis framework focuses on the dynamic within the sector and how market dynamics influence the transition process. The definition of this category excludes the technologies and solutions (see section 5.2.3) and demand-side dynamic (see section 5.2.4).

Actors: a wave of new entrants to the sector

The electricity sector traditionally has pervasive boundaries as customers can be producers as well. For example, greenhouses and industrial customers generate their own energy and especially greenhouses can supply back to the market as well. In this sense, the generation part of the utility business model has always had some cross-sector competition.

In the last decade, however, the competition from new entrants to the sector has multiplied. First foreign competitors entered the market. The first entry mode of foreign competitors was to acquire generation assets. Both E.ON & GDF/Electrabel acquired assets in the early 2000s. In 2009 Vattenfall procured Nuon, and RWE procured Essent. Other players like DONG also became involved in both supply and generation in this period, as it developed the Enecogen PP in Rotterdam together with Eneco.

Since the privatization of the market, new companies have been able to enter with a “supplier only” model. Greenchoice was the first mover in 2001 (11_0438_W). From that year companies with a clear renewables profile were allowed to enter the market. Later on, from 2004 generic suppliers were also allowed to enter. These suppliers were able to gain market share due to aggressive marketing tactics and easy switching abilities. Greenchoice, for example, attracted 250.000 customers in the first ten years (10_0038) and Oxxio even attracted 700.000 customers in 2,5 years (14_0118). Although Greenchoice was focused on developing the renewables market, most start-ups focused on price/marketing-based competition and merely sold green current based on certificate trade (see section 5.2.4).

In contrast to the supplier start-ups in the 2010s, several new start-ups emerged which focused on facilitating decentralized generation with new business models. These are mostly focused on the solar market (e.g. Qurrent, Zonline). From the onshore wind sector, several players started to focus more on selling the current directly to the consumer (e.g. Windunie, Raedthuys) and new players emerged in this segment with crowdfunding models (either financing-focused, or supplying back to the consumer, e.g. Windvogel, Windcentrale). Recent start-up Vandebroen (2014) connects biogas and wind energy generating farmers to customers with a platform business model.

While the start-ups connected/facilitated initiatives across the country, the local collectives were strongly locally rooted. In 2012, approximately *300 of these collectives* had emerged (12_0234, 12_0333). Most of them shared that they supply energy (often with Greenchoice and/or Trianel as back-office) and stimulated local solar capacity installations and energy savings. Some, however, diverged into other asset categories, e.g. with biomass projects, wind turbines, or by re-activating a hydro power plant (14_0015). Texel Energie even planned a €20 million geothermal project (10_0014), which was apparently not successful. Beyond these projects, these cooperatives tended to invest in local community projects and also prospered based on anti-multinational corporation sentiments. In some cases, the municipality was actively engaged in setting up the local collective as a way to implement an active sustainability policy. Since 2013, the emergence of umbrella organizations (such as the DE Unie) have been mentioned, to facilitate more professional back-offices and shared procurement (13_0350, 14_0088).

Entrants from several other sectors also entered into the electricity sector. First the waste industry, which was already connected to energy with power generated from waste incineration, more actively engaged the electricity market. For example, Van Gansewinkel decided to actively engage the sector after a partnership with Eneco was less successful (11_0149). The most notable example is HVC, which started to actively develop solar and wind projects (e.g. 11_0018). The installation sector also became actively engaged in the energy sector. Companies such as Cofely and Unica developed new “installation and

maintenance” business models for local energy assets (12_0260, 12_0041). Finally, players from the technology sector also became engaged, at first to compensate for the massive energy needs of datacenters with renewables projects, but later also with a focus on developing smart home and data-driven solutions. Especially this competitive risk of enterprises such as Google, Uber entering the sector also played a key discursive role in story-lines that predicted rapid sector disruption and was perceived as a driver of incumbent behavior (Interview 11 & 13).

Finally, (renewable energy) technology start-ups (such as tidal or kite power energy, see section 5.2.3) sometimes also generated energy, but this was often on a (small) pilot project scale.

A manifold of business model innovations

With the entrance of so many new players, several new business models also emerged, especially marketed by the start-ups. The business models were often targeted at a specific bottleneck for market growth. For example, many solar start-ups developed models to improve the business case (e.g. by local sharing of surplus energy) or reduce the upfront investment of customers (e.g. with a lease). The highest profile business model innovation probably was the launch of collective procurement programs for solar panels, as this was introduced by Urgenda at the end of 2010. By procuring the panels directly in China and opting for a bulk discount, the prices decreased by 30-50%. Urgenda itself sold 50.000 panels in less than two years (12_0139). However, since many players followed this model, the effect on the proliferation of solar panels was much bigger (it should be noted that this was not only due to the business model innovation, but also to the emergence of overcapacity in the solar manufacturing industry in China). Also, a remarkable example is Vandebron, which claims to be able to bring the biogas (CHP) asset category beyond the profitability tipping point and as such empower a broader movement (e.g. 14_0096). In addition, Windcentrale succeeded in financing at least two whole turbines (€ 7 million) solely based on crowdfunding (12_0349).

Temporal dynamic: a cascade of events leading to adverse market conditions

The Netherlands in the 2000s suffered from higher energy prices compared to neighboring countries. This damaged the competitive position of the energy-intensive industry (e.g. steel & chemicals). Based on the need to reduce the energy prices, two lines of initiatives emerged: (1) improving the interconnection of the grid by developing connections with the UK and Norway grid, and improving the connection to Belgium and Germany and (2) developing new (efficient) power plants, especially also coal-fired to balance the heavy dependency on the gas market.

The effort to improve the Dutch energy market was rather effective and led to overcapacity and low prices. The network connection was claimed by network operator Tennet to have leveled the energy prices with the neighboring countries since the early 2010s (10_0365, 12_0082). At the same time in Germany, new renewables capacity was added to the grid, inducing a temporary overcapacity in Germany on windy or sunny days (e.g. 12_0371, 12_0240, 14_0132). Due to the improved connection, the Dutch market was directly connected to the overcapacity, which induced low and eventually temporary negative prices (14_0159). Beyond this effect in the early 2000s, several new power plants were fired, inducing an overcapacity (12_0238, 14_0132, 14_0337). It is remarkable that this overcapacity was already predicted by several actors in 2010 (10_0195, 11_0132, 10_0249). The effect of these market circumstances was further amplified by a temporary weakening of demand (especially on the industrial side, total demand remained stable vs. growing market before) due to the economic crisis (11_0448). Taken together, the effect of these market dynamics on the local electricity market was rather adverse.

Due to the connection to the global markets for resources, the gas PPs were especially heavily impacted. Power generation depends strongly on the resource prices of gas and coal. Since the grid should be continuously in balance, this means that in case of overcapacity only the assets which supply for the cheapest price will operate (except renewables, which have structural grid priority). Therefore, the fluctuations of the resource prices have a strong impact. Until 2011, the coal price was high and the coal PP owners were complaining about challenging market conditions (11_0263, 11_0447). However, since 2011 the coal price has strongly declined again, because of the shale gas uptake in the US (which led to much coal export from the US, as it was not needed any more in the US, 12_0324, 13_0123, 13_0006). The combination of low coal prices, overcapacity in general, and temporary overcapacity due to renewables, led to the gas PPs being forced off the market (14_0086, 14_0158). Consequently, many (fairly) new gas PPs were running idle for a large share of the time.

A risky market as such

The energy market –in these times of transition– is a complex market with many interacting forces, as is evident. High dependence on (fluctuating) government support is a key a risk. In a specific case, it was shown that subsidies amounted to more than 50% of the lifetime revenues of an onshore wind turbine by a multitude of fiscal and subsidy stimulation programs (14_0051). Although this might not be identical for all assets developed in the market, the multitude of complementary interventions, as well as the relatively high amount illustrate the complex interaction with public policy. As was clear from the section discussing the governmental impact on the market in more detail (5.2.1), the policy in the discussed period was highly volatile and was mentioned as having induced substantial uncertainty on the market.

Table 5.9 - New business models emerging from the market dynamic (source: summary of media analysis data).

Solution	Model	Players (not complete)	Quoted effects
General	Engage shareholder	HVC	Advise municipality on energy policy & stimulate participation in projects (11_0018)
General	Profit re-invested local/renewables	Local cooperatives, TUD green employment agency, Vandebbron, HelloYellow	Flourishing communities (14_0310)
General	Wholesale market access platform	Falckstraete	Increases revenue by 15-20% (10_0131)
General	Niche segment focus	Orro, Zonline	Engage more customers
General	Easy switching & discount	Oxxio	Grown to 700k customers in 2,5 year (14_0118)
General	Aggressive (door/telephone) marketing	NLE, Greenchoice	Engage more customers
General	Back-office sharing	Anode, Greenchoice, Trianel, HelloYellow	Empower local/focused initiatives
Smart meter	Smart meter	Unica	Energy saving (12_0260)
Consumption	Energy saving & low energy appliances web platform	Greenem	Empower energy saving
Solar	Fee per panel	Grunneget Power	Grow market
Solar	Install panel & supply fixed fee/lease	Greenchoice, Solease	Grow market
Solar	Compensate production energy with solar	Dothebrighting	Neutralize production energy need (11_0242)
Solar	Local ambassador promotion	ZON-IQ/Nudge	Customer engaging/autonomously growing community (12_0124)
Solar	Local supply of solar for roofless	Zonnepark NL, Herman	Engaging roofless (12_0103)
Solar	Solar output prediction	Zonline	Reduces risk
Solar	Collective purchasing	Urgenda, SN&M, Eneco	Urgenda: 50k panels sold (12_0139)

Solution	Model	Players (not complete)	Quoted effects
Solar	Solar tender platform	Samenzonneenergie.nl	Optimal pricing for consumer, challenged to disrupt local market and induce lower quality
Solar	Active notification of solar sharing options	Zon op NL/Greenchoice	Engaging more customers
Solar	Employ disadvantaged people	Zonline, Zonnecollectief	Creating jobs for disadvantaged (11_0246, 13_0421)
Biogas, wind	Peer2peer connection	Vandebron	Make biogas-CHP profitable again/restart CHPs, energy saving (more connection/asset, 14_0192, 14_0096)
Wind	Crowdfunding	Eneco, Windvogel	Raise capital, create local support
Wind	Fund-supply crowdfunding	Windcentrale, Windunie	Raise capital, create local support, free publicity (12_0349, 14_0310)
Wind	Design-build-maintenance contracts	Siemens	Reduce customer risk, grow market

Unpredictable interaction of policy schemes and goals, especially visible in the ETS case, led to high profile projects being cancelled. Low CO₂ prices (ETS) resulted in freezing CCS plans, which were intended to improve the position of coal as part of the fuel mix during the transition. Beyond local resistance and some other disadvantages, the incumbents claim that the CO₂ price was a crucial negative factor in their business case to invest in CCS (14_0072, 12_0380). The CO₂ price was quoted to be low due to the interaction of several dynamics: (1) a tendency to spare the industry by providing excess CO₂ rights, and (2) temporary crisis demand reduction in combination with substantial renewables growth, which further created oversupply of CO₂ rights in the ETS system (14_0053, 12_0337). As such, the ETS system, which was positioned as key part of the climate change policy, had an adverse and unplanned effect on important building blocks needed in the same policy.

During the period studied, several high-profile bankruptcies drew attention. First, Econcert showed spectacular growth as a developer of innovative renewables projects, and attracted a lot of attention. Although overambitious management eventually led to brutal misrepresentations of the financial situation and strongly contributed to the bankruptcy, adverse and unexpected market conditions were also part of the mix of causal effects (10_0368, 13_0433). The fact that later many specific assets were successfully acquired and exploited, for example, by Eneco proves that the efforts of Econcert were not all castles in the air (10_0083). Second is the bankruptcy of Bard, which earlier successfully acquired €4 billion of subsidy to develop the Gemini offshore wind park (11_0111). Third is a chain of bankruptcies induced by the default of supplier start-up Orro (13_0049). The presented article mentions that this was primarily due to unexpectedly high numbers of defaulting customers. The bankruptcy triggered financial problems for Trianel, a German firm which provided back-office solutions to many decentralized energy collectives.

In the late 2000s and early 2010s, a lot of electricity generating biogas fermenters were developed by farmers. These also received substantial amounts of SDE(+) exploitation subsidies. However, due to low market prices many of these assets were idled, due to a lack of profitability (14_0096, 14_1032).

Incumbents struggling

First it is important to remark that most incumbents operate with a *three-sided business model* in which each side has specific dynamics. The first part is the electricity generation, which is an asset management type of business model, in which assets with a 20-40 year lifespan and high upfront investments need to be exploited optimally by supplying sufficient volumes of current at sufficient prices. It can be noted that developing assets in an uncertain market in transition is a rather risky business. The second part is the supplier model, in which large numbers of customers need to be supplied at competitive prices. It should be noted that

this market is characterized as a commodity market, in which competitive prices are crucial (see 5.2.4). Beyond the marketing and sales aspect, trading of energy is important as a driver of the resulting margins. This can be done by either trading on the spot market, or by negotiating long-term contracts (or in case the supplier also owns generation assets, by supplying from owned assets). As such – especially in times of volatile markets - there is considerable risk in this part of the business model. The third is the network part, in which companies own the regional grid and can charge customers with a distribution fee. It is noted that this is the most stable and predictable part of the business model. However, based on the privatization process in the Netherlands, the network business was obliged to separate from the supply business. Eneco and Delta chose to challenge this directive in court and have not yet executed this separation. While Essent and Nuon already separated their network business, it should be remarked that their parent companies do profit from the positive side of this business model in other markets abroad.

Second, it is important to note that several incumbents were rather active in terms of company venturing in the early privatization period in the 2000s, but many of these initiatives proved unsuccessful. Delta, for example, adopted a multi-utility strategy and branched out into waste collecting, water supply, biofuel production, and solar panel production (14_0081, 10_0288, 10_0427). The last two businesses were terminated due to a lack of success, while the first two were sold later on to generate cash. Nuon as another example had to terminate a thin film solar material pilot plant after considerable investments (10_0341, 11_0182, 12_0058) and put up for sale its installation and engineering business units in troubled times (12_0194).

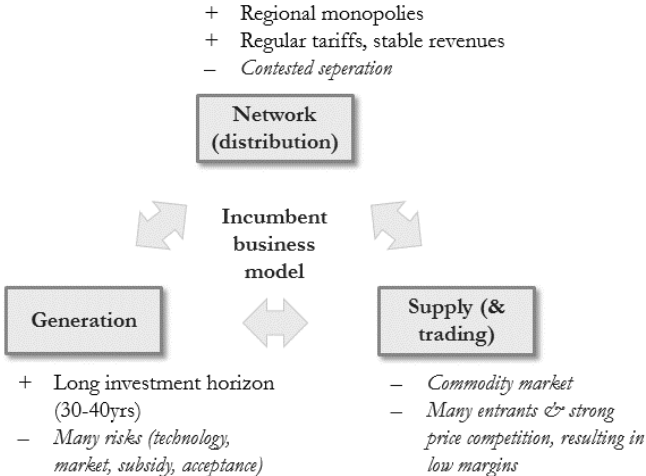


Figure 5.6 - The three components of the incumbents' business model with relevant characteristics and dynamics.

Starting in 2012, incumbents were heavily impacted in their business model by the adverse market conditions described before. This was especially visible in write-offs in the asset side of the business as well as large declines in the market valuation. The write-offs reflected the (unexpected and at least partly structural) decline in energy prices, the uncertain future due to the uptake of renewables, and bad competitive position of gas PPs in the total energy mix. Several players (EON, RWE, Vattenfall) in the Dutch market were heavily impacted in the German market, as they own nuclear PPs which need to be closed down prematurely, due to the Atomausstieg.

Finally, an apt observation is that the dynamics in the market drove incumbents to fundamentally reposition themselves. RWE decided to turn the company around towards an energy service provider (14_0086, 14_0327, 14_0319). E.ON even more radically decided to separate the conventional PPs in a separate company, to be able to focus its core business on renewables assets and the supplier business model (14_0343, 14_0344, 14_0345, 14_0346).

Causal relationships: a challenging market for incumbents to innovate

The competitive dynamic in the electricity sector can be considered rather challenging for incumbents. First, the global resource market connection strongly fluctuates and has major influence on the business model of the incumbents. Especially the effect of shale gas on the coal price, and the import of German renewable power led to unexpected market conditions (low coal price, gas power plant idling). Furthermore, privatization has increased the intensity of the competition in the sector, including the entrance of start-ups and entrants from other sectors and abroad. Especially start-ups have introduced new business models to the market. Another effect of privatization seems to be the increased competition, especially on the retail side of the market. The combination of the adverse market conditions seems to put all sides of the incumbents' model under pressure and is likely to limit their space to invest in innovation. In contrast to the overall dynamic, especially for Delta and Nuon, data was found of substantial corporate venturing activities in the 2000s (likely to have been caused by privatization).

5.3 DISSECTING HOW THE SITUATION BECAME DISRUPTIVE FOR INCUMBENTS

5.3.1 Signs of disruption

In the course of 2012 and 2013 an interaction of trends became visible which seems to have had a dramatic impact on the Electricity sector. These trends were mentioned in the previous

sections and especially section 5.2.5. However, what is of interest now is the influence they have had on the incumbents. The signs were several. The incumbents, as they engaged in the media, seemed to have lost their self-confidence and called for help to ensure that the electricity system was not disrupted. This is in contrast to earlier media engagements, in which they structurally emphasized that their existence was not at stake. For example, consider this quote from RWE CEO Terium:

Q17 “What I just want to say: also for renewable energy much capital is needed. The role of large energy suppliers is far from irrelevant, their contribution is much needed” (12_0019)

Table 5.10 shows a selection of quotes by incumbent spokesmen revealing their lost self-confidence and call for help. They use strong words to describe market trends such as “dumping,” “strong market disturbance” and “being forced out of the market.” Furthermore, they project strongly negative societal consequences such as power outages, excessive price increases, job losses and that no actor would be willing to invest in energy assets any more. They stress that their survival is also in the interest of society at large. Finally, they call for government support to ensure their survival by stopping subsidizing renewables and providing a new support scheme for “back-up capacity.”

Table 5.10 - Exemplary quotes of incumbents who have lost self-confidence as result of the market trends in 2012/2013 .

Q18 Terium: 'In principle much is possible with regard to green power. But the power still needs to be distributed, which is a problem, considering that green activists oppose each power line under construction. It is all hands on deck to ensure the availability of electrical power across Germany.' (12_0019)
Q19 In contrast, RWE/Essent-CEO, Peter Terium (..) last month published a press release which stressed that the energy bill will rise to unpayable levels in the coming years. He even added that subsidies for solar power strongly disturb the market. (Koorstra, 12_0190)
Q20 But Essent CEO van Laethem also knows: more investments in generation assets - renewable or conventional - are useless due to the excess capacity on the market. (12_0238)
Q21 "We can't develop a rather expensive power plant, if the plant will only run for ten years," as GDF Suez explains. The firm fears for shortages in five to ten years and together with E.ON advocates a special surcharge on the energy bill of households and businesses. (12_0330)

Q22 Subsidized German solar power is dumped on our market, according to the Essent spokesman. Our clean gas-fired power plants, which, as should be emphasized, were constructed to support fluctuating sustainable energy generation, are now forced off the market. A spokesman for energy supplier Eneco replied on request that Enecogen, their brand-new gas-fired power plant opened last year, is running idle much of the time for the same reason. (12_0237)

Q23 In Germany more is at stake. Again, thousands of jobs will be lost at RWE, as CEO Peter Terium stated yesterday. A striking 30-40% of the power plants of RWE are running at a loss, because of the decline in the electricity price, according to Terium. He fears he may have to switch off these power plants. (13_0270)

Q24 Persson: Especially the use of that last word (sustainable, to be precise) is of highly confusing brutality. Sustainable energy is not sustainable, according to Mestrallet, who stated this at a hearing of the European Parliament one and a half week ago. (..) Mestrallet is not the only one: the bosses of the "energy giants" like Eon, RWE and Vattenfall also visit politicians and MPs with a ranting and raving temper. Their message: help us, we are sinking. They are strongly impacted by this cursed and elusive green electricity. (13_0348)

Q25 In the meantime, the conventional energy suppliers are fighting for survival. Ten CEOs of the largest EU energy suppliers appealed to the European Commission and member states last Friday in Brussels to stop subsidizing solar and wind power. (13_0380)

The adverse nature of the market trends was also visible in the financial results of incumbents. Due to the declining prices on the wholesale market, the incumbents had to make impairments on their assets. As the overview of the Dutch incumbents shows, the impairments of the top three incumbents in the Dutch market add up to €6,4 billion especially in the period 2012-2014. The EU incumbents, the parent companies of many Dutch incumbents, also struggle greatly. RWE for example announced a €2,8 billion loss in 2013, in fact, its first in 60 years.

Table 5.11 - Impairments made by Dutch incumbents due to low market prices and idled power plants.

(€m)	2010	2011	2012	2013	2014
Essent		€ 270	€ 1.700	€ 2.400	N/A
Nuon			€ 1.100	€ 419	€ 380
Eneco			€ 78	€ 68	(partial roll-back)

These trends also led to fundamental strategic and structural changes by incumbents. Executives in the context of these changes stated that they have come to realize that fundamental changes are needed. For example:

Q26 "The current business model has no future," says CEO Johannes Teysen of EON. (14_0345)

Q27 RWE strategy document quoted by EnergyPost: The European energy retail sector is "about to undergo a massive transformation in the coming years" (13R-01, p. 1)

As a result of this realization, RWE and E.ON announced fundamental, strategic changes in 2014, which also resulted in the unbundling of their conventional and renewable activities. Vattenfall also announced a strategy revision in 2013, including more focus on service-driven business models.

It is argued that the described dynamic in the Electricity sector can be seen as a potentially disruptive innovation process, as it is used in the innovation literature. Building on the work of Christensen (Christensen 1993, Christensen, Bower 1996, Christensen 1997), this literature discusses (mostly technological) change processes, which result in fundamental changes in the competitive balance in a sector (Danneels 2004). Due to the fundamental nature of the changes in business models and competitive bases, incumbents at first often ignore these changes and later struggle to catch up. As a result, new entrants become well established and incumbents are even threatened in their survival. Although the final outcomes of this disruptive dynamic in this case are as yet unclear, the fact that it strongly affected the incumbents' current business model, and fundamental change seemed to be needed, became evident from the evidence described before. As is argued in the remaining part of this chapter, this was strongly related to a reactive approach to the decarbonization trend at first – also a characteristic of a disruptive innovation process.

5.3.2 Discussing the underlying dynamic

The causal sequences underlying this disruptive trend are analyzed in the now following discussion. Data is used to validate the perceptions and framing of the actors. The temporal pattern pays specific attention to illustrate that an interaction of factors caused a strongly challenging situation, especially in the period 2011-2013.

Import and the EnergieWende

A first cause mentioned by several actors was the increasing import of power from Germany, which was attributed to the expansion of solar power in Germany.

Q28 Subsidized German solar power is dumped on our market, according to the Essent spokesman. Our clean gas-fired power plants, which as should be

emphasized, were constructed to support fluctuating, sustainable energy generation, are now forced off the market. (12_0237)

It is true that data shows a rapid increase of imported power in 2011 and 2012. A relationship with the development in Germany seems plausible, as over the same period decreasing wholesale prices and increasing exports were reported, due to the uptake of renewables (Burger 2016). A more detailed analysis of the renewables growth in Germany reveals an accelerated pace, especially in 2011 and 2012. In this period, the overall renewables share increased from 16,6% (2010) to 22,8% (2012). The development of solar (PV) capacity shows a comparable pattern, with 2011 and 2012 as years of highest growth (14,5 TWh growth in production in these two years).

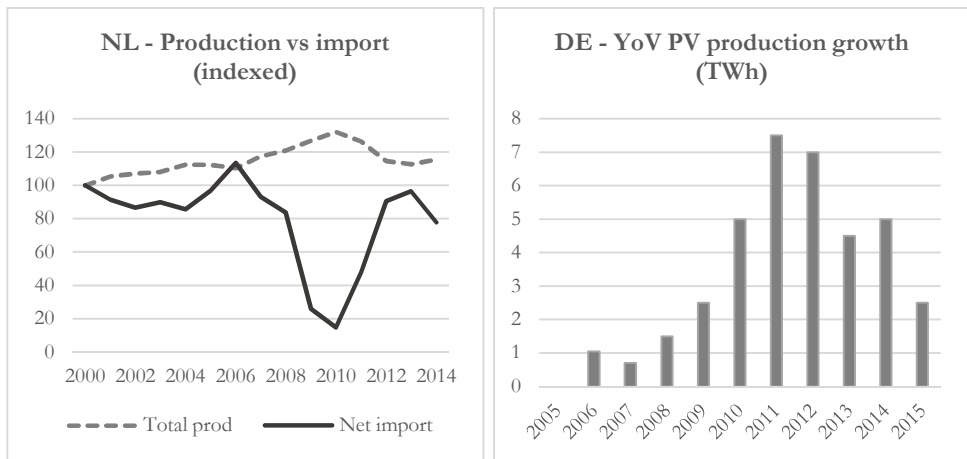


Figure 5.7- Left: NL total national production of electricity vs. imported electricity (indexed vs. 2000, source: CBS statline, table: Elektriciteitsbalans; aanbod en verbruik, retrieved September 15th 2016). Right: Year on Year Photovoltaic production growth (TWh difference with previous year, source: Burger 2016, p. 16).

It is also important to note that imports were not at historically unprecedented levels. In fact, after a dip in imports in 2009 (probably related to the financial crisis), the demand mainly recovered to the levels which were normal in the period 2001-2007.

Resource prices & shale gas “revolution”

Another cause mentioned is a loss of relative competitiveness of gas due to the low coal price. This resulted in many gas PPs running idle and later also being mothballed.

Q29 Energy producers confirm that, due to the high prices for natural gas, the most polluting coal-fired power plants in the Netherlands are running full throttle, as stated Nuon. According to de Haas, less polluting, gas-fired power plants are

running low or idle. This is because the costs of emitting CO₂ are "ridiculously" low. (12_0125)

This trend is attributed to the availability of coal on the global resource market, which is again triggered by the uptake of shale gas in the US. As ECN expert Sinke states:

Q30 And there is an unexpected threat: the recent emergence of cheap shale gas in the US has lowered the cost of fossil-fuel-based electricity generation. (13_0071)

The indexed development of the gas and coal prices shows a comparably strong increasing trend since 2000, which is related to the increase in global demand. In line with the suggested causal relationship since 2012, the coal price indeed shows a decrease, while the gas price keeps increasing. In similar vein, the fuel mix of the Dutch electricity generation indeed shows a trend break. While coal was steadily declining and gas almost stable, since 2012 coal use has strongly increased and gas use is declining. Although the observed concurrent trend breaks indicate a likely relationship, it should be remarked that there is also a relationship with the increase in coal-based capacity in the same period.

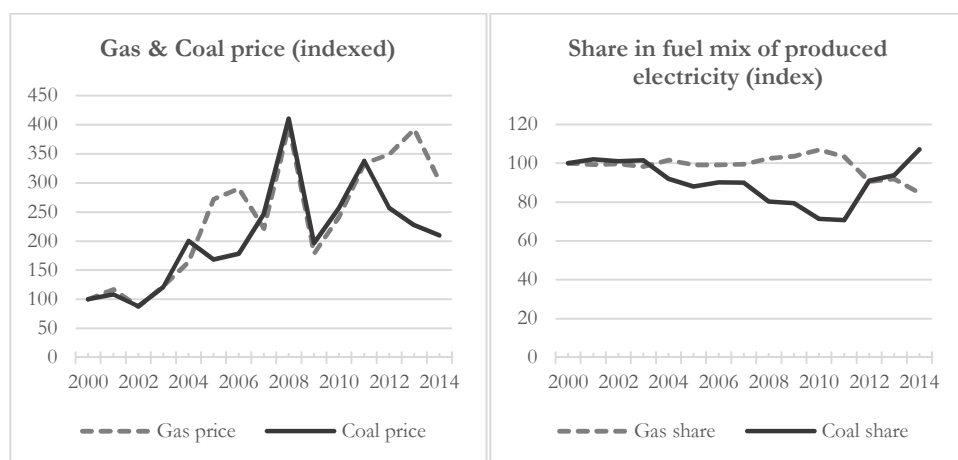


Figure 5.8 - Left: Gas and coal resource prices (source: (BP 2015), gas: UK, Heren NBP Index, Coal: Northwest Europe market price, indexed versus 2000). Right: share in fuel mix of produced electricity in the Netherlands (source: CBS statline, table: Elektriciteit en warmte; productie en inzet naar energiedrager, retrieved: September 15th 2016).

Financial crisis, failing demand and the adverse effect on the CO₂ price

A third reason provided for the adverse trend in the sector is an (unexpected) fall in demand as result of the financial crisis which struck Europe in the course of 2008. As a result of the subprime mortgage crisis in the US, which became evident in the summer of 2007, governments were required to bail-out banks in Europe in the second half of 2008. During

this process, the economy at large was also impacted, which resulted in a strong decline of demand. This effect was seen most clearly in the industrial section of the customer base. As Nuon states:

Q31 “These market conditions changed after the financial crisis in Europe, and demand for electricity has since fallen. Some electricity-intensive industry has been shut down or moved out of Europe.” (13N-F1, p. 8)

Besides the direct demand effect, the lower industrial production also affected the ETS and resulted in structurally low CO₂ prices from 2011 on. Since ETS also includes Electricity generation and coal (being the most carbon-intensive) was having the most impact, the decline of CO₂ prices strengthened the relative competitiveness of coal-based power generation (also related to the relative development of the coal price, see before). As Eneco states:

Q32 “The current price of CO₂-emission allowances is only a fraction of what was expected a few years ago. This has several causes, including the economic crisis and structural bugs in the EU-ETS. The current levels of the CO₂-prices in combination with the high prices for natural gas lead to low margins for e.g. gas-fired power plants.” (12O-C1, p. 8)

The data on supplied electricity indeed reveals a sudden decline of demand in 2009, after a structural increase before 2009. Looking to the overall demand this effect can be considered moderate (-3,5%). However, in the industrial demand the effect is much stronger. This demand plummets by -13% in 2009. A detailed analysis reveals that in fact only the industry showed declining demand in that phase, while residential, utility building, and agricultural electricity demands still kept growing. There was another remarkable trend: the industrial demand did not recover. Factual analysis of the demand decline shows that 53% of the overall demand decline (2008-2014) is in the non-ferrous metal industry. For the paper and print industry and the metal products industry combined, this adds up to 76% of the decline over the studied period. Indeed, newspapers reported on bankruptcies and offshoring in these industries, as a result of the relative decline of competitiveness, especially vs. the US (due to shale gas) (e.g. 13_0191, 13_0341, 14_0009). Indeed, this more structural effect resulted in the overall energy demand decline by 6% over the period 2008-2014. Considering the rising demand to which the industry was accustomed, this probably caused significant gaps in expected production vs. actual production.

The CO₂ price, after being relatively stable in the €15/tonne zone in the period 2009-2011, also showed a strong decline in 2011 and fell to €5 levels in 2013. As such, both the direct demand and indirect CO₂ price effect seem plausible. However, its effect on utilization should be judged in connection with the capacity developed, as discussed in the next section.

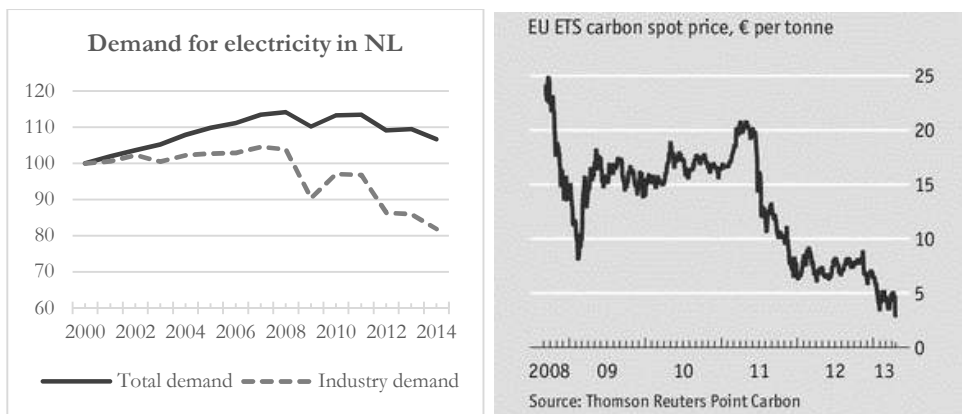


Figure 5.9 - Left: Demand for electricity (indexed vs. 2000, source: CBS statline, Table: Energiebalans; aanbod, omzetting en verbruik, retrieved September 15th 2016), Right: EU ETS carbon spot price (source: (Plumer 2013), original source Thompson Reuters).

Overcapacity and its relationship to industrial policy

While the incumbents tend to focus attention on the external factors (import, resource prices, demand), the capacity, in effect, is also relevant to consider. In fact, the incumbents claim that this is not as a cause, but as an effect of the dynamic in their context. Due to this interaction, their conventional PPs are running idle and they will not be able to build new ones in the future.

Q33 Van Laethem, Essent: More investments in generation assets - renewable or conventional - are useless, due to the excess capacity on the market. (12_0238)

However, at least since 2010 (where the media analysis dataset starts) there has been debate that the considerable new capacity (especially coal PPs) will create overcapacity.

Q34 The Regieorgaan Energie Transitie (Energy Transition taskforce) fears that the price of green electricity will be negatively affected by the plans of businesses to construct new coal-fired power plants. If all plans are implemented, overcapacity will occur and this will make it unattractive to invest in sustainable energy. (10_0026)

As the data reveals, electricity generation capacity had been growing consistently since 2005. Detailed analysis reveals that this was at first mainly due to new decentralized wind, solar, and greenhouse gas-CHP capacity. Since 2010, the centralized capacity also started to grow rapidly. While not denying the influence of the other factors mentioned before, it is argued that the declining utilization trend, which can be seen since 2011, would have been

less adverse if the capacity did not do as much in the same period. In fact, while the demand wavered, the capacity still grew by 38% in the period 2010-2014. Considering also that the imports were restricted by the capacity of the grid interconnectors, a lower overall capacity would have led to structurally higher utilization rates (assuming the same demand).

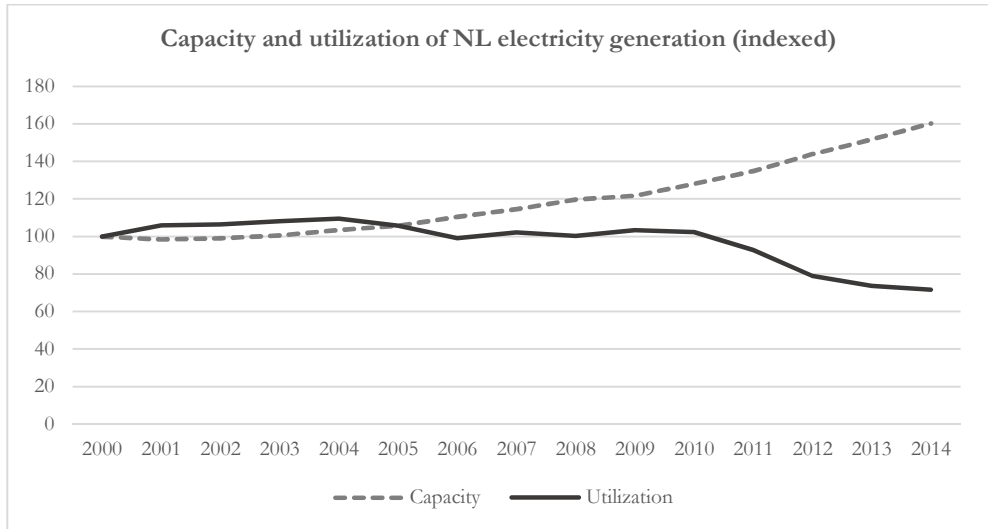


Figure 5.10 - Capacity and utilization of NL Electricity generation (indexed vs. 2000, source: CBS statline, Table: Elektriciteit; productie en productiemiddelen, Utilization = Production MWh/(Capacity MWe * 365 * 24)).

It is relevant to mention that in the media this capacity growth was positioned as related to a request by the industry. As - at that time - Essent CEO Peter Terium stated:

Q35 “But the manufacturing industry struggled at that time with higher (energy) prices and requested us to develop new power plants to increase the supply of electricity. In 2007 we decided, all things considered, to build the newest kind of coal-fired power plant in the Eemshaven region.” (11_0151)

This related to a broader tendency to support industry, due to its sensitivity to international competitiveness and the importance of energy costs in this respect. In fact, the electricity demand development (as discussed before) shows that negative effects were not theoretical. Also, because of the importance of the industry in terms of jobs and wider economic growth, the industry is largely exempted from energy tax. The negative CO₂ price is also attributed to – besides the crisis effect on demand - a generous provision of (free) rights to the industry to prevent negative effects on their competitiveness (10_0393, 11_0193). In general, this support for the industry “harms” the business case of decarbonization of the electricity

supply of the industry, because due to low energy prices and lack of environmental cost inclusion, the economic incentives for renewable electricity generation are smaller.

Renewables in NL – structural growth as result of renewables goals and technology development

Largely as a result of the active support policy of the Dutch government, the renewable electricity generation in the Netherlands is growing substantially. The Dutch government, as part of its climate change policy, has had renewables targets and support schemes since the early 2000s, and has utilized (often changing) support schemes to support the growth. Section 5.2.1 provides a more extensive overview. It is relevant to note that the policy support seems to be the dominant factor in the renewables uptake. The acceleration-stagnation dynamics can be clearly related to this policy evolution. The surge in 2003-2006 is related to the MEP support scheme, which was, in fact, cancelled due to its own “success” (Verbong, Geels & Raven 2008, Van Rooijen, Van Wees 2006). The second surge seems related to the progressive climate change policy of the Balkenende IV government. The following stagnation is a direct result of the lowering of the (2020) renewables goal by the Rutte I government from 20% to 14% in 2010.

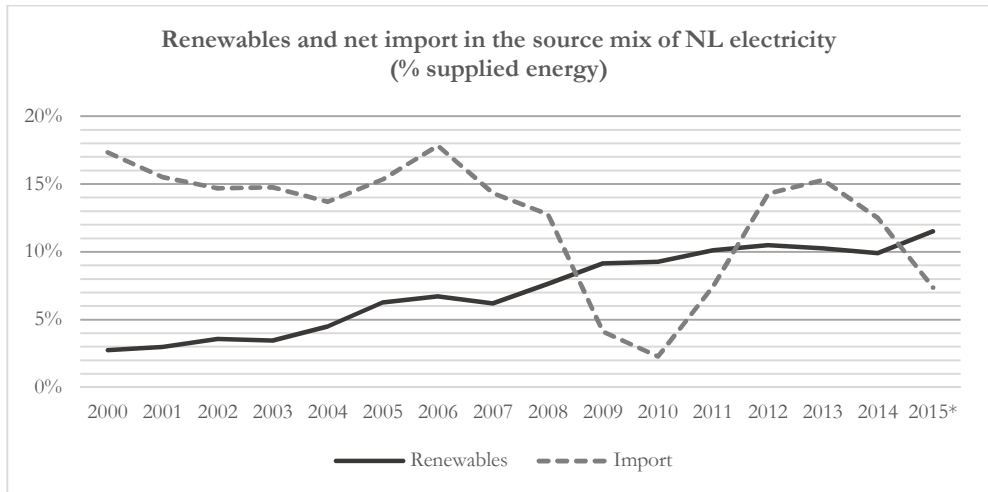


Figure 5.11 - Renewable and net import (import – export) as part of the total supply of electricity in NL (source: CBS statline, Table: Elektriciteit en warmte; productie en inzet naar energiedrager, retrieved: September 15th 2016).

The growing trend of renewables is also facilitated by growing competitiveness of these technologies. Comparable to Germany, especially wind and solar have grown as their competitiveness improved. From 2010 to 2014 wind power grew from 3,7% to 5,8% of the total electricity supply source mix. Solar also accelerated and grew from 0,05% to 0,9% of

the total supply of electricity due to the technology tipping point described in section 5.2.3 (and also underlying the German solar development). In contrast, the biomass co-firing, which was the dominant source of renewable energy until 2012, started to decline when, after the expiration of the MEP support scheme, (not immediately) a new scheme was launched.

It is remarkable to see that the growing renewable capacity in the Netherlands, in contrast to the strong focus on the adverse effect of import of renewable electricity from Germany, did not receive much attention. As can be seen in figure 5.11 the structural, but more gradual, renewable generation trend in fact already outweighed the net import as part of the overall source mix. One possible explanation for the limited attention to this effect is that “blaming” the effect on renewables would have triggered much stronger negative reactions than framing the effect as a cause of unexpected and foreign dynamics.

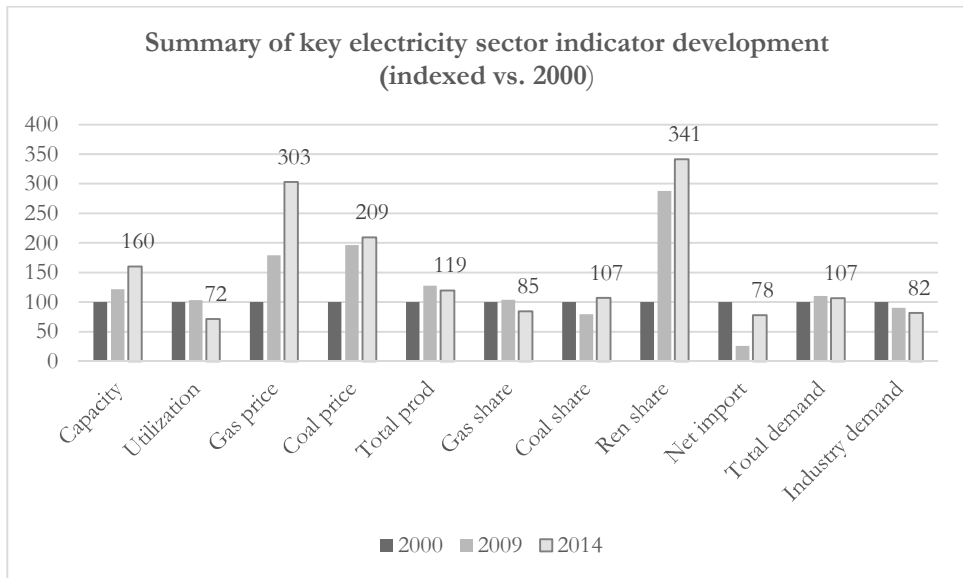


Figure 5.12 - Summary of the previously discussed indicators (indexed vs. 2000, sources see previous figures).

5.3.3 Disruption due to a lack of proactive reaction to structural trends

The previous discussion can be summarized in six structural trends which induced the dynamics that led to the disruptive situation in the Dutch Electricity sector. It is the interaction of active climate change policy (of the EU, DE & NL government), technology development (especially wind & solar) and industrial policy in interaction with the market dynamics over time (resource prices & industrial demand), which led to the explosive mix

of capacity growth, demand decline, and increasing import. The analysis is summarized in table 5.12.

Table 5.12 - Structural drivers of the disruptive dynamic in the Dutch Electricity sector (author analysis).

Structural driver	Intermediate dynamics	NL Electricity sector impact
EU climate change & energy policy	<ul style="list-style-type: none"> • The Netherlands lagging targets • Contested solution direction • Changing support regimes 	<ul style="list-style-type: none"> • Continuing wind/solar growth • Biomass growth stalls
Energie Wende DE	<ul style="list-style-type: none"> • Structural investment in renewables since 1990s, increasing pace since early 2000s • Fukushima (Atomausstieg) 	<ul style="list-style-type: none"> • Importing/negative prices • RWE/Vattenfall write-offs
Renewables technology development	<ul style="list-style-type: none"> • Fast growth, especially of wind & solar deployment in NL and especially DE • Quick acceleration of solar in DE since 2009 	<ul style="list-style-type: none"> • Rapid growth in & import from Germany • Moderate renewables growth in NL
Tight but fluctuating global resource market	<ul style="list-style-type: none"> • Structural increasing demand globally leading to nervous market with upward trend • Shale gas US > coal export 	<ul style="list-style-type: none"> • Turbulent market dynamics • Fuel shift gas > coal
Financial crisis	<ul style="list-style-type: none"> • Temporary demand decline • Low CO₂ prices 	<ul style="list-style-type: none"> • Overcapacity • Reduces ETS incentive
Industry policy (NL + EU)	<ul style="list-style-type: none"> • High volume ETS rights (protect industry + interaction with renewables & crisis) • Active Dutch energy policy focus on lowering energy cost > New coal PPs & international grid connections 	<ul style="list-style-type: none"> • Limited pressure on industry • Overcapacity & low prices (also linked to import)

It is argued that this disruptive trend can be attributed largely to structural trends, which could have been anticipated more by incumbents. As the discussion before showed, incumbents preferred to attribute the dynamic to factors which they assert were difficult for them to predict: imports, global resource market shift, and a strong demand decline. Especially for the demand effect as it was related to the financial crisis, this was a rather strong argument. The potential of shale gas was widely discussed, although the US export effect could potentially also be argued to have been unexpected. For the other factors, which

mainly consisted of the combination of climate change policy (on different levels) and renewables technology development, these trends were structural and already present for a long period of time. Climate change policy has been active since the 1990s and intensified in the early 2000s. The German EnergieWende is also rooted in policies dating from the 1990s. Although the German exit from nuclear power in 2011 (Atomausstieg) strongly impacted the German incumbents, the impact on the Netherlands (via imports) was mainly due to the uptake of wind and solar.

A key question is why the incumbents did not respond more proactively to these trends. The incumbents did for a long period of time participate in these policy debates and invested in renewables (with support of the government). However why did they still massively invest in conventional power plants in the late 2000s? And why did they not succeed in transforming a larger part of their business model to the thriving renewables segment? In fact, as the massive impairments and strategy changes of the incumbents in 2014 clearly show, these are the two central questions. Without ignoring that some of the involved dynamics were rather unpredictable, some others could have been anticipated, especially in the investment decisions. The next two sections will explore two relevant explanations, which emerged from the data analysis and actor interviews, why they did not succeed in a more proactive response.

5.4 MODEL 2: WHY THE CONTEXT DID NOT STIMULATE PROACTIVE STRATEGIES

Using theory to understand which mindset is primarily stimulated by contextual antecedents helps to understand the complex context dynamic. As section 5.2 has demonstrated, the context in which electricity sector incumbents operate is highly complex and turbulent and imposes divergent influences on incumbents. This is something to be expected in the acceleration phase of a transition, since transition scholars have documented the same dynamic with historical research (Rotmans, Kemp & Van Asselt 2001, Geels 2005). In section 3.7 it was elaborated how specific contextual dynamics mostly confirm incumbents with a specific mindset. Especially when a contextual influence reinforced their mindset, they are likely to react actively. Building on this proposition, this section demonstrates that this notion can help to create an overview of how a divergent contextual situation stimulates incumbent behavior. To do so, the literature introduced in section 3.7.2, combined with input from interviewees, will be utilized to reflect on the contextual dynamic and see whether this explains the lack of proactive reaction to the structural trends underlying the disruptive dynamic in the electricity sector.

5.4.1 Policy context: dominant political culture stimulates reactive-active approach

Evaluating the policy context, especially the policy uncertainty, strongly stimulates more reactive behavior. As the literature shows, a lack of policy certainty induces more reactive reactions (Meijer, Hekkert & Koppenjan 2007, Markusson et al. 2012). It has been documented before that the Dutch energy policy is characterized by strong “hypecycles” and has changed the (renewables) support scheme five times in the last fifteen years (Verbong, Geels & Raven 2008, Van Rooijen, Van Wees 2006). This is borne out by the fact that all the actors in the Dutch energy debate argued that what was needed more was policy stability. This was the fertile ground in which the Energy Agreement (2013) was rooted.

Table 5.13 - Illustrative quotes for the tendency of actors across the board to support the need for more stable policy.

Q36 Boer, EON: Investing abroad is more attractive to E.ON due to a more stable policy context. This results in a higher return on investment. What is mostly needed, is a long-term vision, to prevent that the policy changes every few years. (10_0085)

Q37 SER committee: Until today, the Dutch policy to arrive at an environmentally friendlier economy has failed, even though Dutch firms could have earned a lot of money with sustainability. "The policy is fragmented and lacks continuity," as the researchers stated in the report. (10_0095)

Q38 de Haas, Eneco: A future vision on the transition towards a sustainable energy supply is lacking. This should not only be blamed on this administration. The past fifteen to twenty years the energy policy has been drifting continuously. In some periods, all kinds of support were provided, while in others not. This cripples our firm's ability to contribute. We can't set a policy considering this continuous change. (10_0393)

Q39 Cohen & Samson, PvdA: While the parliament has been divided on energy politics for decades, each time the power shifts the policy is changed. Each change consequently reduces investment security and stagnates progress. We have arrived at the rearguard of the EU. This is the result of fifteen years of Dutch energy policy. (11_0125)

Q40 Thijssen, Greenpeace: Entrepreneurs and investors in sustainable energy criticize these inconsistent signals as reason why clean energy in the Netherlands is not taking off. We are at a meager 23rd position with regard to sustainable energy, even behind Romania. (12_0253)

Q41 Profunda, commissioned by SN&M: Dutch pension funds leave sustainable energy projects alone. Even less than 0,5% of the billions of capital is invested in this kind of project. Of this small share, most is even invested abroad. This is mainly caused by the continuously drifting government policy on sustainable energy. If the policy becomes more stable, pension funds are willing to strongly invest in, for example, offshore wind projects. (13_0196)

A tendency to protect the current economic balance, especially in support of the energy-intensive industry and Topsector policy, contributes to a (re)active focus. As such the active policy to sustain the competitiveness of the (energy intensive) industry by shielding them from policy measures (e.g. generous ETS rights and energy tax exemption), harms the business case for transition in this important segment of the market. Moreover, the industrial stake was the central consideration for the Dutch government to actively support the construction of a new generation of conventional power plants from the mid-2000s on. The Topsector policy introduced in 2010 by Rutte I in its framing as “linking innovation support to current national strengths” is another example of “protecting the current economic balance.” The heavy involvement of incumbent representation in the steering committees is also documented by transition scholars as an indication that resulting support behavior might prefer incremental solutions (Rotmans 2011, Hisschemöller, Bode 2011). As shown before, this incremental tendency can indeed be seen in the budget allocation of the Topsector. However, while the policy does actively support innovation projects and collects co-funding from market actors, it can be considered to stimulate active behavior as well.

The tendency to “optimize” the support schemes towards the “minimal cost” solution on midterm induces mainly active behavior. Most of the debate about policy measures is framed as a discussion of how to achieve the 2020 goals with minimal cost. This is a typical tension in the Dutch policy debate, typified by one of the interviewees as the “preacher vs. merchant” tension (interview 6): acknowledging a certain responsibility, but seeking to minimize the added cost. One of the clear examples of this type of policy was the last support scheme SDE+, which has been effective since 2011. This scheme utilizes an auction mechanism to pick the most efficient solution in terms of cost per generated unit of renewable electricity. As such, it will select more incremental solutions. Another mechanism which induces this focus on incremental solutions is the focus on the midterm goals. Because more radical innovations are likely to have the best business case in the long term (see e.g. propositions 9 & 10 in chapter 3), only focusing on the midterm outcomes makes selection of incremental technologies likely. This is rather evident in the way which biomass was discussed in the debate as an “indispensable” solution to achieve the midterm goals, while it is broadly acknowledged that this is (due to a lack of learning curve) probably not the best solution in the long term.

Q42 Essent: Reaching the environmental policy goal of reducing CO₂-emissions by 30% in 2020 is impossible without large scale co-firing of biomass. (10_0025)

There are some elements within the policy mix that did stimulate more proactive behavior, however, these were in most cases curtailed to limit impact. Probably the clearest enabler of proactive behavior is the “grid priority.” Although this measure did not receive much attention in the energy debate, it is this general priority which ensures that newly developed renewable capacity in all cases pushes conventional generation out of the market. Besides this, the possibility of net self-generated energy by prosumers and the local netting introduced in the Energy Agreement are also enablers for new decentralized generation business models, and as such can be considered more radical. However, it should be acknowledged that these two schemes were introduced with clear limitations (the cap on personal netting to one’s own usage, and spatial limits to local netting). As actors indicated during the interviews, it was not primarily for the protection of incumbents, but mostly the protection of fiscal revenue flows, which was dominant in these conclusions.

Beyond this, several actors noted during the interviews that especially with regard to measures needed to support new business models, the current policies leave many challenges unaddressed:

Q43 Real fundamental changes in the heat supply and how to engage the customer are not included at all. It is about dumb numbers of wind turbines, which eventually can be realized considering the large amounts of subsidy provided to the sector. (Interview 16)

Q44 Government policy will play an important role. Not in the sense of providing [monetary] support, but in the sense of developing appropriate policies. Stimulating policy means subsidies for wind. That is not what I am talking about. What I am talking about is for example the connection to the grid. How costs are calculated at that level. Are there incentives for the customers to use or supply power when it is necessary? The change of the rate plan will be the biggest revolution. (Interview 15)

To summarize, the policy context is likely to mainly stimulate reactive and active behavior by incumbents. This relates to a policy culture of continuous optimization, focus on midterm stakes, and focus on protecting current economic strengths. There are some policies which allow for more proactive behavior, however they are currently consistently curtailed.

5.4.2 Public support: evolving from reactive to more proactive influence

NGOs and local activists campaigning against incumbents contributed to a reactive approach. As the literature has documented, negative campaigns tend to trigger defensive reactions (Miles, Munilla & Covin 2002). In the Dutch dynamic NGOs campaigned especially against new coal PPs and biomass. Besides the environmental NGOs, incumbents also struggled against local resistance for their new developments. In general, this led to defensive approaches of incumbents to sustain the legitimacy of their proposals with more arguments and incremental changes. As earlier research has demonstrated, incumbents are rather advanced in presenting such narratives in line with the general societal stake (Smink, Hekkert & Negro 2013). For example, consider the following quotes from Essent's annual report showing an illustrative combination of acknowledging that it does listen, doing some investments in the local context, and arguing why the plans should continue:

Q45 Because the Eemshaven power plant will be present in Groningen for decades, we want to make a positive contribution to the region on several aspects, next to the enormous investment and long-lasting economic impulse for the region. This is realized by collaborating with a diverse set of parties towards projects with regard to economy and employment, sports and culture, knowledge and innovation, and nature and environment. (12E-C1, p. 91)

Q46 ENGOS such as Greenpeace and Natuur en Milieu are critical about the construction of the new power plant. Essent respects their views and has invited them from the beginning to start a dialog. Sharing knowledge and constructive dialog provides a foundation for sustainable cooperation between businesses and NGOs. (12E-C1, p. 92)

Q47 We strive for a balance between a reliable, affordable and sustainable energy supply and cannot, as yet, realize this without the usage of coal and other fossil fuels. (...) However, we take all possible measures to use coal in the most sustainable manner. (12E-C1, p. 121)

It is relevant to consider that their campaigns in one case did coincide with a more fundamental change of plan. Although three of the four incumbents completed the construction of their new coal power plant, Nuon changed its plan in 2011 to eventually (after postponing it at first) cancel the coal part of its multi-fuel power plant design. As was also acknowledged during the interviews (Interview 10), the fact that Nuon had adopted a multi-fuel concept made it easier to change. At that time, the still relatively high coal price also made economic stakes coincide with public acceptance.

Besides this relatively traditional picture of NGO-incumbent interaction, however, a more constructive approach emerges which empowers more proactive behavior by incumbents. An earlier adopter of this approach was WWF which resulted in a strategic partnership with Essent and later with Eneco. More recently, many NGOs have embarked on comparable journeys. The 2013 Energy Agreement is the clearest evidence of the approach, also resulting in a clear impact on the context. Underlying this evolution was a realization by a new generation of NGO leaders that a more constructive approach could potentially generate more impact, as this quote illustrates:

Q48 When I started this job in 2010 I noticed, at that time still as an outsider, that the internal discussions [of the ENGOS] were not effective. Nothing changed in the outside world as a consequence of these discussions. What matters is the impact you want to make in the outside world. At the same moment Mrs X took charge of another NGO. And she agreed that this internal posturing made not much sense. So we agreed to see what impact we could make in the outside world. We launched the G11 as collaborative platform of 11 NGOs and started strategizing together. We drafted the energy strategy together. So, the question was how can we make a real impact? This is when (NGO X) re-evaluated their position and concluded that a more positive impact could be realized for the Dutch society (BV Nederland) by participating in the EA. This in contrast with continued appeals from the outside and shouting: "it is not sufficient." Eventually this process them to decide to join the negotiations, and we were happy that they did so. (Interview 12)

Another relevant contribution of the NGOs is that they have started to actively challenge the ineffective green electricity system in the market. As they primarily utilize a benchmarking approach this creates more transparency and attention for “dark green” products in the market and as such stimulates a more active approach.

5.4.3 Solutions: uncertainty and potential radical change makes a proactive approach complicated

The rapid and massive evolution of renewable generation technologies created an uncertain environment for incumbents. Across the globe billions of euros were invested in renewable technology development (IEA 2015b). As is shown in section 5.2.3 this led to a broad base of potential technologies available. It is thus not so much the lack of solutions, but rather the vast number of different solutions, and uncertainty, and the rapid pace of evolution that made the situation difficult to assess. Especially uncertainty has a crippling effect and often leads to a more reactive approach by incumbents (Markusson et al. 2012, Meijer, Hekkert & Koppenjan 2007, Alkemade, Suurs 2012). That this can lead to unanticipated dynamics was once more demonstrated in this case. It is however noted that this is also due to the cognitive

framework with which the solutions were evaluated, as will be discussed more in section 5.5.

Second, the potential change towards a more decentralized and dynamically managed system made the change more radical for incumbents. There was (and is) still considerable uncertainty on how the future system would be orchestrated in terms of balancing supply and demand. Although general trends such as (partial) decentralization of generation and the potential application of storage and active demand/flexibility management were acknowledged by most actors, still a considerable uncertainty remained. This was also evident during the interviews, as ambiguous and varying perspectives were given about the pace and extent of decentralization. For example, adding a wind turbine to a centralized grid still largely fed by conventional power plants, was not so complicated. However, there will be a certain tipping point beyond which more radical change is needed:

Q49 Much more likely there will be a moment when it makes no sense to add more renewable assets. This will be the case already close to fifty percent. Then we still have fifty percent of conventional capacity, maybe even more. An important reason is that solar and wind will be available at the wrong moment [out of sync with demand] (Interview 7)

The decentralization will involve radical changes to both the technical (e.g. grid infrastructure, storage facilities) as well as institutional aspects (e.g. pricing and congestion management). This also renders several physical and tacit assets of the incumbents obsolete. While not neglecting the possibility that incumbents can indeed lead such a change, the most acceptable hypothesis is that they will struggle and approach such a change in a more reactive manner – at least until more clarity is reached on the path ahead.

5.4.4 Demand: some proactive stimuli in a reactive, commoditized market

The lack of clear market demand for greener electricity makes reactive strategies most likely. In general, the current electricity market can be characterized as a commodity market, in which there is also increasing competition on the basis of price. As mentioned, a large percentage does purchase green electricity, but this has an equal price impact without much influence on the transition. In contrast, this market situation makes more proactive product development complicated, as it is a complicated message to communicate to a mass audience why one product is greener than another. In the business segment of the market, the cheap electricity that large users procure (as part of the industrial policy discussed before) makes the business cases for change rather complicated.

Although most interviewees endorsed the diagnosis of a commoditized market, they do emphasize that some contrasting influences should be noted. With the support of active NGO campaigning, both incumbents as well as new entrants developed “dark green” products which guarantee locally produced energy, often from a specific source (mostly wind). Second, and more influential according to the interviewees, the “prosumer” trend generates an incentive to innovate and introduce new business models, which is also influencing incumbents.

Q50 What I mean by the influence of the market, consumer, customer, is that customers are now making the choice to generate energy, by installing solar panels on their roof or participating in wind projects. And that has an impact on suppliers' behavior, in my opinion. (Interview 5)

As such both can be perceived as “niche segments” which could provide market-side stepping stones for incumbents to start their business model transition. On the business side of the market, partnerships with large users function in a comparable manner as supporting more proactive strategies.

5.4.5 Competition: inducing both reactive and proactive pressure on incumbents

Since privatization, the competition has been strongly intensified. Both start-ups and entrants are engaging the dominant market position of the top three incumbents. This has induced increased price competition resulting in increased switching behavior by customers. This can be considered as a factor diverting their attention from sustainability and limiting their slack capacity to innovate.

The competitive pressure also produced a positive pressure for change. Some of the new entrants also introduced new business models to the sector. This induced many examples for incumbents to follow and utilize their scale to leverage these new models (Hockerts 2010). Besides this effect, interviewees also explained that especially cross-sector entrants such as Google attracted much attention from incumbents and could be a trigger for change.

Q51 Our strongest competitor is just around the corner, but we didn't spot him yet, so to speak. Other actors are entering the arena and these are not traditional energy suppliers. This involves technology firms such as Google, but also firms like IKEA. IKEA creates homes, but has also already entered the solar panel market. This changes the storyline. Many more sectors are engaging the energy market, because everyone wants to enter consumers' houses. (Interview 13)

5.4.6 Summary: reactive tendency can be understood, but also some room for interpretation

As is documented in this analysis, the reactive tendency among the incumbents can certainly be related to the contextual dynamic. The dominant optimization culture in the political domain, the considerable uncertainty, and the adverse market dynamics stimulated reactive behavior and thereby reinforced the reactive mindset. Differentiating between stimulation of active and proactive behavior from the context also makes clear that measures framed as “supporting the transition” such as the current renewables support scheme, mainly supported active behavior. Chapter 7 shows that this combination of reactive and active behavior can indeed be observed with two of the three incumbents and be linked to their mindset which resembles a combination of the reactive and active ideal type.

It must be stressed that the context also provides room for interpretation. With regard to each contextual category, other factors are observed that stimulate and/or empower more proactive reactions. This makes the point that how the incumbents’ leadership interprets the transition and their role can make a difference, which is elaborated more throughout this thesis. Again, the analysis in chapter 7 shows evidence that resembles the relationship proposed in proposition 11a, namely, that one incumbent with a proactive mindset was able to successfully execute a proactive strategy within the same contextual dynamics. It is likely that the contextual factors stimulating more proactive behavior, such as the willingness of ENGOs such as WWF and SN&M to collaborate with them, did strengthen and empower them in executing that strategy.

5.5 MODEL 3: WHY INTERPRETATION MATTERS

A second important factor explaining the reactive approach, is a lack of proactively understanding of and embracing cognitive institutions underlying the emerging trends. Especially during the interviews several actors stressed that it was not only the increased dynamic as such which caused the incumbents to struggle, but that it was their struggle to interpret them correctly. This is aligned with the key assumption of transition research that institutions, including the cognitive ones, are essential to the stability of regimes and as such are hard to adapt (Geels 2002, Markard, Raven & Truffer 2012, Geels 2004). It is also in line with the finding of disruptive innovation scholars that one of the factors that makes these innovations disruptive is that their performance logic does not match with the current dominant logic and thus their (lack of) performance is wrongly evaluated at first (Christensen 1993, Danneels 2004, Christensen, Bower 1996). In this section, some striking evidence is presented that this also played an important role in this case.

Table 5.14 - Mapping how the contextual factors are either aligned with (beneficial for) reactive or proactive behavior.

	Reactive	Active	Proactive	Compounded influence
Policy	<ul style="list-style-type: none"> * Changing policy ambitions * Changing support schemes * Focus on industrial competitiveness 	<ul style="list-style-type: none"> * Support schemes promoting cheapest solutions (especially SDE+) * Topsector support for R&D (80% incremental) 	<ul style="list-style-type: none"> * Renewables priority on grid * Supporting household & local netting, but with clear limitations 	Reactive-active
Public support	<ul style="list-style-type: none"> * Strong negative campaigning against new coal PPs (<i>however Nhon case is contrasting evidence</i>) * Local protest against wind, CCS & nuclear * Pro-decentralized NGOs discredit incumbents 	<ul style="list-style-type: none"> * NGO green product benchmarking 	<ul style="list-style-type: none"> * Increasing focus on partnerships and agreements (2013) * Pro-decentralized NGOs promote decentralized generation 	Reactive, evolving to stimulating more (pro)active behavior
Solution	<ul style="list-style-type: none"> * Considerable solution uncertainty * Lack of clarity about system level architecture * More decentralized system had limited complementarity with current assets 	<ul style="list-style-type: none"> * Renewables to some degree can be added to the current system 	<ul style="list-style-type: none"> * Solution level tipping point solar 	Reactive-active
Customers	<ul style="list-style-type: none"> * Commodity market with increasing price competition * Retail: green current preference without clear impact * Lack of business case & customer attention in 2B segment 		<ul style="list-style-type: none"> * Niche segments: dark green & prosumers * Industry/large-user partnerships 	Reactive, with some triggers for proactive behavior
Competition	<ul style="list-style-type: none"> * Fierce price competition in supply 	<ul style="list-style-type: none"> * Cross-sector entrants induce reaction among incumbents 	<ul style="list-style-type: none"> * Entrants (especially start-ups) introduce new business models, including more decentralized variants 	Reactive, with some triggers for proactive behavior

A crucial point to understand in this dynamic is that three meta-trends, each causing substantial change, interacted strongly in the studied period. The first is the privatization of the sector. This trend has its legislative roots in the 1990s and effectively started in the early 2000s. It fundamentally changed the organization of the sector. While the sector was a public sector before, which was managed on a coordination basis, now the market mechanism was guiding the dynamic. Beyond the point that this strongly changed the sectors' institutions and already challenged their ability to change, this process is still ongoing. For example, the forced separation of the generation/supply from the distribution (DSO) unit is still subject to heavy debate and court cases. The trends underlying the disruptive trend in 2011-2013 are arguably most closely related to the decarbonization trend (both in terms of institutional, as well as technological change). This trend also has roots in the 1990s and before, but came to shape the sector significantly since the mid-2000s (e.g. see Verbong, Geels & Raven 2008, Van Rooijen, Van Wees 2006). Moreover, a third trend also emerged in the early 2010s. This was the prosumer trend, also labelled as "decentralization" or "bottom-up movement" in the sector. While this also built on renewable technologies, it will be illustrated in this section that this trend built on substantially different cognitive institutions and induced even more radical change to the sector's business model.

The differences between the cognitive institutions and the stretch that they imposed is best understood by focusing on cognitive tensions. This is an approach broadly applied within discourse analysis (Hajer, Versteeg 2005, Hajer 1995). Especially these tensions show how the changing or differing cognitive institutions are difficult to combine, and how reliance on one cognitive approach relates to an underestimation of the other trends. As the interviews illustrated, the cognitive institutions introduced in the privatization process are in fact the dominant mindset in the sector in the period preceding the 2011-2013 timeframe. Therefore, the tensions are discussed by showing how the privatization mindset differs from the mindsets and cognitive institutions underlying the emerging decarbonization and prosumer trends.

5.5.1 Decarbonization vs. liberalization mindset

New conventional capacity as competitive edge vs. problem

One of the central questions in understanding the disruptive dynamic is why the incumbents decided to invest in new conventional power plants in a time frame when the decarbonization trend was already materializing. The actual investment decisions for these €1,5-3 billion assets with a lifespan of about 40 years, were taken in the late 2000s (Interview 15,16 & 17). During this period, climate change had already attracted broad public attention (e.g. the influential "An Inconvenient Truth" documentary was released in 2006). Substantial renewables support schemes had already been introduced in the early 2000s and in 2008 the

EU adopted its current 2020 goals. So why did they not anticipate the rather disruptive influence these trends would have had on the outcomes of these investment decisions? What other reasons contributed to these decisions?

As several actors explained, besides the industrial political dynamic, the dominant mindset of a privatized NW-European market played an important role in this dynamic. Before it was discussed that one reason, also mentioned by Electricity sector executives in their public statements, is that they were responding to a call from the Dutch government and industry to develop more and coal-based capacity to lower the Dutch Energy costs. As interviewees explained, however, when questioned more deeply, the internal sector dynamic and the underlying cognitive institutions as well as institutional mimicry played a crucial role as well. The sector perceived that there was now a NW-European privatized energy market and that a few incumbents would survive as most fit in this market after a period of consolidation. An important cognitive aspect in this mindset was the thinking that capacity locations would be optimized on a European level. The Dutch shore was an optimal location for competitive coal logistics and they expected that these efficient power plants would replace less efficient plants on other locations further from the shore.

Q52 The grand strategy, of course, was to establish a European energy market. This was certainly expected to happen in North-West EU. The large energy suppliers saw this as their project. This made focus on [international/cross-border] optimization a key aspect of their mindset. (Interview 8)

Besides this, the competitive dynamic in this perceived consolidating market also played an important role. As the illustrative quotes below demonstrate, the market position of an incumbent is much better if supply could be backed with its own generation. This would simply result in more profitability. A related fact was that foreign incumbents (such as RWE, Elektrabel (GDF) and EON) entered the Dutch market and were keen to build an asset base in the Dutch market as well. Finally, interviewees stressed that the boardroom dynamic strengthened this play as well. Executives thought of themselves as CEOs who needed to prove themselves now in a free market and this resulted in what some interviewees labelled as “executive arrogance.”

Q53 RWE Netherlands, at that time, consisted of a small sales organization, but they had no generation capacity of their own. This made it rather complicated to compete, especially in the B2B market. However, if you build a power plant, you can be much more competitive. (Interview 17)

Q54 Many firms showed a kind of "me too" thinking. What is relevant to consider is that at that time these firms, for the first time in their history, had a CEO [due to

the privatization]. Before that time, the director was something like a regional director of energy supply in Amsterdam. Now they were suddenly CEO and then, of course, you needed assets (Interview 16)

Without doubt the incumbents were already warned early on by other actors that their investment decision might be rendered counterproductive, in light of the emerging climate change trend. As quotes below show, there is evidence of actors warning already in the same period, that the new capacity would be a problem and that overcapacity in the market could be expected. The fact that these arguments did not resonate, can probably be explained by the fact that it was totally opposite to the road ahead that the incumbents perceived, namely, that their new conventional assets were not a problem, but a key asset in ensuring their future economic sustainability.

Q55 The first thing that happened was creating an enormous overcapacity. But they were eventually warned about that risk. I mean we [an NGO] already warned them in 2007 that they were developing much too much capacity. (Interview 2)

Q56 Teuling, Greenpeace: This government provides virtually no opportunity for clean energy. The overcapacity in terms of coal- and nuclear power plants, that this administration has planned, will push aside sustainable energy (10_0405)

Q57 The Regieorgaan Energie Transitie [Energy Transition taskforce] fears the price of green electricity will be negatively affected by the plans of businesses to construct new coal-fired power plants. If all plans are implemented, overcapacity will be developed and this will negatively impact the attractiveness of investing in sustainable energy. (10_0026)

International vs. national focus

Another tension emerging from the same cognitive model of privatization is that its more centralized approach conflicts with the importance of national (policy) systems in the decarbonization process. As the previous discussion already mentioned, the incumbents were perceiving a new “NW European market” and consolidation in this respect. In 2009 two of the top three incumbents were acquired by, respectively, RWE and Vattenfall. As especially the analysis of firm level documents (discussed more extensively in chapter 7) shows, the incumbents also centralized many functions, including their “Corporate responsibility” function in the studied period. As a result, they were not so much focused on national level politics any more. In contrast, they reasoned that they would simply divert investments elsewhere, as the national situation was not attractive any more. This focus

made it much more likely that they were less attached to national level dynamics and missed important developments.

Q58 I work with businesses that are very different from each other. Some have a Dutch head office such as Akzo Nobel and a CEO who is involved with what happens in the Netherlands. But there are many other businesses that just have a plant manager in the Netherlands, who has just one assignment: producing as much as possible. The biggest challenge is how: how can we engage these parties? This is also relevant in the Electricity sector: how can we get these firms to start moving and invest specifically in the Netherlands? (Interview 14)

Q59 De Boer, EON: It is true that the policy with regard to sustainable energy is fragmented. On the international level the Netherlands is falling short. For Eon, investing abroad is more attractive, due to the more stable policy context. There our return on investment is higher. (10_0085)

Market vs. government/stakeholder coordination

A third and related tension is that the newly privatized Electricity sector was not focused on the government as important player anymore. They saw it as a logical consequence of privatization that it was now up to them to “manage” the sector. This is evident, for example, in the strong negative reactions to directive policies and active advocacy for market-based regulative institutions such as the “supplier obligation” or “ETS.” This is at a strong tension with the decarbonization process, which once again induces a more active role by the government. It can be expected that this tension induced reactive and/or defensive reactions towards decarbonization and related policies.

Q60 This is just a logical consequence of the choice to privatize the market. In that case, it is just the merit order and cost that determine who will produce what kind of electricity. (Interview 6)

Business model: wrong appreciation of the merit order effect

It is remarkable that incumbents consistently did not predict the effect on the merit order of adding renewables. In the period 2011-2013 it was shown that renewables in “peak periods” reduce wholesale prices to low or even negative levels. Several actors assert that this will now be “the new normal.” As the illustrative quote below demonstrates, their models did not predict this upfront and this was mentioned in several more interviews (e.g. 1 & 17).

Q61 We always thought that the gas-fired power plants would determine the price. (...) We employed an enormous team and we knew so much. But how the prices in

the market would be influenced by the large volume of sustainable energy fed into the grid: there was no one telling that message, no. (Interview 16)

Separation vs. integration (of DSOs)

A final aspect in which the tension between the two trends clearly emerged is the separation debate. It could be remarked that all incumbents at first were against the separation and this also related to pure economic stakes (the DSOs generate a stable cash flow and a good margin). However, in the course of the dynamic, the separation debate also became attached to the decarbonization, as the remaining resisters (mainly Delta and Eneco) strongly argued that an integrated company would be better positioned to realize smart solutions, enabling decarbonization.

Q62 De Haas, Eneco: 'Yes, the unbundling works counter-productively with regard to sustainability. In the future local generation, grids and usage of energy will go hand in hand. That should be considered coherently. Where do you need to invest? The appropriateness of the grid is strongly determined by the location of generation and usage of energy. An integrated, bundled enterprise is much better suited to find the balance between sustainable, decentralized generation and the adaptation of the grid needed as consequence.' (12_0037)

5.5.2 Prosumer trend as another fundamentally differing cognitive model

In the early 2010s a new trend emerged known as the “prosumer trend.” The essence is that the customers will more or less generate their own power. This trend was strongly rooted in the anti-establishment and pro-local community sentiments of citizens/consumers. But beyond this, the trend implied a totally new role of the electricity supplier as back-up, balancer and service provider. New start-ups such as Qurrent and Vandebroon showed that this required fundamentally new business models. This created new tensions again on the cognitive level with the dominant, privatization-rooted cognitive model of incumbents.

Data and smart homes as new competitive edge

A first implication of this trend is that the value creation logic shifted to something which was perceived more as data-based logic than a traditional “electron and asset based” business. As some actors eloquently illustrated, a decentralized energy system requires a “smart home” in which energy generation, storage (e.g. in EVs) and usage (appliances) is dynamically aligned and optimized. The connection and optimization will require and induce many new data-streams. In a similar vein, for example, as the cab (Uber) and hospitality (Air-BNB) industry are now data-based models, the electricity sector might also

become a new data-driven sector. It is beyond doubt that this requires fully new competences and renders many of their current physical and tacit assets obsolete.

Q63 The energy market thus will shift towards a data oriented market. (...) We strongly focus on the service aspect and consider ourselves really as a data- and energy-service firm. (Interview 11)

New business models to facilitate the shift

Start-ups positioning themselves within this new trend also tend to develop new business models that are better aligned with this new reality. In essence they attempt to disconnect their revenue stream from traditional supply and thereby mitigate potential cannibalization of self-generation by prosumers. A cannibalization risk has been documented as a key causal factor in incumbents' reluctance to proactively embrace new developments (Chandy, Tellis 1998). In the interviews, especially these new entrants also voiced that they perceived the heavy cost structure of incumbents as incompatible with these new lean and mean business models.

Q64 New entrant: We do not earn any more on the [amount of] supplied energy. Second, we have founded a cooperative. The generation assets are owned by the cooperative and our customers are members and as such owners of the wind turbines owned by the cooperative. (Interview 11)

Q65 New entrant: We have reasonably low cost levels. Therefore, we are able to service, based on the fixed-fee part of the monthly energy bill and are not dependent on the variable part of supplied volume. Thus, also in case the customer starts to feed-in energy, this does not matter for us. (Interview 4)

Q66 New entrant: Eneco currently employs a lot of initiatives on the market (...) They want to develop activities with cooperatives. Eneco also has an initiative with heat pumps. (...) They are also involved with solar and wind. And that is all great fun. They also do that pretty well. However, it is important to note that the underlying business model is a loss-making activity. (Interview 4)

Business case: solar as inefficient technology

As a final tension, it is shown that incumbents underestimated the potential disruptiveness of solar power. As the quotes by the incumbents in Germany (RWE in this case) illustrated (below), although their home market was leading in terms of solar adoption, they did not understand the business relevance of this new technology in a timely manner. This is again a matter of perspective. They compared the marginal cost of solar power with centralized generation and were, in one way, correct that even today solar is not competitive from this

perspective. But as the rapid adoption of solar also illustrated, this is not the economic perspective of the “prosumers” who can compare their cost with the cost of supplied energy (and in case of Germany, with the feed-in tariff). This is thus a case of differing performance logic that disruptive innovation literature has demonstrated earlier as being crucial in disruptive trends (Danneels 2004).

Q67 I still remember one of my first sessions at the German head office of RWE with the community of innovation managers [approx. 2010]. There were also many engineers participating. In fact, I was the only participant without a PhD in engineering. (...) I recall one of the first discussions in which I was participating. They were still debating the impossibility of relying on solar energy in Germany. From their perspective that was not efficient and they had many other technical arguments why it was madness that solar was employed in Germany. While at that time it [the strong growth of solar] was already fully under way. (Interview 3)

Q68 'Solar panels in Germany? That is like growing pineapples in Alaska' as RWE-executive Jürgen Grossmann said even in 2011. (Persson, 13_0348)

5.5.3 Summary

The previous analysis has demonstrated how the two new meta-trends had fundamental tensions with the dominant privatization-rooted cognitive institutions of the incumbent regime. In line with the literature already referenced in the previous discussion, this is likely to be an important explanation of the reactive adoption of these new trends. In fact, this is exactly what many of the interviewees stressed in the conversation with them. Table 5.15 below summarizes the differences between these cognitive models. It is relevant to point out that these three meta-trends compounded and interacted in a rather short period of time. Even privatization, now the dominant rationale, was still rather fresh. The fact that beyond privatization still two other fundamental change dynamics were added, makes the cognitive stretch for incumbents rather strong.

Another relevant remark is that, as chapter 7 will demonstrate more extensively, Eneco did embrace both decarbonization and decentralization (“prosumer”) much earlier (as of the mid-2000s). This again proves the relevance of a proactive attitude of the incumbents’ leadership.

Table 5.15 - Differences between the cognitive institutions underlying the three meta-trends in the Electricity sector.

	Liberalization	Decarbonization	Prosumer
Dominant competitive rationales	Internationalization (NW-EU) Consolidation & scale growth Price/efficiency competition	Develop renewable assets Acquire support (cherry picking)/limit risk (limited) attention for supporting marketing/business models	Service & data driven market Reinvent business model Aggregate flexibility & storage
Focus level	Europe	National	Local
Business case	Merit order	Grid parity/ zero marginal cost	Customer solution
Government role	Retracts, market mechanism focus EU directives leading	Strong national coordination	Limited role
Capacity planning	Diversify fuel sources International location optimization Conventional capacity improve competitiveness	Crucial role of government support & multi-stakeholder coordination Potentially government directed phase-out of conventional assets	Unclear, potentially storage and demand management as buffers
Customer relation	Commodity	Differentiation/green marketing	Co-creating
Market growth	Expected	Expected due to electrification & EVs	Traditional business models decline due to growth of self-generation
DSO separation	Logical for level playing field However implementation differs per country	Potentially negative due to impact on cross-financing	Potentially negative due to less smart grid/solution coordination

5.6 CONCLUSION

5.6.1 Conclusions

This chapter has documented relevant contextual influences of all five relevant contextual categories. The substantial but also constantly fluctuating influence of *government policy* is documented. It was also observed that while many policies are in place, important questions remain unaddressed. In terms of *public support and stakeholder pressure* it was documented that NGOs are clearly engaged with the energy sector, but their engagement is evolving from mostly activist towards a more differentiated and constructive approach. Besides this, local resistance remains a key challenge for several energy technologies. Rapid development of *technologies and solutions* is clearly influencing the dynamic of the sector. An important consideration in this respect is, that it is still unclear which technologies will be most relevant and different meta-paths exist. In terms of *market demand*, it is demonstrated that the core segments of both the retail and wholesale market engender only limited market pull, but specific niche segments in which renewable energy has premium value also can be identified. Finally, a fierce *competitive dynamic* has been identified both as a result of privatization, but also due to new entrants embracing decarbonization/renewable energy-focused business models. To conclude, this system analysis demonstrates that the context is certainly relevant to incumbent behavior in the sustainability transition in the Electricity sector. Second, the documented causal influences function as background to the more detailed analysis in the next chapters.

A second contribution of this chapter was to document how the mix of contextual trends led to a disruptive effect on the Electricity sector in the 2011-2013 timeframe. The disruptive effect was visible in the alarmed engagement in the public debate, the billion € impairments on conventional assets made by the incumbents, as well as their major strategy and structure changes as of 2014. Further statistical analysis showed how these observed effects related to structural trends in the key drivers of the sector such as capacity, utilization, resource prices and import. Combined with observations of actors (during the interviews) this resulted in identifying six structural trends underlying the dynamic: (1) EU climate change & renewable energy policy, (2) EnergieWende in DE, (3) Renewable Energy technology development, (4) tight but fluctuating global resource markets, (5) financial crisis and its effect on demand, (6) industrial support policies of the government. While especially the financial crisis and some of the effects in the resource market were difficult to anticipate, the other effects were structural trends that had been influencing the energy sector already for decades. This clearly raises the question why the incumbents were not able to anticipate these trends and their effects more proactively.

Third, it is demonstrated how most contextual antecedents supported reactive to active behavior of incumbents, however, stimuli for proactive behavior also existed. To do so, the literature-founded framework presented in section 3.7 was utilized to interpret the earlier presented evidence of contextual influences. It was shown that the Dutch political culture led to a tendency to continuously optimize the policies and led to fluctuating policies, mainly stimulating incremental innovation. Also, several other contextual conditions such as the considerable solution uncertainty and the limited demand effect stimulated more reactive behaviors. In contrast, however, NGO strategies evolving to more constructive approaches, potential partnership with customers, and new business models demonstrated in the competitive dynamic, also created stimuli for more proactive behavior. Relating these findings to the documented disruptive trend, it is argued that the dominant effect of stimulating reactive to active behavior can be considered an explanation for why incumbents did not yet proactively anticipate these trends. A further contribution was that this application in practice demonstrated that this framework provided a structure to make sense of the multitude of divergent contextual influences on incumbent behavior. Especially this way of structuring the contextual influence also highlights why governmental policies might stimulate active behavior, but this might not be sufficient in light of radical change processes emerging. As such, it is evidence for the practical relevance of proposition 11a.

A fourth finding which emerged from the discussion with actors is that the lack of proactive behavior by incumbents is also related to tensions between cognitive models underlying meta-trends influencing the Electricity sector. As discussions with interviewees illustrated, the current dominant cognitive institutions are related to the privatization trend. The now concurrently present decarbonization and “prosumer” trends are based on cognitive institutions, which induce strong tensions with some of the cognitive models of the privatization trend. This provides for a second explanation why most incumbents were not able to proactively embrace these emerging trends. This finding resonates with earlier findings in both the transitions literature focus on how cognitive institutions provide for persisting regime stability, as well as the disruptive innovation literature which demonstrates how differing logic result in reluctance of incumbents towards embracing new solutions. Therefore, this analysis also supports proposition 11b.

Adding up the previous findings, this analysis shows how incumbents interpret their context matters. It was shown how contextual influences are certainly relevant, and that a lack of proactive anticipations of those might lead to strong, value-destroying, disruptive trends. Furthermore, it was shown that although the context did predominantly stimulate reactive-active responses, proactive stimuli also exist that could be embraced by incumbents to develop more proactive responses. Third, the demonstrated cognitive tensions explain why reactive and more superficial responses to emerging trends might lead to the wrong

interpretation. In cohesion with the findings in chapter 7, it could be argued that Eneco did anticipate the two emerging trends much earlier and more thoroughly. This resulted in a less disruptive impact on their firm.

5.6.2 Limitations

While the integral and multi-method approach involves several methodological challenges, the systematic approach and multiple triangulations provide for sufficient validity. While not repeating the extensive discussion of chapter 4, it is asserted that the applied method utilized systematic content analysis, provided for several triangulations, and was validated both with actors' interviews and informants. This in fact mitigates many of the limitations in terms reliability and validity which single aspects of the applied methodology would imply.

A limitation to be considered is that the time-frame captured by the systematic media analysis does not fully capture the evolution of some of the contextual trends. In fact, many of the privatization and decarbonization trends are rooted in the early 1990s. This is partly mitigated by incorporating earlier research in the Dutch Electricity sector (e.g. Verbong, Geels & Raven 2008, Hofman 2005), as well as by historical observations present in both the media sources and interviews. This, however, does not allow for such a systematic analysis as the developed dataset allows for the period 2010-2014 and might also suffer (in case of the media & interview sources) from retrospective biases. It would certainly be of interest to study how the emerging decarbonization trend resonated in the public energy discourse in the period since 2000, to further validate and enrich the understanding of why the response to these trends was reluctant at first.

As a single sector case study, the external validity builds on its resonance in earlier literature, but cross-sector validation, especially of the moderation effect, is relevant. The Electricity sector case was selected as a relevant case of a sustainability transition in acceleration with differential behavior of incumbents. It resonates in earlier findings of the transition, CSR, as well as radical and discontinuous innovation literature, and provides further evidence in this respect. Especially the moderating effect of the incumbent's leadership mindset (as proposed in proposition 11a and investigated in section 5.4), which is a theoretical innovation introduced in this thesis, could certainly be further strengthened by cross-sector case studies and multi-case comparisons. The ability to study whether the moderation effects persist over multiple contextual configurations will greatly increase the validity of the evidence for this conclusion. With regard to the external validity, it is relevant to consider the specificities of this case mentioned in section 4.4.4. In particular, the high public relevance of energy strengthens the relevance of policy influence and public acceptance, in comparison with other cases.

5.6.3 Further research

Three recommendations for further research are outlined:

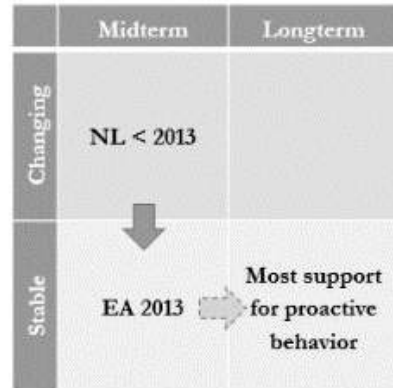
- The analysis of contextual antecedents can be further validated by matching it with a more detailed analysis of firm level behavior. This is something which the combination of this chapter and chapter 7 of this thesis provide.
- The long-term impact of the disruptive trend observed is yet to be seen. Although the documented trends have had major impact in the timeframe 2011-2013, its structural implications for the actor constellation of the sector are unclear. As of 2014 several key incumbents adopted a more proactive approach and fundamentally changed their structure and strategy. Whether this provides for their future survival and prospering is something that is currently subject to substantial debate and systematic documentation is therefore certainly of key relevance.
- The moderation framework (proposition 11a) could be improved by extending it, structuring it, and validating it with cross-sector comparison. First, the differential impact of contextual variables on different mindsets could be elaborated on for more variables. Since earlier literature (implicitly) had assumed a linear relationship, considerable work can be done in this respect. Second, the framework could benefit from further structuring and operationalization, for example, in developing a systematic survey instrument to measure what is the dominant contextual influence on incumbents. Third, as argued before, cross-sector comparison would certainly improve the validity of the findings.

5.6.4 Practical implications

For incumbent executives, this case study provides relevant evidence why the proactive and open interpretation of the sustainability trends in the context matters. It has been demonstrated how a reactive approach to structural sustainability trends can lead to strong value destruction. Furthermore, it is shown that interpretation matters. With superficial interpretation, emerging trends might be wrongly anticipated and contextual stimuli, which provide opportunities to adopt a more proactive approach, might be overlooked. This implies that emerging sustainability trends require sufficient boardroom attention and also that – considering the sometimes fundamentally different cognitive logic – the active involvement of outsiders to understand the relevance can be recommended (as many interviewees also suggested).

For policy makers, this study implies the need for more focus on how to stimulate proactive incumbent behavior. As the study shows, stimulating active behavior is not the same as stimulating proactive behavior. The recent adoption of the Energy Agreement (as discussed further in chapter 6) might provide for a good first step as it provides for the stability that actors pleaded for across the board. It is clear that for more proactive behavior, a shift from midterm to long-term perspective would be very beneficial. Arguably, with policies focused on a mid-term perspective, the more radical innovations are probably perceived as “less optimal,” because the value creation happens on a longer time-horizon probably.

Figure 5.14 - Policy effect with regard to stimulating proactive behavior.



Chapter 6 Wrestling with words - How incumbents shape energy transition debates and policy with reactive and proactive discourses

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6.1 FOCUS AND METHOD

6.1.1 Relevance and context

In the context of transitions, public policy is typically highly influential and heavily contested. While technological developments are often at the forefront, fundamental institutional change is a crucial part of sustainability transitions (Markard, Raven & Truffer 2012, Rotmans, Kemp & Van Asselt 2001, Geels 2005). Public policy often plays a crucial role at different stages of the transition (Smith, Crotty 2008, Hillman, Sandén 2008, Raven, Geels 2010, Popp, Hafner & Johnstone 2011, Inoue, Miyazaki 2008). It steers and provides financial means for early technology development and to pilot technologies in real life situations. But also in scaling technologies, regulating market conditions as well as financial support schemes play a crucial role. This is certainly the case in the Dutch energy transition, where public policy has already (since the 1970s) been stimulating the development of alternative, often renewable energy sources (Verbong, Geels & Raven 2008, van Rooijen, Wees 2006, Hofman, 2005, Raven 2005). As the previous chapter has described, in recent years this support has been implemented in a large diversity of policies and is rather substantial if one considers that the government has invested more than €21 billion since 2003 in scaling renewables. Because of its influence, the course of policy is also heavily contested (Bosman et al. 2014). The analysis presented in this chapter shows that in the past five years >400 actors participated in the public debate about sustainable energy. That this heavy contestation is not without influence becomes clear if one considers that the Dutch energy policy is highly unstable and support schemes for renewable energy have been substantially changed more than five times since the start of this century (Verbong, Geels & Raven 2008, Rotmans 2011, Raven 2005, Van Rooijen, Van Wees 2006, Hofman 2005).

The influence of incumbents within this public contestation on policy is a matter of strong controversy. For example, the struggle of incumbents within the public debate is described as “Darwinism in its purest form.” And it is noted that “even if you win in terms of arguments, you will eventually fail to beat their lobbies” (see section 1.1 for more quotations). This quotation makes clear that their influence on public policy is an important channel of using their power. These observations resonate in transition theory, which predominantly assumed that incumbents, as part of the regime, would protect the stability of

current systems and influence the institutional dynamic, such that mainly incremental innovations are selected (Smink, Hekkert & Negro 2013, Markard, Raven & Truffer 2012, Geels 2005). Within the same public debate, another sound is present. Incumbents are seen and recognized as making pledges to transition, and committing to collaborate and invest in order to realize more sustainable energy and realizing public targets (see section 1.1). This resonates in other literature, which maintains that incumbents can also adopt an active or even proactive approach to transition and can use their political influence to support that strategy (Maon, Lindgreen & Swaen 2010, van Tulder et al. 2014, Oliver, Holzinger 2008). This thesis in general aspires to create more insight in how to appreciate the role of incumbents. A crucial aspect is the context creating behavior of incumbents to influence public policy. The analysis presented in this chapter inventories their relative contribution, compared to other participants of the policy debate, as well as the effects of their advocacy behavior on policy stability or change.

The Dutch Energy Agreement and the public debate preceding that policy agreement provides a strong case to create more insight. In 2013 – after an intense negotiation process - 48 parties from all sectors of society – including governments, NGOs and businesses - signed an agreement to accelerate the energy transition. Among other goals, the agreement aspires to more than triple the amount of renewable electricity in less than a decade to 35% in 2020 (ECN et al. 2015). This had a strong influence on the electricity sector. The agreement represented a major policy change in the sense that environmental goals received a more binding nature, investments in the growth of renewables were significantly increased, and a start was made with phasing out fossil-fuel based power generation (see section 6.5.3). The agreement was preceded by a policy-oriented learning process (Sabatier 1988), largely taking place in the context of the public debate. In this debate, the subjects of lagging behind environmental goals and neighboring countries, the capturing of economic opportunities, and the need for more stable policy, played a crucial role (see section 6.4.1). As is shown in this chapter, the incumbents as central actors in advocacy coalitions played an important role in the debate preceding this policy change (Markard, Suter & Ingold 2016, Sabatier 1988, Weible, Sabatier & McQueen 2009). Therefore, this case can be used to create more insight in the recurring question of how to appreciate their role.

6.1.2 Research focus linked to the propositions

The primary focus in this chapter is on how incumbents shape transitions by influencing energy policy through the societal debate. The first task was to study what incumbents actually do to influence policy through the public debate. In line with the approach proposed in section 3.5, the focus in this respect was on discursive strategies and discursive coalitions. Second, in line with proposition 8, the relationship between the incumbent's leadership mindset was investigated, assuming that proactive strategies would result in different

discursive strategies (sustainability-centered and future-oriented) and coalitions (cross-sector coalition of actors supporting that proactive vision).

Proposition 8: A proactive mindset leads to creating cross-sectoral, multi-stakeholder coalitions around sustainability-centered, future-oriented visions.

Third, proposition 9, which assumes positive long-term outcomes (environmental) of proactive incumbent strategies, was scrutinized specifically by considering how the utilized narratives and proposed measures result in policy and by reflecting – assisted by the views of different actors – on its influence on the transition. While the former is extremely relevant, considering that the incumbents’ role in sustainability transitions is best understood from a multi-level iterative approach, the causal chain from incumbent mindset to policy is the main focus of the most robust part of this analysis.

Proposition 9: Proactive innovation and context creating behavior increases the impact of the incumbent’s behavior on the transition in the long run.

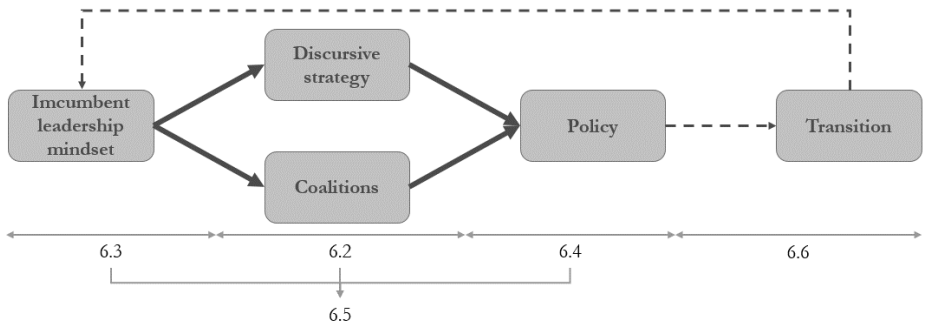


Figure 6.1 - Conceptual model used for analysis (relevant section numbers included at bottom).

6.1.3 Link to theory and literature

The relevance of (regulative) institutional change in transitions and the influence of actors in this respect has been acknowledged in several streams in literature. As section 3.5 discusses more extensively, transition literature has studied primarily how incumbents, as part of the regime, advocate the status quo or incremental adaptations (Smink, Hekkert & Negro 2013, Bohnsack 2013, Wesseling et al. 2014). CSR literature has studied long how firms participate in multi-stakeholder societal processes (van Tulder et al. 2014, Murillo-Luna, Garcés-Ayerbe & Rivera-Torres 2008, Murillo-Luna, Garcés-Ayerbe & Rivera-Torres 2011, González-Benito, González-Benito 2006). Political strategy literature documents which political strategies firms utilize and what are their outcomes (Holburn, Bergh 2008, Oliver, Holzinger 2008). Finally, institutional entrepreneurship literature has

also studied how regulative institutions are changed as a result of actor behaviors (Maguire, Hardy & Lawrence 2004, Greenwood, Suddaby 2006, Garud, Hardy & Maguire 2007).

This chapter addresses a key point of contention between the transitions literature (Smink, Hekkert & Negro 2013, Farla et al. 2012), which generally assumes reactive behavior by incumbents, and CSR and political strategy literature, which allows for proactive strategies of incumbents (van Tulder et al. 2014, Oliver, Holzinger 2008). The research in this chapter shows that although indeed reactive strategies are dominant amongst incumbents in the Dutch energy system, there are also incumbents that follow proactive strategies, rooted in a proactive leadership mindset. The context creating behaviors of proactive actors proved to be markedly different from actors following reactive strategies. As has been argued in chapter 3, exactly this difference between reactive and proactive behavior was responsible for the fierce debate on the role of incumbents and therefore more understanding in this respect is of key interest. This contribution also addresses earlier calls in the transition literature for more focus on actor agency (Farla et al. 2012).

Analyzing the content of incumbents' discursive positions is useful to link the context creating behavior to mindsets. The analysis in this chapter builds on the hypotheses developed in chapter 3 (see table 3.3). To operationalize these hypotheses, insights from the policy literature were utilized. As the central method to understand the linkage between mindset and discursive behavior, the Advocacy Coalition Framework was adopted. Furthermore, some insights from the Analytical Discourse Analysis were used to create insight in specific discourse dynamics. These two methods share the core assumption that besides the actors and coalitions (and the accumulated power of the actor represented in it), the discursive strategies of the incumbents also matter. The relevance of these discursive strategies was recently explained in the transition literature (Markard, Suter & Ingold 2016, Hermwille 2016) and institutions literature (Battilana, Leca & Boxenbaum 2009, Lawrence, Suddaby 2006).

The Advocacy Coalition Framework (ACF), because it links policy dynamics to beliefs, can help to link context creating behavior to mindsets. ACF understands policy change as a result of (changes in) advocacy coalitions, which share deep and core beliefs (Sabatier 1988, Weible, Sabatier & McQueen 2009, Sabatier 1998). ACF differentiates between three levels of beliefs: deep core, core, and secondary. Deep core beliefs represent the actors' underlying world views. The policy core beliefs are central, stable beliefs about the central problem definition and role division in a certain policy area. Secondary beliefs are beliefs about the relevance and (dis)advantages of specific policies. Building on this distinction, ACF assumes that rather stable advocacy coalitions exist that share consistent core beliefs, while secondary beliefs might change over time. This chapter shows that especially core beliefs,

as conceptualized by ACF, are helpful to link coalitions and their narratives to the distinct incumbents' mindsets.

ACF theorizes policy change as the result of a combination of events, policy learning and negotiation. The basic assumption is that policy can be expected to remain stable as long as the core beliefs of the influential advocacy coalitions remain stable (Sabatier 1988). The theory assumes that four paths can lead to policy change (Sabatier 1988, Weible, Sabatier & McQueen 2009). The first path consists of external events such as shocks and broad changes to socio-economic conditions. Besides these shocks, the original theory assumes policy-oriented learning as a central mechanism mediating advocacy dynamics and policy change. Policy learning is defined as "relatively enduring alterations of thought or behavioral intentions, which result from experience and which are concerned with the attainment or revision of the percepts of one's belief system." Later on, two other paths were recognized as contributing to policy change (Weible, Sabatier & McQueen 2009). The third mode recognizes "internal events," which demonstrate the failure in current practices. Finally, negotiated agreements between two or more coalitions can induce major policy changes. As such, the context creating behavior of actors and coalitions can induce policy change, either by contributing to learning or by negotiating agreements. Learning is most likely to take place when the process involves secondary beliefs, instead of diametrically opposed core beliefs. Furthermore, learning is easier when the matters are quantifiable, focus on physical rather than social aspects, as well as when a good forum exists and actors have sufficient technical resources (Sabatier 1988).

Insights of the Analytical Discourse Analysis (ADA, Hajer, Versteeg 2005, Hajer 1995) can further enrich the interpretation. This framework emphasizes the relevance of understanding how hegemonic discourses shape policy debates. It assumes that policy change is, in fact, the institutionalization of a new hegemonic discourse, which results from a preceding discursive struggle. A discourse in this context is defined as "an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through and identifiable set of practices" (Hajer, Versteeg 2005). Discourses are utilized by discourse coalitions which share the same discourses. It should be remarked that ADA assumes that actors can have different motivations to join the same discourse coalitions and the composition of coalitions changes more easily (Winkel et al. 2011). In analyzing discursive struggles, ADA stresses that it is important to focus on tensions between the applied narratives, because these are strong indicators of differing positions. A typical ADA research studies the employed narratives and the tensions to identify coalitions, and maps their shared storylines (Munoz et al. 2014, Szarka 2004). This overview can be utilized to reflect on which discourse is dominant and validated further by seeing whether the discourse is institutionalized in regulation. It is relevant to note that the

roots of ADA lie in environmental policy analysis, but this method has already been applied before in transition literature (Hermwille 2016, Munoz et al. 2014).

The ADA literature is complementary in the sense that it is even more focused on the ongoing discursive dynamics. It points to the relevance of capturing tensions from discursive struggles in the media as a means to develop insights in coalitions underlying the debate. Discourse coalitions, which can connect actors with different motivations, are linked to the distinction between core and secondary beliefs from ACF. Furthermore, the notion that a discourse can become hegemonic proves the relevance of discourses and how they are incorporated in key policy agreements and changes. The value of integrating insights from ACF and ADA has also been recognized in earlier literature (Szarka 2004, Lovell 2004).

6.1.4 Methodological approach

Data source logic

By using media data, this analysis can document behavior of a broad actor range and also the interaction between different actors. The analysis adopts media analysis data as basis to capture the discourse dynamics in contrast with the often-used approach to utilize actor advocacy documents such as position papers. It is argued that this in fact improves the validity, as a broader set of actors is reflected. While typical discourse analyses focus on a limited set of central actors, in this analysis contributions from a broad range of 400+ actors can be documented reliably. The primary focus is on the role of the incumbent. Since the incumbents function in broader cross-sector coalitions and interact with other coalitions, capturing this broad range improves the validity. Moreover, the media data allows the interaction between actors to be captured more directly, as they respond to each other more often and more directly in the media. Considering the relevance of interaction to understand the tensions between actor groups, this also adds to the validity of the analysis.

The media data is supplemented by a systematic analysis of the Energy Agreement (EA), as a key policy change and reflecting the intended energy policy for the next decade. The focus in this analysis is on distilling its key agreements and used narratives, which allows for comparison with actors' advocacy behavior later on. The EA was selected as representation of the Dutch energy policy for two reasons. First, the agreement captured the negotiated consensus on long-lasting debates and also embedded several earlier agreements from the preceding period. It can be considered a major policy change in the sense that environmental goals received a more binding nature, investments in the growth of renewables were significantly increased, and a start was made with phasing out fossil-fuel based power generation. The reflections on the nature of the agreements and the process upfront in sections 6.5.1 and 6.5.3 more extensively discuss the substantial change the agreement

represents for the electricity sector policy subsystem. In the process of arriving at the EA, both policy learning and negotiation played a crucial role. Second, the EA was explicitly purposed - by the broad coalition of actors signing - to represent a stable base for the policy for the next decade (2013-2023). Rooted in a shared discontent about the policy fluctuation in the last two decades, they aspired to fix goals and, most importantly, support schemes for the next decade. Sections 6.4.1 and 6.4.2 discuss the origins and content of the EA in more detail, and section 6.5.3 reflects on how the impact of the agreement can be understood.

Data analysis method

This analysis builds on a five-step analysis process, which is now explained step by step.

1. Extracting basic data from media analysis data

The foundation of the analysis is the media analysis dataset, in which a subsample was selected to match the Energy Agreement (EA). This dataset consists of 1345 newspaper articles that were systematically retrieved with a Lexis Nexis query representing the debate on sustainable energy in six major Dutch newspapers. More details about the dataset and the followed procedure can be found in section 4.6.1. Before the detailed analysis was applied, the dataset was subjected to a broader exploratory analysis and coded for their theme and content. Based on the exploratory coding a subset of 576 articles was selected, representing the crucial debates related to the topics of the EA. As table 6.1 below demonstrates, the debates (resulting from the exploratory thematic coding) closely matched the relevant chapters of the EA. An exception is the debate on support mechanisms, which relates to agreements in several chapters and the debate about the need for stable policy and the EA was also included as a separate debate. The majority (74%) of excluded articles (769) consisted of articles that did not include actors taking a position, but in contrast contained mostly informative content. In the other excluded articles (199), the most recurring debates were the debates on nuclear energy (36 articles) and green current (30), neither of which were part of the agreements of the EA. The remaining share contained a large diversity of other debates, of which none is present in more than 10 articles.

From this dataset, a database with records for each actor's positions was developed. With a systematic approach, the positions voiced by actors were listed in the database in which a record consisted of a specific position of a specific actor in a specific newspaper article.

Table 6.1 - From the media analysis debates were selected to match the relevant EA chapters.

EA Chapter	Debate from media analysis
Introduction & general	EA Need
2. Ambition	Ambition & goals
3. Energy saving	Energy saving
4. Renewables support – Wind	Wind
4. Renewables support – Biomass	Bio-based
5. Decentralized generation support	Bottom-up & solar
Integrated in all chapters, mainly 4&5	Support mechanism
7. ETS	ETS
8. Conventional PPs	Conventional & CCS

Voicing different positions in the same article, multiple actors in the same article sharing the same position, as well as the same actor repeating the same position in multiple articles resulted in multiple records. This resulted in a database with 1897 records (3,3 per article). Each record captures the position and actor as base data. If an actor included a motivation for the position, this was captured separately to relate this to core beliefs and actor mindsets later.

2. *Coding and clustering data on shared beliefs & coalitions*

Second, this database was systematically coded with the help of the ACF method discussed before. For each record, it was attempted to code which secondary belief and core belief was reflected. Secondary beliefs are defined as concrete measures proposed by the actor. Core beliefs are defined as underlying policy values, which are most explicitly visible in the motivation of the actors to support a specific measure or its vision for the goals of the transition in general. Advocacy coalitions are defined as the set of actors endorsing the core beliefs of the coalition. The concept “pragmatic coalition” is defined as a group of actors advocating a specific secondary belief.

To develop a reliable coding approach especially with regard to core belief, the coding started with a dual coding approach. The core beliefs are (logically) most clearly found in the Ambitions & goal debate (targets are a subset of this debate). Therefore, this debate was central to arrive at the core belief coding scheme. The two researchers separately coded three samples (onshore wind, 45 records; SDE+, 57 records; targets, 57 records). Afterwards, the differences were discussed and resolved and this resulted in a coding scheme for core beliefs. At first the differences focused on distinguishing what defines the core beliefs. For example, positions which resemble the “Clean fossil” core belief do refer to realizing long-term environmental goals, but differ from pro-environment in giving priority to midterm to

protect supply security and advocate a specific path which fits the stakes of the incumbent actors. It required some debate to get the indicators of each core belief clear. In the third pilot coding sample, after improving the coding scheme in the first two samples, the coders realized an agreement for 67% of the cases. In all the remaining cases one coder considered a position to resemble one core belief, while the other considered the data not to clearly represent only one core belief. For example, with regard to the report of the commission of environmental experts of all political parties in 2011 (11_0066), one coder noted that this includes multiple value systems, while the other noted that the overarching goal was to realize environmental goals (pro-environment core belief). It was concluded that in case multiple value systems were present, multiple labels were to be coded to capture this complexity.

A second conclusion was that secondary beliefs can best be coded by clustering specific positions (the combination of sub-debate and position variables), based on an exploratory coding cycle. After the exploratory coding the researcher (based on the shared positions and tensions, as advised by ACF and recognizing the value of tensions outlined within ADA), developed a coding scheme for secondary beliefs (pragmatic coalitions) by categorizing the specific positions, which was utilized to then systematically code the records (axial coding). After the dual coded pilot, each researcher continued with a specific part of the dataset and relevant discussion points. The resulting categorization (of positions in pragmatic coalitions) were exchanged.

3. *Linking advocacy coalitions to pragmatic coalitions and key actors*

The mapping of secondary and core beliefs provided for the opportunity to link advocacy coalitions to pragmatic coalitions and central actors with the help of statistical analysis. Based on the previously defined schemes, it was possible to classify 93% of the records in one of the 34 pragmatic coalitions (secondary beliefs). Also, 85% of the records was classified with regard to one of the five advocacy coalitions (core beliefs). The remaining 15% represented a smaller, pro-local stakes coalition (especially resistance against wind, CCS and gas storage with arguments on the negative local impact, 3% of total) as well as a broader collection with records which mostly did not provide clear indications on the underlying core belief (12%). After the exclusion of the incomplete records, the remaining sample provided information on the actor, core belief and secondary belief for each record.

Based on the theoretically assumed relationship between actors, core beliefs, and secondary beliefs, the data can be analyzed statistically. Building especially on ACF's theoretical assumptions (Markard, Suter & Ingold 2016, Sabatier 1988) it is justifiable to assume that there is consistency in actors' positions as dominantly residing in one advocacy coalition and that actors in each advocacy coalition show comparable patterns of joining in pragmatic

coalitions, supporting specific secondary beliefs (although this might change over time and these dynamics are relevant). Therefore, the database can be used to build an actor x belief matrix in which the number of records in which an actor shows allegiance to specific core and secondary beliefs is counted. This makes it possible to analyze the mentioned relationships with both counting and correlation analysis (justified by the assumed relations).

4. *Linking advocacy coalitions to incumbent mindsets*

To be able to understand how the incumbent's mindset functions as antecedent of discursive behavior, the fourth step focuses on the relationship between core beliefs and mindsets. To do this, this step zooms in on the behavior of incumbents captured in this dataset. This detailed view is combined with an analysis of the firm's mindset presented in chapter 7 (section 7.3). This combination is used to validate the hypothesis that core beliefs of the advocacy coalition in which the incumbent predominantly participates correspond closely to the incumbent leadership mindset.

5. *Analyzing the influence of advocacy coalitions on policy*

The final analysis step links the content of the EA to the advocacy coalitions to understand their influence. For each relevant chapter of the EA detailed notes were made on the specific agreements and the key narratives (especially as reflected in the introductions of the relevant sections). This analysis was enriched and triangulated with the media analysis data discussing the agreement. The content of each chapter was systematically mapped on the secondary beliefs of pragmatic coalitions (whether they were reflected in the specific measures) and the core beliefs (whether they were reflected in the narratives employed in the agreement). A number of chapters are only analyzed on outline, having less relevance to incumbents' role in the Electricity market: chapter 6 on grid infrastructure (mainly relevant for DSOs), chapter 9 on mobility, chapter 10 on labor market implications (mainly installation & clean tech sector), chapter 11 on export stimulation (mainly clean tech sector) and chapter 12 on financing (mainly relevant for finance sector & investors). This five step method is summarized in figure 6.2 below.

To improve the validity and causal understanding, the analysis was enriched by interview data representing 17 interviews with key actors in the Dutch electricity sector as well as different stakeholders engaged in the energy policy debate (see section 4.7). This data was especially used in the discussion section. The interview question with regard to evaluation of the EA and the process upfront (question 12) was most relevant in relation to this analysis. Finally, the interpretation and outcomes were validated by discussing them with four informants with strong experience in the sector (see section 4.5).

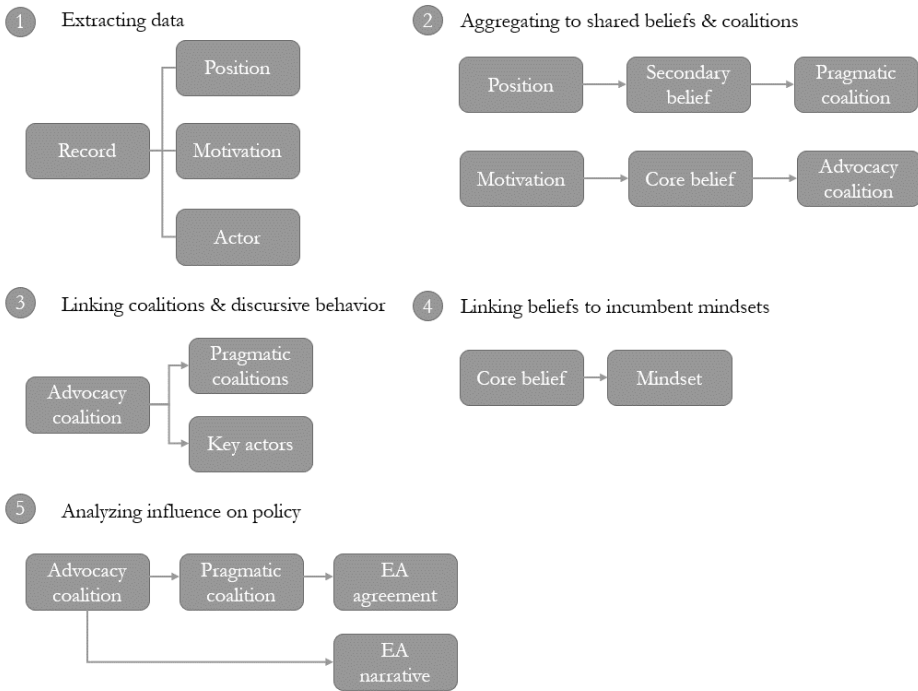


Figure 6.2 - Five analytical steps applied in this chapter.

The following sections will follow the logic of the previously presented steps. Section 6.2 summarizes the outcomes of steps 1 to 3, focusing on how these reflect advocacy coalitions and pragmatic coalitions. Section 6.3 focuses specifically on how incumbent behavior resembles their mindset. Next the content of the origins and content of the EA was analyzed and related to the advocacy coalitions in section 6.4. Finally, in the discussion section (6.5) specific focus was given to how actors explain the observed coalition dynamics and the implications of the EA for the transition.

6.2 MAPPING ACTORS, BELIEFS AND COALITIONS AND HOW THEY RELATE

This section analyses the media analysis data upon how it reflects actors, core and secondary beliefs, and the evidence this provides for pragmatic and advocacy coalitions. Next it is analyzed how the advocacy coalitions each have distinct profiles in terms of key actors and key positions. This corresponds to steps 1 to 3 of the analysis method.

6.2.1 A multitude of actors with an important role for incumbents

A diverse spectrum of 412 actors participated in the Dutch energy policy debate. This emphasizes the complexity of the multi-stakeholder dynamic in which the incumbents participate. The most active actor in the debate was the Ministry of EL&I (Economic Affairs), which voiced 77 specific positions in the five-year period included in the database. Two incumbents (Eneco and Essent) were represented in the top 10 of most active actors (as table 6.2 illustrates). Considering the categories of actors, applied research and consultants (such as PBL & ECN) were the most active (# 287 records). They had an important role in providing progress data reports and presenting future projections. Second most active were stakeholder bodies (sector organizations, labor unions, etc.) and politicians (especially MPs). Incumbents were the fourth actor category in terms of discursive activity (# 199 records) in the debate. It is relevant to note that incumbents were in fact much more active than

Table 6.2 - Actors (top 20) and actor categories sorted on their activity in the captured debate.

Actor	# records	Actor category	# records
Ministry EL&I	77	Applied research & consultant	287
Eneco	69	Stakeholder body	256
ECN	65	Politicians	237
PvdA	60	Incumbent	199
PBL	52	NGO	183
SN&M	46	National Government	128
Groenlinks	44	Academia	118
Essent	42	Journalist	80
VVD	41	Local & regional government	76
Volkskrant	38	Other firm	74
Greenpeace	34	Expert	66
CE Delft	27	Bank	49
Energy Agreement	23	Challenger	41
Energie-NL	23	Citizens	37
VNO	23	EU & international organisations	22
Rotmans – EUR	21	Local initiatives	21
RWE	20	Multi	4
D66	20	Investor	4
Urgenda	17	DSOs	3
DGZ	17	Other & unknown	12

challengers (defined as new entrants to the sector, # 41 records), which have been quoted 5x less in the media. This is a first indication that incumbents are more relevant with regard to influencing the public debate and eventually policy.

6.2.2 Thirty-four pragmatic coalitions representing the key positions per debate

Clustering the multitude of specific positions in 34 pragmatic coalitions (see section 6.1.4 for the method used) provided insight into the underlying structure of the debate. This structure was used in section 6.2.4 to relate the pragmatic coalitions supporting a specific position to advocacy coalitions that share a common set of (stable) core beliefs. In this section, the coalitions and their discursive positions are discussed briefly for each of the eight debates (selected based on their match with the relevant EA chapters) to provide some background on the content of the debate.

The debate on the *need for an Energy Agreement (EA Need)* included proponents and resisters supplemented with a coalition arguing for consistent policy in general. The former represented a broad coalition of actors experiencing the negative consequences of the fluctuating Dutch energy policy (see also section 5.4.1). Whether and what concrete image they had of such an envisaged stable policy system differs (and as such is part of the support mechanism debate), but their plea for consistent policy was important in understanding the EA need debate. Rooted in the previous position, however, with more specific proposals and procedure, was the coalition that advocated starting a process to arrive at a “Delta plan” for energy policy with broad multi-stakeholder support. Their argument was at odds with the resisters coalition, which stressed the fact that such an agreement would not empower a radical shift (but would stimulate incremental change) and create administrative burdens. They also expressed the fear that the process would involve many actors but not the new decentralized community.

The second debate on the “*Goals and Ambitions*” that should be pursued in energy policies showed five coalitions reflecting different problem and solution definitions. Logically, as the problem and solution definitions shaped the concrete proposal, these functioned as structuring the other debates. This made this debate specifically relevant to identify the core beliefs that define the more stable “advocacy coalitions.” To prevent redundant text, these are discussed in the next section (6.2.3).

The debate on the *(policy) support mechanism* reflected distinct approaches on how to structure policy. First, there was the “free market” approach, which advocated limiting market interference and limiting negative economic impact. Their core proposal was to limit exploitation subsidies and to focus mainly on supporting exploration (R&D). Another policy mechanism popular with this coalition was the “Greendael” approach, introduced by the

Rutte I administration, which closes deals with market actors to facilitate projects with non-subsidy support (such as providing guarantees, adapting regulation, or speeding up procedures). On the other side, the renewable support coalition advocated active interventions for greening the economy. While they did support subsidies, their core argument focused on the need for internalization of environmental cost (reducing large-user tax exemption, introducing carbon or coal taxing etc.) and a feed-in system empowering decentralized generation. In between there was a considerable advocacy coalition which resembled a key characteristic of Dutch energy politics: “the Optimizers” (see section 5.4.1 for more background). They embraced the mid-term environmental goals, but focused their discourse on how the cost and economic impact could be optimized. Both the auction based SDE+ scheme as well as the supplier obligation had a good fit with their arguments as both selected the optimal solution with a market based mechanism.

Central in the debate on *conventional power plants and CCS* was the tension between the supporters and adversaries of coal power, but a gas supporting coalition took an important position in between. The clean coal/fossils coalition argued that in combination with CCS, biomass and other optimizations coal could and should still play a role for several decades. Their adversaries’ position was that coal is a highly polluting technology which should be phased out soon. As such their struggles centered on the construction of a generation of new coal power plants (in 2010 & 2011) and in the debate on the phase out of the oldest coal power plants. There was a third coalition, which promoted gas as carbon efficient conventional power source as the back-up solution in the transition phase, which also provides economic opportunities for the Netherlands. While this coalition sometimes allied itself with the coal resisters (in support of gas-fired solutions), they tended to have ambiguous positions on coal or renewables. Because this gas coalition did connect new and also economically powerful actors from the Dutch gas regime, this was an important separate group to consider.

In the debate on *onshore and offshore wind* the coalitions could be distinguished as supporters and resisters of the specific technologies. The onshore wind proponents stressed its competitiveness (being cheaper than solar technologies) and proposed all kind of measures to facilitate its growth (such as regional coordination and smart spatial policies). Their adversaries tended to emphasize different kinds of negative local impact of the turbines (horizon, health, community etc.). The offshore wind debate positioned offshore as crucial to reach goals and focused strongly on the potential for the Netherlands to build an industry around offshore wind. They also proposed approaches to reduce the cost of offshore wind. The former argument was an attempt to counter the key argument of their opponents. Besides the negative impact on nature and coastal communities, these opponents mainly stressed the

excessive cost and questioned the environmental benefits (due to fluctuating output and ETS leakage).

The *Solar & bottom-up movement* debate also included a relevant intermediate coalition. The most tensions existed between the bottom-up supporters, who hailed the revolutionary potential of decentralized energy generation – mainly based on solar - also due to its societal rootedness. They argued that due to the fact that many solar initiatives were developed by local communities, this created the much-needed societal support, in contrast to resistance against, for example wind power and CCS. Their opponents – while not opposing support for solar initiatives in all cases – pointed out the marginal contribution of the small and decentralized solutions and problems of how to integrate them effectively in the current system. The intermediate coalition focused on solar as promising technology. The key actors were related to the academic and industrial ecosystem around solar manufacturing in South-NL. It is important to realize that while they supported the potential of solar (as do the bottom-up supporters), their concrete secondary position most often reflected support for research on, and industrialization of, new generations of solar technology (such as thin-film and nanotech based PV products).

In the context of the *Bio-based solution* debate, two coalitions existed on the supporter side. The first supported the bio-based economy as a vision of a new economic system which thrives on the cascaded and circular use of bio-based material. While they also promoted more specific support measures (especially of biogas), their central concern was support for research in this respect. Their position was related to, but should be distinguished from, a smaller group of actors rather actively advocating the benefits of co-firing biomass (in coal power plants). They positioned biomass as the most efficient renewable and crucial to reach the 2020 goals and advocated (renewed) support by either subsidies or a supplier obligation. Their adversaries stressed all kinds of issues attached to biomass, including its connection to coal-fired power plants, but also the limited resources available and several sustainability issues in the supply chain. Although their focus was on biomass co-firing, some of their argument also related to bio-based economy solutions in general (especially the supply chain issues).

In the *ETS* debate the two coalitions shared the argument on the need to adapt ETS, but differed on how this should be done. All actors actively voicing opinions on ETS shared the criticisms and the dysfunction of the ETS (see section 5.3 for some data), but also shared their support for ETS as a mechanism. The coalition characterized by their environmental focus, however, chose as their benchmark how hard guarantees could be given (on minimum prices or hard ceilings) and how this could be realized as quickly as possible (they tended to support a national system, as a European solution would take too much time). The economically focused side of the debate shared the argument that negative market

Table 6.3 - Pragmatic coalitions per debate (rows) represented by their summarized discursive position. NB: the horizontal order is arbitrary and the columns do not represent coalitions.

Debate	Coalition 1	Coalition 2	Coalition 3	Coalition 4	Coalition 5
EA Need	Consistent policy need - The Dutch energy policy lacks stability and this should be improved	Delta plan & EA positive - A multi-stakeholder agreement is needed to create a stable policy context	Delta plan & EA negative - The EA (and earlier plans) should be evaluated negatively		
Goals & ambitions	Pro-decentralized - A decentralized energy system is the way to go	Pro-environmental - Achieving environmental goals is central	Green Growth - Shift the economy to green opportunities	Clean fossil - The near future mainly consists of clean fossil PPs with add-on solutions	Pro-economy - Minimizing economic harm for industry, consumers and government budget
Support mechanism	Renewables - Achieve goals & develop "real" renewables	Optimizers - Achieve goals with least cost	Free market - Leaving to market with support for innovation		
Conventional & CCS	Coal resisters - Coal is a highly polluting technology which should be phased out	Gas focus - Gas as carbon efficient conventional power is the back-up solution in the transition phase and provides economic opportunities for NL.	Clean coal - In combination with CCS, biomass and other optimizations coal should still play a role for several decades		

Debate	Coalition 1	Coalition 2	Coalition 3	Coalition 4	Coalition 5
Wind	Onshore Proponents - Support onshore wind as key solution	Onshore Resisters - Resist the growth of onshore wind	Offshore Proponents - Support offshore wind as key solution with large economic potential	Offshore Resisters - Resist offshore wind as a desirable solution	
Solar & Bottom-up	Bottom-up supporters - Underline the revolutionary potential of decentralized energy generation rooted in a social empowerment movement	Solar supporters - Hail the large potential of solar as technology	Limited potential - Underline the limited potential of solar & decentralized energy generation		
Bio-based solutions	Biomass support - Biomass as optimal renewable	Bio-based support – Bio-based economy provides many (green) growth opportunities	Biomass resisters & Bio-based issues - Especially Biomass has many sustainability issues and should not receive comparable support as renewables		
ETS	Adapt - environment focus - ETS should be adapted with primary focus on environmental goals	Adapt - economy focus - ETS should be adapted with primary focus on economic goals			

Debate	Coalition 1	Coalition 2	Coalition 3	Coalition 4	Coalition 5
Energy saving	Energy saving general - Energy saving is the most effective and efficient option in the energy transition	Higher ambitions - The savings goals should be increased	Lagging behind - Progress lags behind the targets (EU/EA)	Building environment - Is a key opportunity economically & in terms of transition	Residual heat - Is a key opportunity
Energy saving - continued	Efficiency industry - Focus on remaining efficiency leader	Heat pump - Is a key opportunity	Heat pump - against - Economically unattractive and potentially damaging to soil/water supply		

interference should be prevented, by ensuring a level playing field within Europe, and sustained global competitiveness vs. other continents. This led to a clear preference for an EU level adaptation as well as more advanced arguments on how the stability of the system and positive impact on energy efficiency innovation could be realized.

The debate on *Energy saving*, also due to its much broader impact across the economy and on consumers, showed a more fragmented nature. There were three groups advocating energy saving in general, by supporting higher ambitions, as well as emphasizing that the current efforts were lagging behind the agreed goals. Besides that, there was a broad coalition supporting the potential of energy saving in the building environment, both because of its importance in terms of decarbonization, but also because of the economic spin-off. Finally, three coalitions promoted residual heat (nets), industrial energy efficiency measures and heat pumps as important measures which deserved support. This last coalition also had adversaries, who pointed to negative business cases and the potential damage to soil and water.

As support for this analysis, in Appendix D, a set of tables for each of the debates is included, describing the key characteristics of each of the pragmatic coalitions. These include for each of the coalitions the central belief, the positions, and the most often supporting actors.

6.2.3 Five core belief systems defining the underlying advocacy coalitions

The previous section discussed thirty-four pragmatic coalitions which supported a specific position (secondary belief) in one of the eight debates, which proved to be rather flexible. The positions at this level could change even to opposite positions if conditions and stakes changed. For example, in early 2010, EnergieNed was against a supplier obligation, while as of end 2010 Energie-NL (then merged with VME) started a strong lobby for the same policy measure. Another example is that incumbent spokesmen at some moments marginalized the bottom-up movement, while at other times acknowledged its potential. A third example is that the Gasunie, as central actor in the gas regime, on several occasions in 2012 and 2013 explicitly joined the renewables advocates in the need to phase out coal (and support the combination of gas & renewables). The point is, as outlined in the earlier literature (Markard, Suter & Ingold 2016, Sabatier 1988), that the positions and (pragmatic) coalitions on the level of secondary beliefs are instrumental and are changed and abandoned rather easily when the plot shifts.

Underlying these flexible secondary beliefs, defining belief systems can be identified that point at more stable advocacy coalitions. These core beliefs define more stable value systems from which actors define their positions with regard to secondary beliefs. The core beliefs were most clearly reflected in the Ambitions & Goals debate, however, they were visible

also in the other debates, as the key values served as argument to support or oppose a specific policy measure or solution. This is in line with earlier findings in the literature (Markard, Suter & Ingold 2016, Sabatier 1988). Identifying these core beliefs is relevant, because they point at more stable advocacy coalitions. Understanding the debate at this level is enlightening as it can point at the discursive hegemony of one of the advocacy coalitions (which helps to understand the power balance) as well as key dynamics, such as when two or more advocacy coalitions ally themselves to shift the policy debate in a desired direction.

Analysis of the discourse revealed five advocacy coalitions each with their own core beliefs. These core belief systems defined the most crucial aspects of a policy area including their view on the central issue and its salience, the solution direction and the role division (Markard, Suter & Ingold 2016). This definition of central aspects in a core belief system is also well aligned with the central aspects of the leadership mindset of the incumbent discussed in section 6.3. Below, each of the five narratives is discussed. The underlying data is made transparent in table 6.4 presenting illustrative quotes for each of the narratives. Finally, their logic is summarized in table 6.5 with regard to the central aspects of problem definition, solution direction, and role division.

Table 6.4 - Exemplary quotes for each of the five core advocacy coalitions.

Advocacy coalition	Exemplary quotes for core belief
Pro-decentralized	<ul style="list-style-type: none"> • Q69 Breithaupt, Grunneger Power: "Two thirds of the Dutch energy market is controlled by foreign parties. Most of the profits flow across the borders. Let's take those back and let's start in Groningen. Our energy firm will reinvest all profits in local, sustainable energy projects." (12_0213, Goals & Ambitions) • Q70 Alderman Haarlemmermeer: These municipalities in fact move back one hundred years in time. At the start of the previous century many Dutch municipalities and provinces also founded their own energy firms. (..) 'Some things were better arranged in the past than today', according to alderman Nederstigt. This is also why they have embraced an appropriate slogan for their new energy firm: 'The future started yesterday.' (14_0083, Bottom-up &Solar) • Q71 Rotmans, Erasmus University: "A bottom-up movement of citizens is growing. Their principle is that 'when government and the business community do not take action, we will do it ourselves.'" (12_0350, Bottom-up &Solar)

Advocacy coalition	Exemplary quotes for core belief
Pro-environment	<ul style="list-style-type: none"> • Q72 Director Tjerk Wagenaar of Stichting Natuur en Milieu in his reaction points to the agreement in the EA that in 2016 a 35% energy saving needs to be realized. 'If that is not achieved, it is logical to employ additional measures quickly.' (14_0271, Goals & Ambitions) • Q73 The advisory council for environment and infrastructure, this week [October 22nd 2011]: 'In the last decades the transitions towards a sustainable energy supply went slower than in other European countries and the Netherlands is therefore now lagging behind.' (11_0361, Goals & Ambitions) • Q74 A report of Stichting Natuur en Milieu, last Saturday [October 22nd 2011]: 'It is remarkable to note that the Netherlands are often not complying with European environmental agreements, considering that the cabinet calls these agreements leading.' (11_0361, Goals & Ambitions) • Q75 Dik, Christenunie: "This cabinet should choose fundamental, green reforms. At this moment, there is no level playing field between fossil and green energy. In the current situation, the tax advantages for fossil energy amount almost 6 bn euro." (12_0371, Support measures) • Q76 ENGO leaders: The Netherlands can only generate 14% of its energy sustainably in 2020 by using offshore wind. (14_0013, Wind power)
Green Growth	<ul style="list-style-type: none"> • Q77 ENGO leaders: With considerable investments in offshore wind turbines, the Netherlands can build a new economic sector, which will provide many benefits: jobs, export of knowledge, and from a long-term perspective a good price for sustainable energy which will benefit the climate. (14_0013, Goals & Ambitions) • Q78 Hoek (DGZ), Rotmans (Erasmus University), van Keulen (Greenpeace): A company which does not actively work on sustainability, will lose its license to operate in ten years. Neighboring countries are greening quickly and see many opportunities to make profits and innovate while doing so. As scientists, companies, and NGOs we call on the government to create supportive tax conditions and a consistent policy to accelerate the process of greening. (12_0304, Goals & Ambitions) • Q79 de Haas (Eneco): "There is no alternative from a long-term perspective. This is also obvious in the market demand in the Netherlands: we have a reasonably green home market. 'Made in

Advocacy coalition	Exemplary quotes for core belief
	<p>Holland' could become a concept recognized for its quality and sustainability performance. In other parts of the world this broader conceptualization of welfare is not yet recognized, but this only a matter of time. If we become sustainable now, this will create an innovative competitive edge in the future. (12_0037, Ambitions & goals)</p> <ul style="list-style-type: none"> • Q80 Van Velden (Gasunie): In the sustainable energy-economy, the Netherlands should keep profiting from its natural gas-based advantage. In a smart, integrated vision of a sustainable energy supply, natural gas facilitates the integration and growth of renewable energy sources. (12_0299, Conventional & CCS) • Q81 PBL: According to the environmental planning agency, the Netherlands owns key assets with regard to the bio-based economy. One example is the available knowledge on the production of renewable resources from natural sources such as the application of beet or starch to produce ethanol, needed to make plastics. "We have a strong knowledge- and competitive position with regard to biotechnology, food chemistry, agri-food and chemicals." (14_0016, Bio-based)
Clean fossil	<ul style="list-style-type: none"> • Q82 According to Hans Alders (chair of Energie-Ned, the advocacy body of the Dutch energy firms), we will not be able to achieve the agreed 14% sustainable energy by 2020. Therefore, we should shift the horizon towards 2050, as he stated in the Volkskrant yesterday. That will provide for some breathing space for a certain period. (12_0329, Ambitions & Goals) • Q83 Terium: Without a predictable and operationalized energy policy, the energy sector will not be able to invest. At least not in capital-intensive generation assets that have a long horizon to recover the cost. Without these larger power plants or offshore wind farms a European energy transition is not possible. (11_0435, Ambitions & Goals) • Q84 Gérard Mestrallet, executive of GDF Suez, the largest electricity firm in the world, dared to state it simply. 'We should slow down the pace of constructing new windfarms and deployment of solar panels on our roofs. The current pace is simply not sustainable.' (13_0348, Ambitions & Goals) • Q85 Jurjus, Energie-NL: On October 3rd [2011] Energie-Nederland closed a Green Deal with the cabinet on the implementation of an

Advocacy coalition	Exemplary quotes for core belief
	<p>obligatory share of renewable energy in 2015. This will create a real market for green power. Suppliers will compete to be able to provide the most attractive offering on the market and for their customers. (11_0374, Support measures)</p> <ul style="list-style-type: none"> • Q86 E.ON employees: The technicians of the old coal power plants are not able to grasp it. "Everybody opposes us," complains Geers. He had just before explained how many installations were deployed to reduce harmful emissions. Nitrogen, sulfur and fly ash are all filtered out of the emissions with ingenious systems. Furthermore, biomass is co-fired and the firm cooperates with neighboring firms to limit CO₂ emissions. Geers: "If this is not sustainable, my ideas are depleted." (13_0296, Coventional & CCS)
Pro-economy	<ul style="list-style-type: none"> • Q87 According to VVD-energy speaker René Leegte, the goal should be seen as 'conditional.' 'If it proves unrealistic or if it becomes too expensive, we will adapt the goal.' (13_0019, Ambitions & Goals) • Q88 Leegte (VVD) will call attention to the threat of 'energy-poverty' as a consequence of the increasing energy bill. The cabinet plans to finance the cost of green energy, which will increase to 3,8b in 2020 and the following years, as a surtax on the basic energy price. This will increase the energy bill for families by a few hundred euros per year. (13_0019, Ambitions & Goals) • Q89 de Groot, VNO-NCW: The employer organization is afraid that Europe will lose a part of its industry if it unilaterally pursues ambitious climate change goals. According to De Groot, the employers do support ambitious climate change goals, 'but only in case of global and binding agreements that apply to everyone.' (10_0232, Ambitions & Goals) • Q90 Buijnk, Ministry EL&I: According to Buijnk the Netherlands should take CO₂-reduction as a starting point and leave it to the market to find the most efficient solution. He proposes to reduce the goal for CO₂-reduction to 20%, the level agreed to earlier with the European Union. This will lead to 'a significant reduction of the climate policy cost,' according to Buijnk. (10_0007, Support measure) • Q91 CPB: He also points to the cost-benefit analysis of the CPB published this week [June 20th 2013]: due to the low electricity price the cost recovery period of wind turbines becomes too long and therefore the conclusion is that it is a better option to wait five years before constructing new turbines. (13_0220, Wind power)

The pro-environment coalition is characterized by its focus on achieving environmental goals. They have a strong focus on climate change, but also broader environmental issues such as pollution, for example, fine-particle issues. Their arguments relate proposed measures to whether they effectively address these issues. Agreed environmental goals (such as the 2020 goals of the Dutch government) are an essential benchmark in their discourses. They tend to stress that the Netherlands lags behind on the path to achieving the agreed goals and question whether proposed measures are sufficient to catch up. Apart from that, they strongly embrace wind and solar as “real” renewables. On the other hand, bio-based measures are evaluated rather critically because of their complementarity to conventional, fossil-fuel based generation and new sustainability issues in their supply chain. In general, they are suspicious about market-based solutions and argue for a clear role of the government in obligating or strongly supporting environmental solutions.

Their traditional adversary, the pro-economy coalition, is characterized by positioning the economic impact as the determining criterion. While they might acknowledge the need to approach environmental issues, this should not harm the economy. In fact, three complementary focal points for judging the economic impact can be seen in this discourse: sustaining industrial competitiveness, consumer purchasing power, and balancing the government budget. Probably the industrial competitiveness is the strongest, as was observed in section 5.3, but the others also play a crucial role. From this perspective, they strongly support measures that reduce the gap of energy cost in the Netherlands with surrounding countries, such as developing new coal based capacity and improving international grid connections. Furthermore, they often oppose progressive renewables scale-up as it might reduce the national competitiveness. A belief in a privatized, deregulated market is deeply rooted in their belief system and they tend to prefer government support for exploration over exploitation support.

As evolution of the pro-economy belief system, the clean fossil narratives plead for building on clean fossil power as backbone in the transition phase. A key characteristic is that they embrace the transition as such, however, frame it as a path to a 2050 carbon-neutral electricity generation (e.g. see the 2011 Eurelectric declaration). Their argument is that conventional power plants will be needed for decades still, and they are occupied with responding to all kinds of arguments reducing the legitimacy of those. More specifically their arguments often stress the need for coal-based power to realize a diversified generation portfolio and make electricity affordable and reliable, but argue that in combination with add-on solutions such as CCS and biomass co-firing, much progress in carbon reduction can already be realized. Rooted in pro-economy thinking, they strongly support the privatized market idea, however they tend to be much more favorable to exploitation support with subsidies (SDE+) or the supplier obligation.

In similar vein, the Green Growth belief system, defined by its argument for the economic potential of the sustainability transition, emerged from the pro-environment belief system. These roots are visible in structurally embracing sustainability as the future vision and the need to structurally solve issues, their appreciation of “clean tech” solutions as most sustainable in contrast to end-of-pipe solutions (e.g. CCS), as well as the need to show leadership in this respect. In their arguments, this coalition does indeed lean towards the economy side by most often stressing the economic potential of the transition. In this respect this is in fact comparable to the clean fossil narrative, which embraces a 2050 carbon-neutral ambition. However, in contrast to clean fossil, their beliefs prove to be rooted in, or related to, the pro-environment and provides for the natural alliance between the two, which is discussed later on. While views on specific measures vary, they in general tend to see the transition more as a multi-stakeholder/cross-sector dynamic and also appreciate the role of the government in directing and supporting the transition.

The fifth coalition is defined by its “pro-decentralized” belief system, characterized by its glorification of the bottom-up movement. While this coalition does embrace new renewable technologies, especially solar, their preference for the local dynamic is more defining. This movement also builds on older self-sufficiency belief systems (Lovell 2004), but equally thrives on the more recent anti-establishment emotions present in Dutch society. While their system vision is not always clear, they believe that the combination of new technologies and bottom-up social processes can be revolutionary and that a more localized economic system provides a solution for many sustainability issues. Based on their anti-establishment views, they tend to delegitimize both incumbents and the government as positive change agents. Their advocacy coalition is much less organized than the other four. The discursive strength of their narrative, in combination with reports on the accelerating number of local initiatives, does ensure that this narrative shapes the debate, comparable to the observation in section 5.5 that the related “prosumer” view shaped the strategic reorientation of the incumbents in the 2013-2014 period.

Table 6.5 - Core beliefs of the advocacy coalitions on problem definitions, key values and role division.

	Pro-decentralized		Pro-environment		Green Growth		Clean fossil		Pro-economy	
Central belief	A decentralized energy system is the way to go	Achieving environmental goals is central	Shift the economy to green opportunities	The near future mainly consists of clean fossil PPs with add-on solutions	Minimizing economic harm for industry, consumers and government budget					
Problem definition	Achieving self-sufficiency and local sustainability	Mitigating climate change, reducing all pollution and preventing negative nature impact of whole supply chain	Transforming the economy to a sustainable business model	Climate change	Climate change					
Key value	Renewable Local system	Renewable/sustainable system	Sustainability as an opportunity	Balance affordability, reliability & sustainability - keep the system stable	Remaining competitive					
Timing	As quickly as possible	As quickly as possible	Clear LT and ST ambitions	2050 as focus year	Open ended					
System vision	Mostly decentral	Much more decentral	Differs	Still mainly central	Still mainly central					
Solution view	All renewable, distributed system	All renewable Gas as transition fuel	Renewable Gas as transition fuel	Clean fossil + CCS + biomass Coal and gas needed in transition period	Open, pick affordable and reliable path Coal needed for competitiveness					
				International connection	International connection					

	Pro-decentralized	Pro-environment	Green Growth	Clean fossil	Pro-economy
Market view	Anti-incumbent	Ambiguous/hybrid market	Positive, but also supporting clear governmental direction	NW EU liberalized market	NW EU liberalized market
Government view	Sometimes considered as part of the regime/barrier to change	Should obligate and tax external cost	Supports a clear government direction	Market selects best options Should support upscaling and R&D	Market select best options Should stimulate R&D

6.2.4 Linking advocacy coalitions to pragmatic coalitions and actors

Statistical analyses reveal that each advocacy coalition has distinct key actors and secondary beliefs. This proves the relevance of advocacy coalitions in creating greater understanding in the dynamics underlying the energy debate. Table 6.7 shows the mapping of key actors (counted) and secondary beliefs (based on correlation) of each advocacy coalition. While there is no clear benchmark available yet, the results are shown sorted in the largest correlation and above a minimum threshold. As also the correlation matrix (of actors demonstrating core beliefs in their positions) in table 6.6 shows, the actors' positions are indeed distinguishable based on their beliefs.

Table 6.6 - Statistical correlation between actor's core beliefs (adherence to advocacy coalitions). Significance: ***: <0,01, **: <0,05, *: <0,1.

	<i>1 Pro-decentralized</i>	<i>2 Pro-environment</i>	<i>3 Green Growth</i>	<i>4 Clean fossil</i>	<i>5 Pro-economy</i>
<i>1 Pro-decentralized</i>					
<i>2 Pro-environment</i>	0,14***				
<i>3 Green growth</i>	0,09*	0,26***			
<i>4 Clean fossil</i>	0,04	0,01	0,12**		
<i>5 Pro-economy</i>	-0,04	0,09*	0,12**	0,14***	

The data also highlights that the advocacy coalitions can join forces in a pragmatic coalition supporting a specific secondary belief. For example, both the pro-economy and clean-fossil coalitions are correlated to (support) the “optimizer” pragmatic coalition, which argues for a specific approach to government support in the transition. This alliance dynamic is also facilitated by actors demonstrating several core beliefs, as is especially obvious between “pro-environment” and “Green Growth.” For example, in its discursive behavior Greenpeace uses both pro-environment (18x) and Green Growth arguments (12x).

6.2.5 Temporal dynamic of advocacy coalitions

The codification in terms of advocacy coalitions also allows for analysis of how the relative influence of each coalition changes over time. It should be noted in this respect that earlier literature stressed that shifts in core beliefs tend to happen over longer periods of time (e.g. 15 years) and thus the observed period is rather short.

With the help of the earlier analysis of the contextual dynamics, two trends can be noted in the temporal analysis presented in figure 6.3. First, in the period 2010-2012 the number of “green” core beliefs (Pro-decentralized, Pro-environment, Green Growth) grows relatively to >65% in 2012. This is the result of both the Green Growth story gaining traction (e.g. in

Table 6.7 - Statistical analysis of the advocacy coalitions (defined by their shared core belief). Numbers represent correlation (between core belief and secondary positions voiced) and number of records (positions) per actor. All correlation between core & secondary beliefs are significant at <0,01 level.

	Pro-decentralized	Pro-environment	Green Growth	Clean fossil	Pro-economy
Key secondary beliefs/pragmatic coalitions (correlation > 0,5)	Bottom-up supporters (0,74)	Goal – Pro-environment (0,86), Support mechanism - Renewables (0,65), Wind - Offshore Proponents (0,61), Energy saving - Lagging behind (0,57), Conventional - Coal resisters (0,51)	ETS - Adapt - environment focus (0,78), Goal - Green Growth (0,76), Wind - Offshore Proponents (0,5)	Goal - Clean fossil (0,89), Support mechanism - Optimizer (0,58), Conventional - Clean conventional (0,58), Bio-based - Biomass support (0,58), Bio-based – Bio-based support (0,54)	Goal – Pro-economy (0,93), Support mechanism - Free market (0,89), Support mechanism - Optimizer (0,54)

	Pro-decentralized	Pro-environment	Green Growth	Clean fossil	Pro-economy
Key actors (> 5 positions)	NewNRG (6), Rotmans - EUR (6), Urgenda (5)	PvdA (47), PBL (45), Groenlinks (36), SN&M (31), ECN (28), Greenpeace (18), CE Delft (15), ENGOs (15), D66 (15), Volkskrant (13), Environmental experts (13), ChristenUnie (10), Urgenda (9), Rotmans - EUR (9), WWF (8), Ministry I&M (8), Milieudefensie (8), Wijffels, expert (6), IEA (6), Eneco (6), CDA (6), Trouw (5), Triodos (5), Rabobank (5), ING (5), Municipality Rotterdam (5)	Eneco (58), DGZ (16), Greenpeace (12), ECN (11), Triodos (10), SN&M (10), Essent (10), BCG (9), Ministry EL&I (8), CE Delft (8), ASN (8), Greenchoice (8), Gasunie (7), DE Koepel (7), Rotmans - EUR (6), NWEA (6), Nuon (5), Nijpels, EA chair (5), Holland Solar (5)	Essent (24), Energie- NL (21), RWE (13), E.ON (8), GDF (7), Algemene Energieraad (6), ECN (6), Nuon (5), "Incumbents" (specific actors not mentioned, 5)	Ministry EL&I (57), VVD (33), VNO- NCW (16), CPB (10), VEMW (10), ECN (10), Algemene Energieraad (9), Volkskrant (6), RWE (5), NRC (5), Vd Hoeven (5), Delta (5), FD (5), Innovatie Platform (5)

the context of the Greendeals of Rutte I and the founding of De Groene Zaak), as well as increasing attention for the pro-decentralized narrative (especially 2012). As of 2013 a reversing trend can be seen in which Pro-economy & Clean fossil based statements increase in relative share. This is related to the disruptive trend in the sector (which caused more debate on conventional power plants) as well as resistance to ambitions agreed in the EA (e.g. see the local stakes resistance growing in 2014).

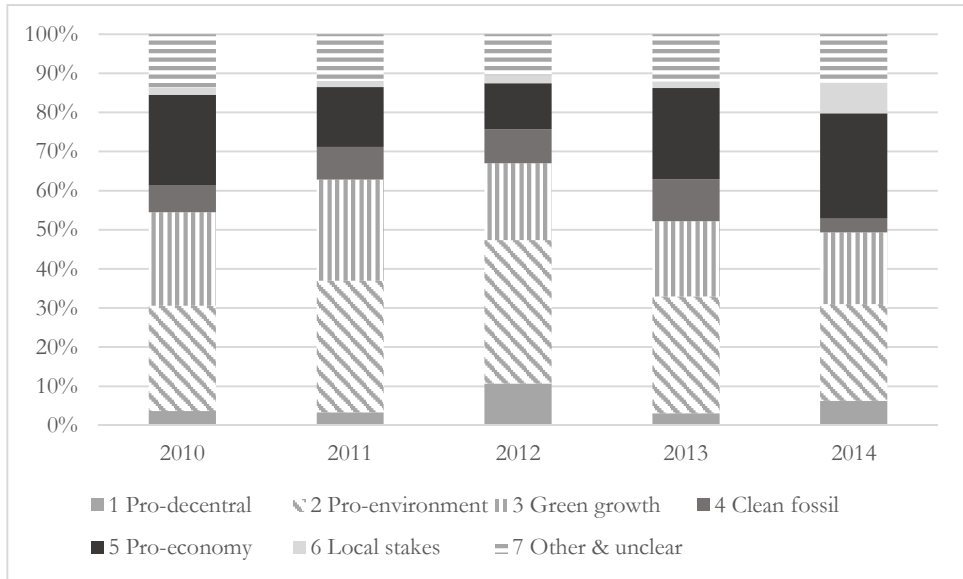


Figure 6.3 - Temporal dynamics of the relative contribution of statements reflecting the core beliefs of the coalitions.

6.3 ANALYZING INCUMBENTS' ROLE

An important question in this chapter is how the incumbents' behavior relates to their mindset. To be able to analyze this relationship, this section in a more focused manner analyses incumbent behavior in the context of the energy debate and the coalitions described before.

6.3.1 Incumbents as central actors in two coalitions

The incumbents play a central role especially in the Green Growth and the Clean fossil coalitions. As reported before, in total 199 records are tracked to incumbents²⁰. Although

²⁰ Defined as the original Dutch incumbents (Eneco, Essent, Nuon, Delta and EPZ) and the foreign entrants entering the market (EON, RWE, Vattenfall, GDF, Electrabel, DONG, SSE). Gasterra (central

they are not the most active actor category (which are the Applied research & consultant actors, see table 6.2) they do play a significant role. This is clearly reflected in the analysis (see section 6.2.1), considering that two incumbents are among the top 10 most active actors in the media (Eneco #2, Essent #8, including parent company RWE even #4). More importantly, they are crucial actors in the Green Growth and Clean fossil coalitions. Although the Green Growth also includes business actors from other sectors (e.g. the green banks ASN & Triodos), broader stakeholder bodies (especially DGZ) and ENGOs (especially Greenpeace & SN&M), Eneco is by far the most active actor (see table 6.7). In the clean fossil coalition, incumbents are responsible for 49% of the records, and the remaining part includes mainly stakeholder bodies dominated by incumbents (Energie-NL, Algemene Energieraad).

Table 6.8 - Number of records (concrete positions) of incumbents per advocacy coalition.

	# incumbents	% incumbents total	# total	% total
1 Pro-decentralized	3	2%	102	3%
2 Pro-environment	6	3%	579	1%
3 Green Growth	84	42%	415	20%
4 Clean fossil	70	35%	144	49%
5 Pro-economy	25	13%	373	7%
6 Local stakes		0%	54	0%
7 Other & unclear	11	6%	230	5%
Total	199	100%	1897	10%

Among the incumbents, Eneco and DONG are “Green Growth” actors, while the others dominantly display clean-fossil narratives. As figure 6.4 shows Eneco and DONG in $\geq 80\%$ of their statements show Green Growth core beliefs. The other incumbents most often show clean-fossil based statements, while pro-economy beliefs can also be found. It is remarkable that Essent and especially Nuon also show green growth beliefs in a smaller part of their statements, which reflect that they also invest in renewables and promote these in specific situations. However, this is not their dominant and central narrative.

gas trader in the Dutch market) is included as well because it joins the incumbent-focused Margritte coalition. All start-ups, including Greenchoice (founded already in 2001), are considered “challenger.”

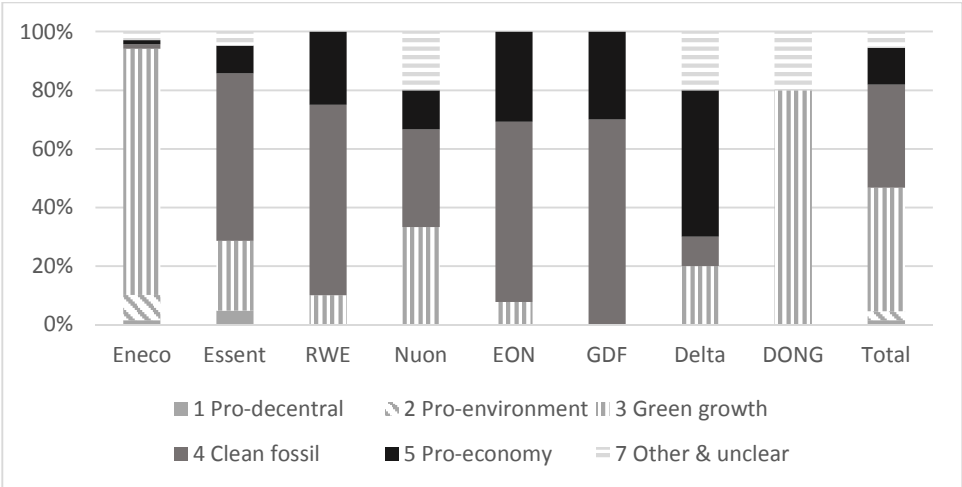


Figure 6.4 - Core beliefs (advocacy coalitions) reflected in incumbents' positions (<5 records excluded).

6.3.2 Key tensions within the incumbent regime

It is remarkable in the context of this transition, that the incumbent side of the regime is also rather fragmented and far from the closed ranks the simplified view of the incumbents often suggests. These tensions often emerge along the lines of the Green Growth (in some cases with pro-environment allies) vs. the clean-fossil coalition. In fact, Eneco as central Green Growth actor is joined by a cross-sector set of allies including gas lobby firms (Gasunie, Shell), challengers (especially Greenchoice) and ENGOS. Table 6.9 below lists the most important tensions with the central debating actors and references to sources where this debate is represented most clearly. Tensions also reflect the pragmatic coalitions described earlier, showing tensions as key indicator for discovering opposing pragmatic coalitions.

Table 6.9 - Key tensions between incumbent actors and key allies reflecting fragmentation on (incumbent) regime level.

	Proponents	Opponents
Biomass	Is the most efficient, local generated renewable, is needed to realize targets, and provides export opportunities - Essent, Energie-NL, ECN, PBL & EnergyValley (10_0073, 10_0320, 12_0220, 12_0328, 14_0286, 14_0373)	Legitimizes coal power and has questionable sustainability itself - ENGOS (11_0447, 13_0335, 14_0137)

	Proponents	Opponents
Supplier obligation	Efficient stimulation of transition - Essent/GDF/EON/Energie-NL	Benefit mainly coal PP owners - Eneco (DONG & Greenchoice)
Coal vs. Gas	Coal can be clean with efficient PPs, biomass and/or CCS - Essent/ (GDF)/EON/Delta/Nuon at first (12_0125, 13_0024)	Gas is complementary with the transition and provides more NL opportunities - Eneco, Gasunie and other gas only actors (12_0174, 12_0125, 12_0371, 13_0099). GDF also supports the pro-gas agenda (13_0184)
ETS	Should be adapted on EU level to remain level playing field - GDF/ EON/Delta (12_0125)	When needed institute a national system to have minimum CO ₂ price - Eneco (12_0174)
Back up fees	Are needed to stabilize the system - Essent, EON, GDF (12_0300, 14_0089)	Not needed, should be part of business case - Eneco (14_0089) - and strengthens lock-in - Greenchoice (13_0389)

6.3.3 Distinct profiles of the focus incumbents

Eneco’s behavior represents its leadership in the Green Growth coalition: 84% of Eneco’s statements reflect these core beliefs. Central in its arguments is the belief that the sustainability transition in the energy sector and the broader economy provides for large economic opportunities. This narrative is used to support pleas for change in policies that support the persistence of the fossil-fuel dominated system, such as the large-user exemption and dysfunctional ETS. Second, Eneco pleads for support especially for offshore wind, but also for more decentralized energy solutions. Reflecting the tensions outlined before, Eneco actively opposes e.g. biomass support and the supplier obligation, which are strongly advocated by the clean fossils advocacy coalition. Eneco’s allies are mainly along the lines of the Green Growth coalition, but also with pro-environment actors.

Essent, in contrast is a leader in the clean fossil coalition: 60% of its view (75% including related pro-economy) reflect this belief system. Besides that, some specific arguments (19% of its statements) also show some Green Growth view, such as supporting offshore wind. The core element in its advocacy is defending the future role of coal power plants, arguing

for biomass support and supporting the supplier obligation, all central secondary beliefs of the clean fossil coalition. Its allies are also mainly among the old Dutch incumbent regime as well as the foreign incumbents.

Nuon's profile interestingly reflects a remarkable in-between position. First, it can be noted that Nuon is much less active, with 4x fewer statements than the other two incumbents. This can be assumed to be related to the more internal focus of incumbents with "active" strategies. Apart from that, its concrete statements reflect a combination of clean fossil (38%) and Green Growth (31%) statements. At some moments in time Nuon defended classical clean fossil secondary beliefs such as coal power plants and biomass co-firing support, however, at other moments it did not support advocacy initiatives of the incumbents in this respect. This also translates into different behavior, as Nuon is the only incumbent to abandon its plan to build a new coal-fired power plant (transform the plants to gas-fired).

6.4 LINKING THE DEBATE TO POLICY CHANGE: THE ENERGY AGREEMENT

Now that the coalitions in the debate are identified and the incumbent's role was specifically analyzed, this section relates the role of the coalitions to policy change. As argued in the methodology section, the EA reflected the policy consensus in 2013 and was purposed to be the central policy framework for the next decade. The EA is considered to be a major policy change in the sense that ACF defines it. The process leading to the agreement resembles both the policy learning as well as the negotiation pathway defined in this literature. Before analyzing the narratives and concrete agreements in the EA, some context is provided on its origins and nature.

6.4.1 The preceding policy learning process: rooted in four crucial debates

The Energy Agreement as it reached final agreement and was launched in September 2013 clearly relates to four crucial historical discourses in Dutch energy policy. These ongoing debates can be characterized as policy-oriented learning in the sense that they reflect "enduring alternations of thought" (Sabatier 1988). First is the broadly shared *call for more stable policy*, which is discussed more extensively in section 5.4. To summarize, after changing the renewable energy support regime 4 times in 15 years, a call to develop stable policy was shared across the board.

The second is the discourse about the lagging behind on environmental goals and the need for a "Delta plan" for sustainable energy. At least since 2010, several actors especially from

Table 6.10 - Summarizing the context creating behavior of the three focus incumbents.

		Essent/RWE		Nuon/Vattenfall	
		Eneco			
Number of positions		69	62	16	
Key positions	<ul style="list-style-type: none"> * Emphasizes opportunities of the transition and the need for ambition * Argues against supplier obligation and biomass co-firing support * Argues large-user tax exemptions benefit fossil fuels and should be abolished * Argues for stable support for offshore wind * Stresses dysfunctional market and ETS considering idled gas PPs and running coal PPs * Mentions potential of bottom-up movement & decentralized solutions 	<ul style="list-style-type: none"> * Advocates the potential of a bio-based economy * Frames biomass co-firing as cheapest renewable and needed to achieve goals * Argues for the supplier obligation and biomass support * Defends the need for new coal PPs and role of conventional PPs in general * Links idled gas PPs to DE import (renewables) and calls for "back-up fees" to improve business case of gas PPs * Argues for consistent policy and market based approach (E'IS) * Calls for offshore wind support * Shows differing reaction to bottom-up movement (1x marginal, 1x potential) 	<ul style="list-style-type: none"> * Support call for offshore wind support * Limited/ambiguous support for biomass co-firing/supplier obligation (1x pro obligation, financial participation in Green deal) * Resists coal PP closure, but abolishes (postpones) own planned coal PP * Critical reaction towards potential of decentralized solutions 		
Reflected core beliefs	Green Growth (84%), Pro-environment (9%)	Clean fossil (60%), Green Growth (19%), Pro-economy (15%)	Clean fossil (38%), Green growth (31%), Pro-Economy (13%)		
Allies (correlation > 0,5)	<p>DGZ (0,97), DONG (0,93), BCG (0,93), ASN (0,92), DE Koepel (0,88), Holland Solar (0,87), Greenchoice (0,84), Nijpels, EA chair (0,84), Triodos (0,83), Gasunie (0,81), NWEA (0,75), SP (0,73), Faaij - RUG (0,65), Koorstra (0,64), van Wijk - TUD (0,63), NM federaties (0,59), St Nederland Knigt Nieuwe Energie (0,57), Greenpeace (0,56), LTO (0,56), SER (0,55), CE Delft (0,53), Nuon (0,52)</p>	<p>Essent: Energie-NL (0,89), E.ON (0,84), RWE (0,83), Incumbents (0,79), Nuon (0,77), GDF (0,76), Turkenburg - UU (0,59), SER (0,55), Algemene Energieraad (0,53)</p> <p>RWE: E.ON (0,92), GDF (0,88), Essent (0,83), Incumbents (0,81), Energie-NL (0,81), Turkenburg - UU (0,7), Algemene Energieraad (0,7), Nuon (0,69), SER (0,62)</p>	<p>Nuon: Essent (0,77), RWE (0,69), E.ON (0,65), NWEA (0,61), Energie-NL (0,6), PWC (0,59), SER (0,56), Incumbents (0,56), Eneco (0,52), BCG (0,51), DE Koepel (0,5), Nijpels, EA chair (0,5)</p> <p>Vattenfall: # records too small for relevant calculation</p>		

the pro-environment coalition started to assert that the Netherlands was far off track to reach the 14% renewable energy agreed with the EU as 2020 goal. They started framing statistics that showed that the Netherlands were lagging behind on EU level and were becoming “the dirty man” of the EU. An important initiative in this trend was that a group of environmental experts from each political party decided to draft a future vision titled, “The Netherlands get new energy, for welfare and prosperity in the 21st century.” and received the subtitle “A cross-party proposal for a Delta Plan for New Energy.” This vision, presented in early 2011, led to two relevant effects. First, it was framed in the parliamentary debate and led to adoption of a resolution supporting the “Delta Plan idea” (which in fact draws on the discursive power of the story of the major water protection structures built by the Dutch in the 1950s). Second, a foundation was founded with the name “St. Nederland krijgt nieuwe energy” (literally, the Foundation the Netherlands gets new energy) which became one of the key advocates of the proposal. With Prince Carlos as their chair, they executed considerable advocacy activities in this respect.

Third is the discourse about Green Growth, central to the eponymous advocacy coalition. The earlier cross-party future vision already was a kind of combination of the pro-environment and green growth narrative: stressing the need for radical change, but also the economic opportunities in pursuing such a change. In reaction to the parliamentary resolution, minister Verhagen sent an advisory request to the multi-stakeholder socio-economic advisory board SER (dominated by employers and labor unions). They responded with the report titled, “Towards an Energy Agreement for sustainable growth” in November 2012, which both adopted the Green Growth narrative (large opportunities) as well as the need for a multi-stakeholder agreement to realize more stability. A remarkable precedent was also the report published by the core employer organizations (VNO-NCW, MKB-Nederland, LTO-Nederland) in the preceding months (August 2012) titled “the Netherlands should start earning again, sustainable growth by entrepreneurship.” These employer organizations in general represented a clear pro-economy core belief in the energy debate (e.g. see section 6.2.3), however, they also adopted the Green Growth narrative in this report. Although further evidence on the process showed that they did not lose their pro-economy beliefs (economic impact and industrial competitiveness remains the final measure), this does illustrate how “bridging” narratives can facilitate agreements between different advocacy coalitions.

Finally, it is argued that the disruptive dynamic in the Electricity sector (see section 5.3), certainly also resonated in the positions of the relevant actors. The fundamental realization by the incumbents that they needed to transform their business model, struck incumbents in the period between 2011 and 2013. This is evident from the fact that all changed strategy in this period and embraced the need for decentralized and prosumer solutions in the narratives

of these new strategies (see section 7.3). This, however, did not directly result in them abandoning their clean fossil core belief with its associated secondary beliefs, as the following discussion shows.

Since early 2013 this resulted in a broad multi-stakeholder negotiation process. This process resembled a second pathway to policy change, as theorized in the ACF theory (Weible, Sabatier & McQueen 2009). The negotiation was structured as separate working groups (closely reflected in the chapter structure), but a smaller coordination group was central in this process. This coordination group was chaired by SER chair Wiebe Draaijer and included representations from the ministry of EL&I, VNO-NCW, Energie-NL, ENGOs (SN&M & Greenpeace in the lead) and labor unions (Interview 6). The working groups and their chairs were (EA, p. 8):

- Building environment: Lodewijk de Waal (former labour union leader)
- Industry/ETS/centralized generation: Ab van der Touw (CEO Siemens NL)
- Commercialisation: Manon Janssen (director of Ecofys) & Michiel Boersma (former Essent CEO & now consultant & academic)
- Mobility: Paul de Krom (former Shell executive & VVD politician/secretary of state, now several chair roles)
- Finance: Jan Kees de Jager (entrepreneur, former CDA minister)

6.4.2 The content and signing actors

The overall goals of the EA as it was adopted in September 2013 focused on a combination of energy saving, renewables growth and economic value creation. As the executive summary of the agreement summarized the overall goals:

Q92 Parties will contribute - in the context of this agreement - to realize the following goals:

- *A saving of the final energy usage of approximately 1,5% per year.*
- *A 100 PJ-energy saving in final energy usage in the Netherlands in 2020.*
- *An increase of the share of renewable energy generation (currently >4%) to 14% in 2020 and a further increase to 16% in 2023.*
- *Creating at least 15.000 fulltime jobs, of which a considerable share is created in the first years from now on.*

(SER 2013, p.11)

There are a few remarkable aspects to the formulation of these goals. First, and probably foremost, a goal on GHG reduction is missing in this agreement. Although the summary

frames the agreement as climate policy, the overall goals do not include specific goals in this respect.

Q93 With the Energy Agreement for sustainable growth the involved parties lay the foundation for a broadly supported, robust and future-proof energy- and climate policy. (SER 2013, p. 11)

Second, economic value creation is clearly framed as part of this agenda. As such the transition is positioned as an opportunity in line with the Green Growth discourse. It could be remarked that in this respect the formulation (15k jobs) is rather traditional and probably still reflects the pro-economy thinking of the employers and labor unions. Third, the horizon of the agreement is stretched beyond 2020, which was the standard before the agreement, due to the EU goals. This is primarily related to the lead time of the offshore wind park construction, as well as the idea that by a sequential tender approach (each year a tender) learning curve effects could be optimally utilized (resembling the Dutch “optimization” tradition again).

The agreement itself was signed by 48 parties reflecting a broad stakeholder coalition (EA, p. 135-141). This includes key representatives of the energy sector, the general employer organizations (including DGZ), labor unions, ENGOs and national and local governments. Besides that, sector organizations of other dominant economic sectors, especially if they had an important role in climate policy, were also involved. This included representatives of the energy intensive industry, finance, real estate and construction & installation, logistics, agribusiness, ICT, and the port of Rotterdam. Reflecting also from the actors who were dominant in the public debate (as illustrated before) one important actor group was missing: the politicians. This was probably one of the vulnerable points of the agreement as was noted both in the media and the interviews. Furthermore, consultants, researchers and academics were not bound to this agreement either, but this is logical, considering their facilitating and/or independent roles.

Table 6.11 - Actors signing the EA (SER 2013, pp. 135-141).

Energy	VNPI, VEMW, Netbeheer Nederland, Energie-Nederland, WENb - Werkgeversvereniging voor de sectoren energie, afval & milieu, kabel & telecom
General employer	VNO-NCW, MKB-Nederland, De Groene Zaak
Labor unions	MHP, FNV, CNV
Government	VNG, Unie van Waterschappen, Rijksoverheid, Klimaatverbond, IPO
ENGO	WWF, Nederland Krijgt Nieuwe Energie, Natuur & Milieu, Milieudefensie, eDecentraal, Duurzame Energie Koepel, De Natuur en Milieufederaties, Greenpeace

Mobility	Vereniging Nederlandse Autolease Maatschappijen, ANWB, St Zero Emissie Busvervoer, Bovag, RAI, NS, Formule E-team, Fietserbonds
Industry	VNCI, Metaalunie, FME-CWN
Finance	Verbond van Verzekeraars, Pensioenfederatie, NVB
Real estate	Aedes, Woonbond, Vastgoedbelang
Logistics	Transport & Logistiek Nederland, EVO
Construction	Bouwend Nederland, UNETO-VNI
Harbor	Deltalinqs
Agribusiness	LTO-Nederland
ICT	Nederland ICT

6.4.3 Narratives and how they reflect core beliefs

Analysis of the narratives used in the EA reveals a reflection of the core beliefs of each of the five advocacy coalitions. As the illustrative quotes in table 6.12 show, the importance of economic outcomes (*pro-economy*) is clearly present in the agreement. Especially with regard to ETS and the energy intensive industry, their core narratives are clearly visible. Also, their preference to minimize cost by seeking optimal support schemes is central to the discussion on renewables' support. The central arguments of the *Clean fossil* narrative are also clearly reflected. Their focus on the 2050 perspective, asserting the relevance of conventional plants, defining a NW-EU market, emphasizing the relevance of complementary solutions such as CCS, as well as framing the transition as trilemma are all included. The reflection of *Green Growth* starts with the title of the agreement. Besides that, the agreement involves value creation potential with respect to several trends and puts clean tech support central. *Pro-environment* beliefs are reflected also in several ways. First, environmental issues and especially climate change are framed as key challenges. Second, the agreement makes environmental policy goals (especially renewables and energy saving) central, although remarkably GHG reduction goals are lacking. At several locations, and especially with regard to energy saving, the threat of obligations, if insufficient progress is made, is included in the text. Finally, the legitimacy of *pro-decentralized* is also asserted as some of its narrative is included and a specific pillar (chapter) is dedicated to the support of decentralized generation. However, this coalition achieved the least success on the level of concrete measures, as is discussed in the next section.

Table 6.12 - Illustrative quotes for the core beliefs of the five advocacy coalitions in the EA.

<p>Pro-economy</p>	<ul style="list-style-type: none"> • Q94 The EA targets strengthening the economic structure and will release billions of investments in all sectors of society in the coming years. (p. 11) • Q95 ETS: assuring the competitive position of international firms (so called carbon-leakage firms) by allocating 100% free allowances based on realistic benchmarks, based on actual production levels and best-performance in the sector. (p. 20) • Q96 The Dutch Economy has a relatively large energy-intensive industry compared to other European countries. Due to recent developments related to the extraction of shale gas, Europe is confronted with high energy and resource prices compared to the US and the Middle-East. This has produced an even stronger awareness of the importance of efficient usage and sustainable generation of energy among internationally competing firms. By aspiring to world-class performance with regard to energy efficiency, this agreement contributes to the strong investment climate for the energy-intensive industry. (p. 31) • Q97 Increasing the energy-efficiency of the industry and agribusiness sectors is of paramount importance to reduce operational cost, the vulnerability with regard to fluctuating energy prices, sustain and create jobs, sustain and when possible improve the international competitive position of these sectors, and to realize climate goals cost-effectively. (p. 55) • Q98 Potentially - rather limited - price effects due to the closure of old coal power plants will be mitigated by a substantial increase of renewable energy and justified by the predicted environmental effects. (p. 22) • Q99 In the EA, parties combine ambition and realism in a smart implementation strategy which creates an optimal balance between societal costs and benefits, on the short- and long-term horizon. (p. 68) • Q100 The starting point is a cost-effective implementation, which provides security for investors, creates additional employment, induces innovation to lower costs and contributes to strengthening the competitive position of Dutch firms in this sector. (on renewables, p. 17)
<p>Clean fossil</p>	<ul style="list-style-type: none"> • Q101 Fossil fuels will, in the period until 2050, still represent an important share of the energy usage, even considering the agreement targets of 80-95% reduction of CO₂-emissions in 2050. (p. 20) • Q102 To realize a completely sustainable energy supply in the long term, the capture, usage and storage of CO₂ (CCS) are inevitable. (p. 21)

	<ul style="list-style-type: none"> • Q103 This EA aspires to sustainable growth. This requires a good balance between reliability, sustainability, and affordability of energy. (p. 31) • Q104 The provision [of biomass support] needs to be implemented in early 2015 to ensure that the agreed 25 PJ [of biomass co-firing] will contribute to the 14%-goal in 2020. (p.74) • Q105 The application of gas-fired power plants in the North West European Electricity market remains important. (p. 98) • Q106 The starting point is a cost-effective implementation, which provides security for investors, creates additional employment, induces innovation to lower costs and contributes to strengthening the competitive position of Dutch firms in this sector. (on renewables, p. 17)
Green Growth	<ul style="list-style-type: none"> • Q107 With the Energy Agreement for sustainable growth the involved parties lay the foundation for a broadly supported, robust and future-proof energy- and climate policy. (SER 2013, p. 11) • Q108 Energy saving contributes towards realizing environmental goals, lowers the energy bill, improves the competitive positions of Dutch firms and gives a boost to employment. (p. 13) • Q109 The ninth pillar focuses on energy-innovation and energy-export. The shared ambition is to achieve a top 10 position in the global CleanTech Ranking in 2030. (p. 23) • Q110 By a smart approach which strongly targets innovation, this agreement offers new opportunities to the Netherlands to profit from the growing world market for clean technology. (p. 30)
Pro-environment	<ul style="list-style-type: none"> • Q111 With the Energy Agreement for sustainable growth the involved parties lay the foundation for a broadly supported, robust and future proof energy- and climate policy. (SER 2013, p. 11) • Q112 The parties aspire to realize a saving of on average 1,5% of the final energy use with this agreement. This saving is expected to amply comply with the European directive. (p. 13) • Q113 If it becomes clear that actual progress deviates from the path towards realizing the targets, additional measures will be taken. These measures can be more obligatory and/or fiscal measures, or other voluntary or non-voluntary measures, whence more certainty will emerge with regard to realizing the 100 PJ energy saving. (p. 13) • Q114 ETS: tightening the reduction path of the ETS-ceiling targeted on the realization of the long-term goal of 80-95% reduction of greenhouse gasses in the whole economy in 2050. (p. 20)
Pro-decentralized	<ul style="list-style-type: none"> • Q115 An important part is the decentralized generation of renewable energy by the people themselves, and in the form of cooperative initiatives; which represents the third pillar of the agreement. (p. 19)

	<ul style="list-style-type: none"> • Q116 Citizens and companies are supported in taking measures to make their houses energy efficient and to generate energy themselves, which enables them to reduce their energy bill. This development is ongoing. More and more people take the initiative to produce energy themselves, either alone or together with others in a cooperative. (p. 31) • Q117 Market actors and NGOs strive to enable 1 million households and/or SMEs to cover their own energy demand for a substantial part with sustainable, decentralized energy, or apply other forms of sustainable generation for their own use. (p. 79)
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The blended narratives support the argument that this is a typical compromise agreement. They do not reflect the emergence of a new shared narrative. Note that formulations such as the following tend to summarize the values of all of the coalitions in long enumerations.

Q118 Energy saving contributes to realizing environmental goals, results in a lower energy bill, improves the competitive position of Dutch firms and gives a boost to employment. (SER 2013, p. 12)

The key narratives of the different advocacy coalitions – which led to tensions before – are all blended next to each other in the agreement. As such, the EA does only to a limited extent present a solution to the fundamental tensions between the core beliefs of the coalitions. It does not present a new set of core beliefs to which all actors subscribe, nor does it indicate how to solve fundamental tensions. If tensions arise again, because the implementation does not (totally) progress as expected, the overall EA narrative does not seem to provide guidance for which way to go. The agreement does specify a governance structure and that additional measures should be taken if execution undershoots the goals. But the agreement does not prioritize values (e.g. climate goals leading above economic impact or vice versa), so when fundamental trade-offs emerge again, there is no direction on how to solve these. The narrative, voiced on other occasions by both actors of the Pro-environment and Green Growth advocacy coalitions, that a sustainability transition is also a matter of abandoning an old business model and choosing a new approach, is not found in the EA. On a practical level, a start is made with phasing out the oldest coal power plants, but the point here is that this old-new dichotomy is not strongly reflected in the narrative.

6.4.4 EA agreements vs. secondary beliefs

Besides analyzing the narratives in relation to core beliefs, the relationship between concrete agreements within the EA and secondary beliefs of the advocacy coalitions can also be studied. When the concrete agreements in the EA reflect the secondary beliefs of an advocacy coalition, this is an indication of their influence on policy. To do so for each chapter, the concrete agreements were identified and mapped upon the secondary beliefs of

the advocacy coalitions. A complete overview is included in Appendix E. Table 6.13 summarizes the key points and dominant coalition per chapter.

The overall ambition reflects a mix of Green Growth, pro-environment and pro-economy beliefs. Green Growth is central in the frame of “sustainable growth,” as reflected in the title. However, pro-environment goals are clearly visible, and pro-economy priorities (sustaining competitiveness, minimizing cost, creating jobs) are as well. One might argue that this compromise reflects Green Growth as an in-between belief system, however, this is not fully legitimate, because the narrative of the EA blends all core beliefs, as opposed to clearly choosing from sustainable business model(s) as the way ahead.

With regard to energy saving in the building environment, the combination of pro-environment and Green Growth can be considered dominant. From the pro-environment coalition, energy saving to mitigate environmental issues are an important approach, as well as embracing obligatory measures (if voluntary approaches prove not to be successful). Green Growth is also clearly reflected, as especially in this segment large economic opportunities are projected. Substantial support is also given to new business models, for example, by facilitating ESCO models and launching a new revolving financing fund. It is noted that clean fossil stakes can also be identified as it is explicitly noted that energy sector incumbents have an important role in the awareness creation, but will not be affected by any obligatory measures in this respect (EA, p. 13).

Regarding the agreement on energy saving in the industrial segment, the pro-economy coalition can be considered dominant. It should be noted that the current agreement builds further on earlier covenants (MJA-13, MEE) and that industry has agreed to contribute and invest in this respect. However, the approach in general (with covenants) and also as it is included in the EA, emphasizes the competitiveness of industry as final measure of what is possible. Central in this way of thinking is that investment with a limited return on investment period (<5 years) can be made, however, beyond that, measures will harm competitiveness and should not be taken. Within the EA this is also visible in that industry only commits itself to a voluntary and case-by-case approach and the total of this is only a minor part (9 PJ) of the overall 100 PJ savings. Moreover, the EA agrees that re-firing the CHP-installation of the industry (idled because of the lowered competitiveness of gas) will not be compulsory. Although the relevance of energy saving in general is rooted in pro-environment thinking and there is also some support for geothermal solutions (Green Growth), the approach clearly breathes the pro-economy beliefs.

The rapid upscaling of wind power can be considered an important win for the Green Growth coalition. In fact, especially offshore wind support is one of their central secondary beliefs. This agreement provides for rapid scaling goals, renewed support for offshore wind, and

some important achievements in terms of streamlining procedures and structures (such as the improved planning processes and the appointment of Tennet as grid operator). This support is generally complementary with the views of the pro-environment coalition, however, it is clearly more central for the Green Growth coalition. The approach also builds further on the optimization tradition, which was in fact advocated by pro-economy & clean fossil before. However, the rapid scaling in a rather short time-frame induces massive investments, which they have strongly resisted before.

It is argued that the renewed support for biomass (co-firing) shows that the clean fossil coalition was dominant in this respect. Due to its connection to coal and limited from a long-term perspective, biomass is one of the most hotly-debated aspects of Dutch energy policy. The fact that renewed support is given after a strong and continuous lobby at least since 2010 (and partly as part of the supplier obligation proposal), can be considered a win for the clean fossil coalition. One could argue that a cap is introduced (25 PJ), however, this can be considered symbolic if one notes that this is more than 2x the maximum amount co-fired up to and including 2013 (namely 12,4 PJ in 2005, the latest reported number is 6,5 PJ in 2013). Therefore, on the mid-term horizon the coal power plant owners receive renewed support for co-firing and even have substantial space to grow in this respect. The EA also makes this support conditional on further improved sustainability criteria, which can be considered a victory for the pro-environment coalition. However, with the knowledge of today, this did not prevent further co-firing and the dialogue in this respect was already embraced by incumbents for a long time. Therefore, this does not indicate their dominance. Finally, the agreement includes some approving remarks on the bio-based economy narrative. However, because of the ambiguity in this respect, this is not considered a substantial gain for the Green Growth coalition.

With regard to support for decentralized generation, the EA can be considered a compromise between the stakes of the bottom-up movement and Finance ministry. Both the tax reduction for local netting and experiments with new rating and legislative arrangements are in line with the previous requests. However, as reactions also indicated, the spatial limitations and the fact that they still pay (reduced) tax immediately limit the potential again. This is attributed to resistance from the Finance ministry to further fiscal erosion (Interview 2 & 9). It can be noted that the pro-decentralized coalition, due to their lack of organization, was not specifically represented in the negotiation process and the inclusion in the agreement is thus most likely more a result of the support for the narrative in general than of active lobbying. Furthermore, no evidence was found of active resistance of incumbents against this movement, as might be hypothesized because of the cannibalizing effect of decentralized generation for them. As an ENGO interviewee noted, the decentralized stakes and issues were more or less out of the picture during the negotiation, even for the ENGOs (Interview

2). A final remark in this respect is that the EA notes that in case incumbents (or suppliers in general) function as back-office for decentralized initiatives, they are explicitly empowered to charge the involved administrative cost to the decentralized initiatives.

The agreements on ETS can also be considered a clear victory for the pro-economy coalition. As mentioned before, all actors involved in this debate lobbied for adaptation, the tensions arose mainly about the priorities and parameters. The Green Growth and pro-environment coalitions together stressed the need for short-term adaptations and advocated a Dutch solution rather than EU-wide, because this can be arranged much quicker. Furthermore, the agreement, which stipulates a collaborative lobby towards Brussels, outlines a proposal that mitigates several potentially negative economic effects (free right allocation and compensation for indirect cost, EA, p. 20). While it does reveal a decreasing ceiling, this is by 80-95% in 2050 long term and leaves considerable “maneuvering space” on the mid-term horizon.

Finally, the agreements on conventional power plants can be considered a compromise between clean fossil and pro-environment. The closing of the older coal power plants is certainly an important win for the pro-environment coalition. However, the agreement underlines the need for conventional power plants and compensates the incumbents by a cancellation of the (recently) hard-fought coal tax. It also legitimizes the need for CCS. One could argue about the broader meaning of this agreement, either by arguing it is a precedent for the further phase out or, in contrast, that it is agreed not to phase out more power plants and legitimizes more coal-fired power in the midterm.

6.5 DISCUSSION

Now that the different coalitions and their respective influence on the EA are mapped, in this section the data analysis presented before is related to the conceptual model and propositions introduced in section 6.1.1. To support and enrich the view on the underlying causal processes, relevant data from the actor interviews is integrated in the discussion.

6.5.1 Advocacy coalitions and their influence on policy change

The five advocacy coalitions identified in the context of the Dutch energy policy debate reflect a pattern with broader relevance. Besides the historical pro-economy vs. pro-environment debate, it is shown that in the evolution of the Dutch energy debate, two new “mutations” of these traditional core beliefs emerged. As demonstrated (section 6.2.3), these

Table 6.13 - Analysis of the dominant coalition influencing a specific chapter of the EA.

Chapter	Key agreements	Dominant coalition
2. Ambition	Renewables: 14% 2020, 16% 2023 100 PJ added saving, 1,5% per year 15k jobs	Green Growth & Pro-environment & pro-economy
3. Energy saving - buildings	€600m revolving fund €400m social housing support EPC-label roll-out Enforcement of obligatory measures Consumer information campaign Support for ESCO & new propositions	Green Growth & Pro-environment
3. Energy saving - industry & agro	MEE/MJA3 agreements sustained Voluntary 9PJ added savings for MEE firms 11PJ added savings for Agro, focus on geothermal solutions CHP idling agreed, no measures Heating nets: targeted planning	Pro-economy
4. Renewables support - Offshore wind	Goal 4450 MW '23 Ambition phased to '23 New SDE+ support Targets 40% cost saving Tennet responsible for grid connection Optimizing procedures	Green Growth
4. Renewables support - Onshore wind	6000 MW goal & planning process Local participation options will be standardized & formalized	Green Growth
4. Renewables support - Biomass	New support promised 25 PJ cap Further sharpened sustainability criteria Bio-based (cascading) potential emphasized	Clean fossil, some concessions to Pro-environment
5. Decentralized generation support	1m 2020 goal 7,5 ct/kWh tax exemption for local netting within limited area Experiments with new rating structures continue, will result in legislation Energy suppliers facilitate, but charge costs	Compromise Pro-decentralized & Pro-economy (Min. Finance)
7. ETS	Collective lobby for EU-level sharpening with overall volume reduction & real production based, but also best performing based free rights allocation	Pro-economy
8. Conventional PPs	5x 1980s coal PPs are closed Coal tax cancelled (on condition of closure) Need for conventional PP & CCS need endorsed	Compromise Clean fossil - Pro-environment

two new advocacy coalitions represent new belief systems in the sense that they have new central beliefs. The new dynamic is visible in a specific group of actors and stakeholder bodies representing these coalitions (see 6.2.4). Besides the four core coalitions, another distinguishable new belief system emerges at the flanks of the debate. Despite the lack of a strong and coordinated advocacy coalition supporting this meta-narrative, their narrative does shape the debate (comparable and related to the “prosumer” trend discussed in section 5.5.2). The two traditionally opposing advocacy coalitions (pro-environment vs. pro-economy) in the energy transition debate have been identified earlier (Markard, Suter & Ingold 2016, Ingold, Varone 2011). The contribution of this research is to uncover a typical pattern that can be expected to have broader relevance: the emergence of new advocacy coalitions reflecting different reactions of regime actors to the transition. The broader relevance of this pattern lies in the fact that it relates the proactive and reactive mindset of incumbents, as is demonstrated in the next section.

It is shown that the policy consensus reflected in the EA demonstrates the influence of each coalition. As is shown in section 6.4, the EA in terms of narratives and concrete agreements reflects beliefs of each of the five advocacy coalitions (although the pro-decentralized coalition clearly had less influence than the other four). One could question whether the influence of these advocacy coalitions in the (public) energy debate is the same as policy influence. That the policy, both in terms of narratives and concrete agreements, closely resembles the energy debate is an indicator that there is a clear relationship. It is fair to remark that access to the actual policy (negotiation) process probably mediated the influence. The more limited influence of the pro-decentralized coalition is attributed by several interviewees to their lower degree of organization and more limited participation in the formal negotiations.

The EA as a whole can be characterized as a “mixed bag” in which all of the belief systems are included next to each other. Thus, the EA does not resemble the emergence of a new shared belief, but is more a compromise. This also points to a potential vulnerability, further discussed in section 6.5.3. For now, it is relevant to conclude that the analysis does demonstrate the influence of each of the advocacy coalitions and that, apart from the pro-decentralized coalition, there is a kind of balance in which each of them has significant gains and significant losses compared to their secondary beliefs.

There are good arguments to conclude that the consensus in the EA reflects a power shift towards the “green side.” One could argue that important parts of the EA reflect policies adopted earlier and thus cannot be characterized as a shift. This could be countered with the analysis that also many crucial elements (such as the phasing out of coal power plants, the offshore wind goal, and the local netting for decentralized initiatives) are new. However, a more crucial difference is that now a broad coalition, including the pro-economy and clean

fossil actors, adopt responsibility for bridging the considerable gap between the 2020 targets and the actual progress. In the preceding decade, the policy reflected a continuous struggle in which pro-economy actors were often successful in advocating constraining progressive policies to limit the cost burden (e.g. in the Rutte I period, section 5.2.1). As interviewees revealed, achieving the EA was not an easy process and the outcomes reflect the fragmentation at the “economy side” as well as the growing coalition and influence of the “green side.” This provides insight into why the power shift happened, but also greatly increases the credibility of this explanation.

Fragmentation on the pro-economy and clean fossil side

Crucial in understanding the fragmentation is the difference between sustainability as “an opportunity” in contrast to sustainability as “central towards the road ahead.” It might be rightfully argued that the pro-economy coalition did embrace sustainability up to a certain degree and embraced it as an opportunity to attract investment to accelerate the economy again after the financial crisis. This was, for example, evident in the reports published by VNO-NCW and the SER in the period preceding the EA (see section 6.4.1). These are, however, still interpreted from the dominant thinking-frame and economic model of today. This leads to lack of deeply understanding and embracing the trend. This is evident in the secondary beliefs promoted (e.g. resisting offshore wind as it remains “excessively costly”) and narratives such as that the competitiveness of the Netherlands (read the current industrial ecosystem) should not be comprised by environmental policy. On a more fundamental level this was also demonstrated for the incumbents in section 5.5. The interview data presented here highlights that incumbents interpreted the emerging decarbonization and decentralization trends only superficially and misinterpreted the fundamental shift in cognitive institutions implied in them. Finally, this tension is also demonstrated in the fact that a group of 34 large firms decided to found a new general employers’ organization in 2010: De Groene Zaak. As the following quote illustrates, these firms demand a much more proactive transition and frame it also partly as abandoning the current model:

Q119 And all agree that the Netherlands is proceeding much too slowly in the transition to a sustainable economy. That is why 34 firms, up till now, decided to combine forces. They launched a new employers’ association, De Groene Zaak, which was founded officially today. Van Boxtel has been appointed as chairman. He states: "We will stimulate politics to accelerate the transition to a sustainable society." Bierman of Triodos Bank wonders why the Netherlands does not more eagerly pursue sustainable development. "We know that we can't avoid abandoning fossil fuels. Why should the Netherlands not attempt to be a front runner?" He thinks there are many opportunities in this regard. (10_0036)

This difference is also illustrated in the Greendal case. While VNO-NCW together with SN&M were central coordinators in this new program of minister Verhagen (in 2011), De Groene Zaak publicly discredited this proposal as lacking ambition:

Q120 But Verhagen does not choose fiscal greening, by shifting tax pressure to energy and resources instead of labor. He does not abandon subsidies for fossil fuels. This is the reason why de Groene Zaak, a platform of sustainable entrepreneurs such as Eneco, Athlon Car Lease and Nyenrode, will not sign the Green Deal. (11_0324)

It is argued that one of the key consequences of this more superficial adoption of the trend of sustainability is the active support for optimization-based policy approaches shown before. These policies leave room to contain cost impact on the economy. Although the EA still includes this optimization narrative and only voluntary commitments on behalf of the industry, it does also limit the flexibility of the pro-economy coalition, since they did actively endorse the environmental goals and the rapid upscaling of, for example, wind power. As several interviewees indicated, the negotiation process persuaded them to go further and commit themselves to something they did not conceive upfront.

Q121 But Mr Wientjes (chair VNO-NCW) has had a change of heart in that period. And those are essential things which change the course of events. But in the first phase: one could compare it to making unwilling horses drink. I think, in fact I know for sure: this is power thinking. Mr Wientjes excels in this, which means facing reality. (Interview 12)

Q122 Well, if VNO-NCW would have known what would be included in this agreement and what would happen as result of it, they would have blocked the agreement in the early stages of the process. So yes, do not underestimate the power of VNO-NCW, but this power is also crumbling to a certain extent. (Interview 6)

Especially on the side of the Electricity sector incumbents, the regime is actively disintegrating. As illustrated in section 6.3.2 there are strong tensions between the more reactive and proactive factions within this sub-regime. It was noted during the interviews that this trend also dates back further to the privatization period (Interviews 14 & 17). In this period, most originally Dutch incumbents were in conflict with the government with regard to the separation of DSO activities. Moreover, new entrants, including the foreign incumbents, even founded their own sector organization (VME) to advocate their specific stakes. These dynamics harmed the relational capital between incumbents and the relationships with politicians. As the incumbents and the clean fossil coalition had always been closely related to the pro-economy coalition (also as members of employers' union

VNO-NCW, the key representative of the pro-economy coalition), this damaged the defensive coalition in the broader sense.

Q123 One of the points was the strongly divided electricity sector. The sector was part of VNO-NCW. But this division in the electricity sector provided space to take measures with regard to sustainability that were not automatically aligned with the classic business stake. (Interview 6)

In the following interview quotes, several actors stressed the strong negative influence the fragmentation had on the influence of incumbents in the debate, but especially also in the concrete policy dialogues and negotiations (especially for the EA in 2013).

Q124 This does reduce their influence because diverging views are voiced, which is never beneficial. But I should say that the energy users, both the individual consumer as well as the large firms, do appreciate this development, because they [the energy sector] were always monopolists. (Interview 1)

Q125 This occasionally results in endless wrangling and squabbling. Drafting 26 versions of a letter. This is also why things take so much time in those circles. That is when they can't agree. Mr Alders was negotiating on behalf of the sector. Because of these largely diverging stakes of the different firms, he was forced to continuously consult his constituency to see whether all parties were still engaged. (Interview 2)

But beyond this, the broader fragmentation already visible in the foundation of De Groene Zaak also directly influenced the pro-economy coalitions lobby during the EA negotiations. Several interviewees noted that during the process more proactive industrial companies, key members of VNO-NCW who did not join DGZ, played a crucial role in shifting the power balance:

Q126 The board of VNO, the general members' meeting, consists of a number of large firms and sector associations. The role of Mr Benschop (CEO Shell NL) was important. He clearly stated: guys, you should not delay the process, but go along with the proposals in a nuanced way. (Interview 12)

Q127 Akzo, DSM, Unilever, and their likes have embraced sustainability as a very prominent theme. (..) They have recognized it and smartly pursue the opportunities. This also induced some developments within VNO-NCW. (Interview 6)

Q128 He (Ab van der Touw, CEO Siemens NL) was also the chair of an industry working group. This was one of the four [five, see section 6.4.1] groups in the

negotiation process for the Energy Agreement and he was the chair. In this role and his role within VNO-NCW he was able to set a lot in motion. (Interview 12)

The pattern demonstrated here resonates in recent literature, which has argued that regime fragmentation is a key indicator of transition (Karlton, Sandén 2012). This new empirical material demonstrates the relevance of this phenomenon and (in the next section) provides for more understanding why this pattern emerges.

A new green alliance gaining influence

On the NGO side, a more differentiated and constructive approach contributed to this shift. As is discussed more extensively (including quote) in section 5.4.2, the ENGOs were open to more constructive approaches, partly as a result of leadership changes and partly as result of a longer learning process. This is not to say that they totally abandoned their activist roots, but they opted for a more differentiated approach in which campaigning and negotiating are complementary. The foundation of the G11 platform in which the leading ENGOs started to coordinate their campaigning and advocacy activities strengthened this trend.

On the business side, the Green Growth narrative gained influence and laid the foundation for a new progressive coalition. This is clearly visible in the Electricity sector, with Eneco allying itself with challengers such as DONG and Greenchoice. However, this also happened more widely in the foundation of De Groene Zaak as “competitor” for VNO-NCW and several other “front runner” platforms (such as the Dutch Sustainable Growth Coalition). These processes were – as could be expected - not warmly received by the dominant actors.

Q129 But the environmental movement joined the group at the table. There was fierce debate about whether de Groene Zaak could be considered an employers' organization that should be allowed to join the conversation in the context of the SER. (Interview 6)

It should be noted that these new platforms and organizations indeed also reflect a “non-trivial degree of coordination” explained in the literature as the defining aspect of an advocacy coalition (Markard, Suter & Ingold 2016). Furthermore, this narrative and its influence on firm strategies also influences the internal dynamic in the pro-economy strongholds, as mentioned in the previous section.

Besides, this growing cross-sector coordination between actors of the pro-environment and Green Growth coalitions has also increased their growing influence. For example, it is noted that Green Growth firms have actively coordinated their advocacy for the EA:

Q130 And we (NGOs) are part of a coalition with regard to the Energy Agreement of which Eneco is also a member. The green actors attempt to form a block [a well aligned coalition] and we cooperate with the NVDE in that regard. (Interview 2)

It is also noted that Eneco as front runner had a good connection with the government officials responsible for the sustainability policies with regard to the energy sector:

Q131 I think I had regular contact with them, which means talking to them once every few months and that included Eneco in all cases. (...) Eneco had specific requests for us as well as concrete ideas. This made it interesting for us to exchange knowledge and ideas and to get those from outside into our internal sphere. (Interview 6)

In similar vein, it is noted that (due to the fragmentation) government officials started talking more actively with individual firms in contrast to their stakeholder bodies.

Q132 We noticed within the ministry of Economic Affairs that we started to talk more and more to individual firms to find out their individual views and that they differed considerably (literally: "what does Pete think, what does Jan think and what does Klaas think, eh, their views all differ"). (Interview 6)

The remarkable aspect in the pattern of coalition building documented is that incumbents play a crucial role in it. Previous transition literature has often explicitly or implicitly assumed that challengers (either start-ups or entrants) argued for niche solutions which would eventually replace the current regime and their (incremental) solutions (Geels, Schot 2007, de Haan, Rotmans 2011). The alternative pattern demonstrated here shows a cross-sector coalition of NGOs, incumbents and to a lesser extent challengers. This demonstrates that (proactive) incumbents played a crucial role, as is discussed further in the next sections. Second, it is noted that the pattern of coalition building is not the same as what has been described earlier under the label "boundary spanning actors" (Markard, Suter & Ingold 2016). In fact, the Green Growth coalition found in this data, represents a new advocacy coalition. Eventually, the Green Growth coalition cooperated with the Pro-environment advocacy coalition, but this would not have been possible without the new narrative about the opportunity of a fundamental shift towards sustainability, which is the foundation of the Green Growth coalition.

6.5.2 The incumbents' role and how the advocacy coalitions relate to their mindset

The analysis demonstrates substantial influence of the key incumbents as central actors in the advocacy coalitions. While the clean fossil coalition consists mainly of Electricity sector incumbents, Eneco has a central role in the Green Growth coalition (clear from their number

of contributions in the media as well as the leading role attributed by the interviewees). Therefore, it is fair to attribute the substantial influence of these coalitions of the EA for a significant share to the incumbents. This can be contrasted with a much lower activity of the challengers (new entrants) in the advocacy coalitions and the energy debate. These findings provide an important reason why incumbents deserve to be seriously considered with regard to their impact on sustainability transitions in the way they shape the policy context.

Second, the analysis shows the relationship between the incumbent mindset and its advocacy behavior. This relationship becomes evident by linking the analysis of incumbent behavior as part of the advocacy coalitions in section 6.3 with the mindset analysis presented in chapter 7 (table 6.14 above matches both). Eneco coalitions (as broad, cross-sector) and discourse (Green Growth, opportunity and sustainability oriented) reflect the proactive profile. Their leadership mindset indeed reflects the proactive ideal type. Essent’s coalitions (regime oriented) and discourses (legitimizing coal and pleading for biomass co-firing) represent the reactive behavior profile, while some more (pro)active elements are visible.

Table 6.14 - Matching incumbents’ advocacy behavior with its leadership mindset.

	Essent	Nuon	Eneco
Reflected core beliefs (6.3)	Clean fossil (60%), Green Growth (19%), Pro-economy (15%)	Clean fossil (38%), Green Growth (31%), Pro-economy (13%)	Green Growth (84%), Pro- environment (9%)
Mindset pro-activeness (7.3)	Reactive motives dominate, but combined with some active and proactive approaches to specific matters. The new strategy of RWE announced in 2013 includes important proactive aspects	Combination of reactive and most strongly active motives	Dominant proactive vision with reactive and active elements present

Chapter 7 analyzes its leadership mindset as dominant reactive, but with proactive elements (especially in relation to bio-based economy). As discussed just before, Nuon’s behavior resembles the active profile. This also matches the finding of chapter 7 that Nuon has a reactive-active leadership mindset, but one in which the active element becomes most dominant. It is relevant that during the interviews, Nuon’s “in between” role and its specific relevance was also emphasized.

Q133 Nuon employee: Then it becomes clear that the views of the members of Energie-Nederland on the world differ (almost) fundamentally. This strongly impacts the ability to organize as a collective.

Interviewer: You do have an interesting position. What I mean is that based on newspaper analysis I see on one side Greenchoice and Eneco. And on the other side E.ON, GDF and Essent with rather well-aligned views. But your position seems to be somewhat in between.

Nuon Employee: Yes, that is correct, you made a correct observation. I do think this role fits us as a company. This also induces obligations in the sense that we should be rather careful to legitimize specific proposals. When we take the coal debate as an example. Bluntly, our position is that coal power plants should be phased out, but we also do still operate a coal power plant. This asset still has a value and still has 15 years remaining of technical lifespan. We have said: there are two options for us. Stand-alone coal can't be the future, thus we would like to co-fire a certain amount of biomass. But second, we are also willing to engage with the government about phasing out this power plant. This makes us part of the "coal" side of the debate, but our future clearly resides in gas. Gas is the future of large scale energy generation and in this regard, we find the actors of the opposing side of the spectrum on our side. (Interview 10)

To conclude, the behavioral profiles closely reflect the hypothesized profiles and provide substantial evidence for the assumed relationship with the incumbent's leadership mindset as posited in proposition 8 and further operationalized in table 3.4. The evidence provided in this chapter thus provides further understanding in how actor beliefs, via shared beliefs, result in coalitions, which consequently gain influence on policy. The crucial point here is that understanding on the level of aggregated beliefs, starting from an actor (incumbent's) mindset, resulted in shared core beliefs of an advocacy coalition. These aggregated beliefs determine and explain their behavior on the level of concrete positions (secondary beliefs). Although this analysis is rather complex (see figure 6.5) and requires careful execution, it does uncover a new and enriching layer of understanding on the context creating dynamics within a transition.

Based on this conclusion, it can be hypothesized that the clean fossil and Green Growth coalitions are a broader phenomenon. As shown this pattern closely relates to both the proactiveness of the incumbent's mindset as well as the earlier proposed regime fragmentation dynamic. It can be expected to be found in other sustainability transitions when incumbent strategies diverge. This results in regime fragmentation and reactive and proactive coalitions taking a contrasting stance in the public debate.

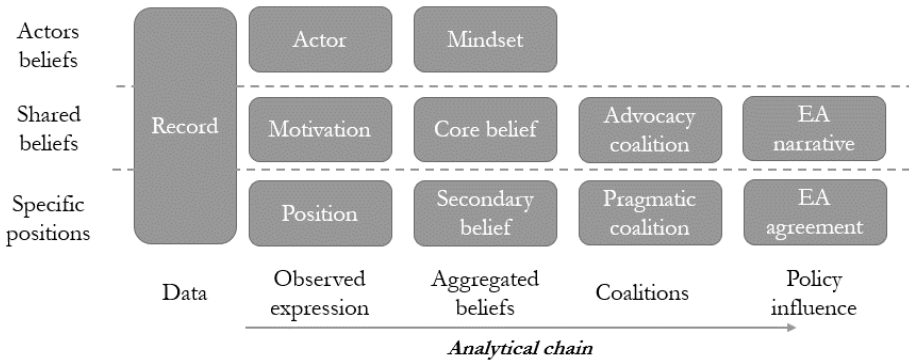


Figure 6.5 - This research relates different levels of beliefs across the analytical chain.

6.5.3 Impact on the transition of the EA

The final question to understand the causal sequence is how the agreement influences the transition as a whole. In the previous sections, it was established how the advocacy behavior of incumbents within broader advocacy coalitions has significantly influenced the Energy Agreement (EA). To be able to link this to the proposition (9) that proactive incumbents have the most (positive) impact on the transition, it should be further investigated how the EA influences and continues to influence the transition towards a decarbonized, renewable energy system.

Drawing on a combination of factual data, reflection on interviews, and information on most recent developments, an evaluation can be made on the relevance of the agreement. It is emphasized that this is still of a rather preliminary nature, considering that the actual implementation is dependent on many developments and happens within the rather turbulent context of an accelerating transition. Because of this preliminary nature (eight) different perspectives of the meaning of the agreement are placed next to each other, before integrating these in the final remarks.

Perspective 1 - A new regime consensus creating stability for the next decade

Without doubt the most shared evaluation of the different actors is the stability the EA brings to energy policy. The agreement is meant to create a stable (policy) context until 2023 and can be considered as a kind of a new regime. The generally positive appraisal in this respect is understandable, considering the shared desire for more stability discussed in section 5.4.1. Apart from some actors who state that the agreement leaves the more radical questions unaddressed (discussed later), it is also possible that especially the 2017 elections might undermine the agreement. Several actors mentioned that politicians in general have a lower commitment towards the EA, because of their limited involvement and they might be

tempted to adopt policy changes as part of a new government agreement. Considering the interconnected nature of this compromise agreement, this might undermine the broader support for the agreement.

Q134 And that there was a clear priority for all parties, apart from the other specific points included in it: stability, broad support and a certain degree of consistency and clarity on the impact of the energy policy and achieving the included goals. Bottom line; this was extremely important for all parties, besides the specific agreements included. (Interview 1)

Q135 The agreement itself has stability and thus has also created a certain level of stability. However, we increasingly see politics crumbling aspects of the agreement in every possible way. (Interview 14)

Perspective 2 - A substantial factual leap forward for the electricity sector

Reflecting on the more factual side – the projected impact of the concrete agreements – the agreement is a substantial leap forward for the electricity sector in its adoption of renewable energy. The central goal to realize 14% renewable energy by 2020 is in fact is predominantly realized by scaling renewable electricity (in contrast to the gas-dependent heating segment or the oil-dependent mobility & logistics segment). Therefore, the agreement translates into 35-40% renewable electricity by 2020. By scaling wind and solar power, 85% of the projected growth of renewable energy until 2020 (vs. 2013) will be realized (based on the latest NEV projection, see table 6.15 below). The share of biomass (including non-co-firing) in the renewable energy mix consequently will decline from 49% to 26%. Thus, renewable energy in 2020 will be far from marginal anymore. Building on earlier transition research one might speculate that growth to such a level means a tipping point in the sense that it induces broader institutional change and enables a “sustainable” pivot to renewables as dominant technology (Rotmans, Kemp & Van Asselt 2001, Geels 2005).

Perspective 3 - Still far from decarbonized

Even with the considerable scaling of renewable electricity, the sector and certainly the Dutch economic system at large is far from decarbonized. Projections currently show that the current policy mix undershoots the general policy goals of -20% GHGs by 2020, with 18% reduction now projected in the same projection (2015). It is also important to underline in this respect that the current reduction is mainly realized in other GHGs (such as CH₄ & NO₂). CO₂ emissions only decline by 5% according to this projection. While the dynamic in mobility (due to its oil dependence) is more adverse, industry and energy (including electricity generation) is also only on a marginal decline track. If, specifically, the electricity

Table 6.15 - Projected electricity source mix incl. the effect of EA '13 (source: ECN et al. 2015).

(PJ left, % change vs. 2013 right)	2013	2020	2023	2020	2023
Total	363,1	383,7	473,0	6%	30%
Natural Gas	194,5	111,9	136,9	-42%	-30%
Central	108,4	50,5	69,8	-53%	-36%
Decentralized	86,1	61,4	67,0	-29%	-22%
Coal	88,4	98,4	105,4	11%	19%
Other fossil	14,8	18,6	19,9	26%	34%
Nuclear	10,4	15,1	15,1	45%	45%
Renewable	43,9	135,1	191,1	208%	335%
Wind	20,3	82,2	124,3	305%	512%
Solar	1,8	17,4	27,8	867%	1444%
Hydro	0,4	0,4	0,4	0%	0%
Biomass	21,4	35,2	38,5	64%	80%
Other	11,1	4,7	4,6	-58%	-59%
International trade					
Net import²	65,7	37,7	-48,1	-43%	-173%
Import	119,7	134,1	87,3	12%	-27%
Export	54,1	96,4	135,3	78%	150%
Share of renewables in electricity	12%	35%	40%		
Share of renewables overall	4,8%	11,9%	15,7%		

sector is regarded, besides the growth of renewables the most polluting fuel – coal – also increases (table 6.16). This is even the case considering the agreed phase out of the 1980s coal power plants as part of the agreement (which produces a 14,8 ktonnes CO₂ reduction, PBL, ECN 2013). Therefore, even with 35-40% renewables, the transition is far from completed. In fact, as noted in section 5.4.3 considering the current system lay-out, a point will be approached where adding more renewables will not be possible, in view of the current technical system restrictions. To grow beyond that point, radical technological (e.g. storage) and/or business model innovations (e.g. demand & flexibility management) are needed first. Furthermore, the growth of coal power against the decarbonization trend confirms the adverse nature of the late 2000 conventional asset investment decision, as well as the global market-price dependence of the transition.

Table 6.16 - Projection of GHG emissions of the Dutch economy at large including EA '13 effects (source ECN et al. 2015).

	1990	2013	2020	2013	2020
CO ₂	160,5	166,2	152,4	4%	-5%
Other GHG	59,0	29,6	28,5	-50%	-52%
Total	219,5	195,8	180,9	-11%	-18%
CO₂ / Sector					
CO ₂ Industry & energy	94,0	91,7	86,8	-2%	-8%
CO ₂ Mobility & logistics	30,8	36,2	34,6	18%	12%
CO ₂ Agriculture	7,8	7,3	6,2	-6%	-21%
CO ₂ Buildings	28,0	31,1	24,8	11%	-11%

Perspective 4 - A precedent for phase out of conventional generation

Especially the agreement on closing the older coal power plants and limiting biomass can function as precedent for phasing out more assets. With this agreement, this option is legitimized and this might act as a precedent for further phase out. Considering that “phase out” is one of the hardest parts of the transition, this is of key relevance. The most recent dynamics provide evidence that this is indeed the case, as there is now an official working group (including incumbent actors and other stakeholders) investigating further phase out of coal power plants. The minister publicly mentioned phasing out the two 1990s coal power plants as an option (Postma 2016). An important trigger for this debate was the court ruling in the Urgenda case. The ENGO Urgenda filed a case against the Dutch government in which the central argument was that the Dutch government neglected its responsibility with a lack of sufficiently progressive climate change policies, knowing the scientific consensus on negative climate change consequences. To the surprise of many, the court ruled positively on this charge. While the Dutch government does appeal to the higher court, they also concurrently started processes to identify which options are available to increase the speed of decarbonization. In fact, the phase out of coal power plants is the measure with the best cost-benefit balance according to several recent publications (CE Delft 2016, Ministerie van Financien 2016). As a NGO representative asserts in the quote below, this development enables the debate to argue for more progress:

Q136 We have an agreement, the EA. When new developments emerge - as was the case - the question becomes how can we still achieve the agreed goals given these new developments? (...) At the same time the Urgenda-verdict played a role. The Urgenda-verdict is an external effect outside of the EA, which, however, gives us

the opportunity to make some additional progress. Of course, we do not resist the option to do more. Thus, in the tension with regard to coal and biomass our position has always been that the EA remains intact. However, we should always be open for new developments. (Interview 12)

It is relevant that this dynamic also surfaces in the continuing struggle. Representatives of the incumbents maintained that their understanding of the agreement is that the newer coal power plants will remain running at least until the end of the EA time horizon. As the quote below also illustrates, their discursive position is rather weak at the moment and it is argued that this precedent contributes to this dynamic as well.

Q137 Yes, that has led to considerable chagrin. That was: guys, this was not what we had agreed. But you notice that the position of the energy sector is weak with regard to coal power. At that moment, it was not a realistic option to say: if you evade the agreements, we will not comply with the EA either. For the energy sector, that is an unimaginable step. That would simply result in more damage than gain. (Interview 8)

Perspective 5 - Only limited progress for the emerging decentralized generation niche segment

Considering the facilitation of the bottom-up movement, the EA is at best a “mixed deal.” It does provide some room for new local netting projects, however, the growth is also constrained by spatial limits and has “only” a partial tax exemption. No clear evidence was found that this was due to active opposition from the incumbents. Interviewees instead point at active institutional opposition from the ministry of Finance, a lack of interest by the core regime actors, as well as a lack of representation of the bottom-up actors (see section 6.4.4).

Perspective 6 - Not addressing many fundamental questions

While not negating the relevance of agreed matters, many other issues still remain open. This includes many matters outside the Electricity sector, but also many matters within the sector. Outside the sector both in the heat (gas) as well as the mobility segments, the development and implementation of solutions is much less progressed than in the Electricity sector, which also results in less far-reaching agreements in these respects. Within the sector several issues are to be addressed. Important ones are the integration of decentralized generation (see before), new market mechanisms allowing for more dynamic matching of supply and demand, the lack of a positive business case in the industrial segment (due to low energy prices there), as well as the lack of effectiveness of the certificate empowered green current concept in the retail market.

Perspective 7 - A first step towards a change of hegemonic discourse

The agreement does provide central legitimacy for realizing the environmental goals and embraces “Green Growth” as its central frame. As discussed in section 6.5.2, the EA reflects a relative growth of the discursive strength of the “green coalition” in which the emergence of the Green Growth narrative plays a crucial role. The EA can be interpreted as structuration of this discourse within the regime and even a change of “hegemonic” discourse (Hajer 1995, den Besten, Arts & Verkooijen 2014). As was noted, the EA also blends in the narratives of the other advocacy coalitions (see section 6.4.3) and it is therefore too early to speak either about a new “shared vision” or a clear hegemonic dominance of the Green Growth discourse.

Perspective 8 - A continuing struggle to be expected

The agreement represents the fragile balance between the reactive (pro-economy, clean fossil) and proactive (Green Growth, pro-environment) coalitions in the discourse. The clean fossil (reactive) narrative still has a powerful ally in the pro-economy coalition. In fact, the actual stability of this agreement and the post-2023 agreements probably depend on the evolution of this alliance. Economic opportunities (Green Growth) and sustained low energy cost might fundamentally shift the interest of the pro-economy coalition towards the proactive stance. Also, the strategy changes and restructuring within the incumbents’ group empowers a potentially fundamental shift of balance (see chapter 7 for more discussion). This, however, remains to be seen. There are several other dynamics which are likely to create new struggles and potentially disrupt the stability of the supporting coalition. Among them is the forced phase out of newer coal power plants, as discussed just before. Also, the unaddressed questions mentioned before provide potential for new struggles as, for example decentralized generation fundamentally cannibalizes the incumbent business and they struggle with implementing radical new business models (see chapter 7). Finally, from a high-level perspective, the detachment of the current EA from the underlying issue (decarbonization was not represented directly in the goals of the EA), as well as the fact that in 2020 only the first 5% of the decarbonization will be completed, is argued to represent a substantial disruptive risk. As a result of unexpected landscape events (e.g. climate-related droughts inducing new refugee streams) a sudden window for further acceleration might emerge.

Integrating the perspectives

Integrating the different perspectives confirms the EA as a significant step forward, but also the fragile balance and unaddressed questions left open. It is argued that the EA certainly contributes to the sustainability transition because it provides for (some) stability, facilitates a scaling of renewables to 30-40% of the overall solution mix, and functions as a precedent for phasing out the conventional generation assets. While the EA includes many agreements

that are rooted in earlier agreements, there are also several strong new agreements (e.g. phasing out the coal PPs, the offshore wind goal, and the local netting tax reduction). However, the coalition stability is still fragile; the EA does not represent an alignment towards a shared vision. Many fundamental issues (especially outside the Electricity sector) also remain unaddressed, but it can be remarked that the agreement does not block answers to these questions, but mainly leaves them open.

Counterfactual I: would other policy modes have had more impact?

Even if it is concluded that the EA from several perspectives means progress for the transition, one could ask whether other ways of developing policy would not have resulted in more impact. What would have happened if there would have been no agreement at all, or if the government unilaterally defined policy? This is something on which several interviewees also reflected and it points to a relevant alternative policy mode to be considered.

Evaluating the counterfactuals to the EA as policy mode, it is argued that especially a breakthrough coalition could be a relevant alternative scenario. As also the interviewees pointed out, one dimension that could varied is which actors to involve. Some noted, for example, that the broadness of the coalition logically resulted in a compromise such as this. As discussed earlier, the current agreement is a rather broad coalition which involved regime actors as well as challengers. One could ask what would be the result if a smaller subset of either predominantly regime or front runner actors negotiated the policy agreement.

Q138 Look, this has been conceived from the system. (..) And this means that in all these polder variants [referring to the Dutch polder model, characterized by its compromises] all the really ground-breaking things, which hurt, have been removed. Transition, however, should hurt. (Interview 11)

Another feature of the policy mode that could be varied is the degree of agreement. As analyzed before, the current agreement is a compromise with regard to the narrative as well as the concrete agreements. This led some interviewees to pose the question whether either leaving the transition more open (creating a free space), or in contrast creating a more shared vision (either by actor alignment or by government directive) would provide for better results.

Q139 I think the EA eventually will have done a lot of damage to the energy transition. The pain lies in the fact that the EA is one big compromise to keep the coal power plants running. (..) The real issues in the Netherlands have not been solved by the EA. And what I mean: why an EA? The ministry of Economic Affairs should carry out its vision. They should point out the direction of development, the

goals to be achieved. This agreement has been initiated because of despair existing in companies. (Interview 16)

Considering the axis of degree of agreement, it is argued that there are no indications that more or less agreement would lead to better results. Without doubt, the shared vision scenario sounds attractive. However, considering the large differences in stakes as well as in cognitive models (mindsets/core beliefs), this seems a bridge too far at the moment. Also, the political will and ability to adopt more radical policies proved to be closely related to the appetite for change within the regime at large. Therefore, when no real vision shift happens in a larger part of the regime, then today directive government policy (in the context of the Dutch political culture, see also 5.4.1) is not likely to be more progressive than the scenario embodied in the EA. Some argue that in a “free space” scenario there would be more room for challengers and front runners to differentiate themselves and adopt more radical approaches. There are no indications at the moment, however, that the agreement in any way thwarts accelerating niches. On the contrary, although with limitations, the EA does support the emerging, and potentially disruptive, decentralized generation niche. While more progressive support (such as the German feed-in scheme) could be imagined, it is questionable whether this is the counterfactual to the currently adopted approach (no fiscal support seems more realistic than a more progressive approach). This does not negate the fact that current institutions (regulative and broader) do limit the growth of radical new business models. However, it is exactly this institutional change which also requires some institutional leverage. Therefore, if no energy and attention is spent to arrive at a certain level of agreement, these institutions are most likely to persist.

With regard to actor constellation, a front runner agreement might potentially result in more progressive policy approaches. If the constellation is limited to only the regime side, the agreement is likely to be more reactive (e.g. consider the position of Energie-NL as key regime representative). This points to the relevance of the actor constellation. An alternative in the form of a front runner agreement is also imaginable. In such an agreement, a subset of regime front runners and challengers outlines a progressive approach. This is likely to lead to a much more progressive approach (e.g. consider the DGZ quote in section 6.5.1 as example). This approach could lead to more progressive results in case they are able to reach sufficient power and legitimacy to arrive at a tipping point in which more radical policy changes could be made (e.g. a broader phase out or change of the market model). While the reality of such a scenario is far from certain, it is argued that this is indeed a relevant scenario to consider. As the ENGO-Eneco-industrial front runner coalition (see 6.5.2) already provided for the progressive elements in the EA, potentially with some more leverage a more radical agreement would be possible. From this perspective, the restructuring of E.ON and RWE is also relevant, because this shifts the stake of the most credible part of their business

towards a more proactive approach. In other words, the company which retains the conventional assets has lost a part of its legitimacy and power, while the new, renewables-focused company can join the progressive coalition.

Even considering the previous argument on the potential of a front runner coalition, the EA remains a substantial step ahead in comparison to most alternatives. As argued, the support for upscaling renewables, a precedent in terms of phase out, and the limited support for the emerging decentralized niche contribute in a relevant way to accelerating the transition. Alternative policy modes are only likely to result in more progressive policies if the underlying visions of actors also substantially shift, or a front runner coalition emerges. Moreover, more incremental policies as a result of retained regime influence are equally likely (or even more likely) alternatives.

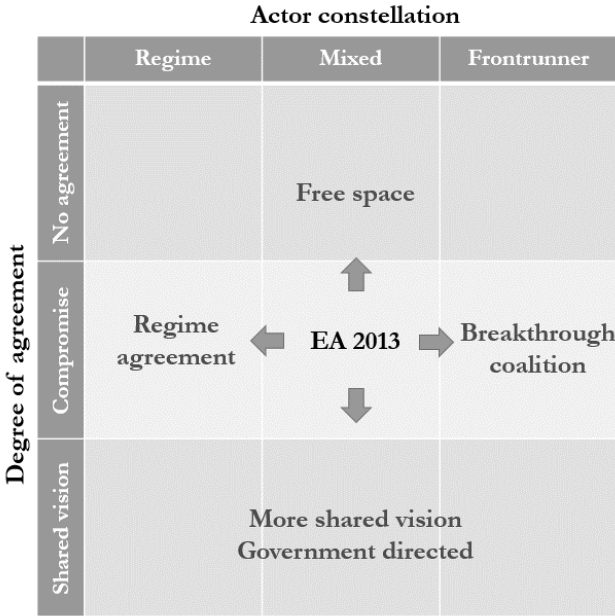


Figure 6.6 - Counter factual scenarios to the EA as policy mode.

6.5.4 Proactive incumbent behavior vs. impact

Now that it has been argued that the EA can be seen as a positive impact on the transition, the question remains whether Eneco’s proactive behavior has had a significant positive impact on the transition. As also formulated in proposition 9, a key to evaluating complex transition developments – especially when they are contemporary – is asking what the alternative scenarios would be. The key question is: would outcomes be different if Eneco

(and the mentioned proactive industrial actors) would not have embraced this proactive mindset and taken active part in the Green Growth advocacy coalition?

Counterfactual II: without proactive incumbents

The analysis presented in the chapter clearly reveals that Eneco and other firms (such as Akzo, Shell, DSM and Siemens), part of the Green Growth coalition, played a crucial role in shifting the overall power balance. In the counterfactual that only pro-environment NGOs advocated progressive change, the outcomes would have been expected to be (far) less progressive. It is stressed that Eneco especially played a central role in positioning the Green Growth coalition, with by far the largest number of contributions in the energy debate. Furthermore, as presented evidence in section 6.5.1 indicated, Eneco also played an important role behind the scenes in linking with NGO and government actors. From still another angle, one could note that the challengers, both within the Green Growth coalition (such as DONG and Greenchoice), as well as the pro-decentralized advocacy coalition, were far less impactful and central to the observed dynamic.

6.6 CONCLUSION

6.6.1 Conclusions

This research demonstrates that proactive incumbent behavior (of Eneco) as central actor in an advocacy coalition (Green Growth) has contributed significantly to the progressive aspects in the policy change of the EA. To do so, it first demonstrated that the dynamic in the energy policy debate can be understood as determined by five advocacy coalitions. Next, it is shown that four of the five (pro-decentralized to a lesser degree) each have strongly influenced the changing policy consensus reflected in the 2013 Energy Agreement, which is meant to be the central policy for the next decade. Furthermore, it is shown, supported by reflection of actors from the interviews, that the current situation with the five coalitions and their influence on policy reflects both regime fragmentation as well as active coalition building. As such, the resulting change in policy consensus can be understood as the consequence of a power shift resulting from the increased relative influence of the combination of the pro-environment & Green Growth advocacy coalitions. Finally, it is shown that Eneco has played a crucial role in the Green Growth coalition and the collaboration with the Pro-environment coalition in the public debate as well as in the coordination behind the scenes.

Second, it is demonstrated that the advocacy coalitions present in this case are in fact a typical pattern with wider relevance because of their relationship with the incumbent

mindset (ideal types). It is shown that the emergence of the Green Growth and Clean Fossil advocacy coalitions can be understood as resulting from proactive and reactive reactions of incumbents to the transition. These coalitions are coordinated by key incumbents and their discursive behavior closely links to the central beliefs of the reactive and proactive mindset. It can thus be concluded that similar patterns can be expected in other cases and it furthermore supports the proposed relationship between incumbent mindset and (context creating) behavior proposed in proposition 8.

Third, an analysis of the potential impact of the EA supports the considerable positive impact of the proactive behavior of Eneco. With the help of the actor perspectives, a discussion of the potential impact and relevant counterfactual scenarios is presented. From this analysis, it is argued that in the counterfactual scenario of no proactive behavior by incumbents, the resulting policy consensus is likely to have been much less progressive. Furthermore, it is concluded that although one could think of other policy process modes with potentially more impact (especially front runner coalition based), the EA does represent a significant step forward in stimulating transition. It is also shown that due to a lack of shared vision and remaining tensions (between the advocacy coalitions), the policy consensus remains fragile and thus further coalition building and discursive struggles will still be determining. Integrating these conclusions provides significant evidence for the positive long-term impact of proactive incumbent behavior (proposition 9).

6.6.2 Limitations

The limited time frame captured in the media analysis makes the conclusions on the emergence of the coalitions, and how this resulted in a power shift leading to policy change, preliminary. Within the Advocacy Coalition Framework literature, it is a key assumption that shifts in advocacy coalitions should be captured over a longer period of time (Markard, Suter & Ingold 2016, Sabatier 1988). This does not diminish the advocacy coalitions found, and their respective influence on policy as well as the role of the incumbents in them. But with respect to the power shift, this analysis is based on the reflections of interviewees and only partly directly supported from the media analysis. Considering the documented tensions between proactive and reactive viewpoints, it is most likely that without the emergence of the proactive (Green Growth) advocacy coalition, the policy development would have been less progressive and the remarks of interviewees support this analysis.

It is argued that the partly speculative projection on the impact of the EA does not negate its relevance. It has been attempted to arrive at a transparent and sound argument rooted in the available data and the perspective of knowledgeable actors. Furthermore, the analysis and preliminary conclusions were also validated with informants. This issue is less applicable to historical investigations. However, the current sustainability transitions are partly

unprecedented in terms of affecting the core of the current economic system and its society-wide institutional roots, which confirms the need to study these transitions in action. Therefore, it was chosen not to leave the question of impact unaddressed, but apply the careful and transparent approach mentioned before.

With regard to generalizability it is relevant that in other sectors the analysis of the public debate is not necessarily so enlightening. Because the dynamic in the Electricity sector resonates in the theory of proactive and reactive incumbent mindsets, it was argued that the conclusions have broader relevance. There is, however, one specificity of the sector to be considered when generalizing. The analysis method used builds on participation in the public debate (based on media analysis). In this sector, it was found that the discursive struggles in the public debate are representative for what happens behind the scenes in formal negotiations. It is assumed, however, that the policy debate is not public in each sector to such a large degree, and other methods might be needed to capture the actual dynamics.

6.6.3 Further research

The relevant findings call for replication of the method in other cases. Although analysis of the policy process has been done before, the focus on the role of incumbents and the relationship to their mindset results in many new insights. It is argued that this deserves replication in other cases of transition policy processes in which proactive and reactive incumbents play a crucial role. This requires attention for the limitation mentioned just before, that not in each sector is media analysis suited to fully reveal the underlying dynamic. Complementary data sources and methods might be needed.

Further study of the evolution of the Dutch energy policy and comparison with other modes of policy process remains relevant. Considering the fragile balance documented, the actual development of policy and implementation in the Dutch case can provide more insight into whether the pursued policy stability and impact is actually achieved. Moreover, there are relevant other policy modes (see 6.5.3) to be considered and compared with the broad multi-stakeholder agreement applied in this case. One can consider whether other approaches such as a policy unilaterally determined by the government or a free space/laissez-faire policy scenario could result in more or less impact. It is also possible that the (theoretically relevant) scenario of a front runner coalition determining policy (in contrast to the broad coalition of the EA) is relevant to consider. Can cases which fit that approach be found and how do they compare to this case in terms of impact?

6.6.4 Implications

Incumbent executives

For proactive incumbent executives, this analysis confirms the relevance of building a proactive coalition to create the context for their strategies. Considering the impact of government policies on transitions (see chapter 5), this chapter adds perspective on how incumbent executives can contribute to progressive policy development. The analysis documents the relevance of both coalition building as well as vision development (developing and spreading new core beliefs and narratives). As this case demonstrates, proactive incumbents had a crucial role in advocating the more progressive elements of the EA, but this was preceded by a process in which a new Green Growth advocacy coalition was developed. In the development, both the development of the new narrative, as well as recruiting supporters across the value chain (both the Electricity sector and their key customers) were important. The cross-sector collaboration with the NGO-led Pro-environment advocacy coalition was also important in accumulating sufficient power to strongly influence the discursive struggle.

Policy makers and other stakeholders

First, the analysis reveals that attention is required to both protect the stability of the agreement as well as address the unaddressed issues. The current consensus can be considered fragile because there is no shared vision on which outcome to prioritize, when the outcomes in practice lag behind the aspired goals. While the EA focuses mostly on renewables targets, a lack of linkage with CO₂ reduction outcomes is a key risk for its stability. Furthermore, many issues such as more flexible pricing mechanisms within the Electricity market, as well as many issues outside the sector (e.g. considering gas/heating & mobility) require attention. Considering the current overcapacity on the market (see section 5.3), as well as the potential gap with CO₂ targets, continuing the phase out discussion is also crucial.

Second, policy makers are advised to consider a more central role to front runners in the policy process. In the case of the EA, the key representative of the Green Growth advocacy coalition (DGZ) was not part of the central negotiation committee. Moreover, in the discussion it was highlighted that a front runner driven or breakthrough coalition-based policy is a relevant alternative to the broad coalition underlying the EA.

Chapter 7 Escaping pilot paralysis – incumbents’ innovation portfolios in relation to pro-activeness

Co-author Dr. K. Dittrich

7.1 FOCUS AND METHOD

7.1.1 Relevance and context

The energy transition as one of the major sustainability transitions of this time represents a huge innovation challenge for incumbents in the electricity sector. Because the energy sector represents approximately 2/3 of the anthropogenic GHG emissions, a major effort is required from the sector to mitigate climate change (IEA 2015a). According to the IEA, increasing investment in renewable energy technologies in the power sector from \$270 billion in 2014 to \$400 billion in 2030 is crucial to meet the Paris agreement (IEA 2015a). In the Dutch situation as part of the 2013 Energy Agreement it was decided to triple the amount of renewable electricity in the limited period until 2020 (ECN et al. 2015). Considering that renewable electricity at that moment will represent 35-40% of the sector’s power generation base, a few critical tipping points will have been past. Both the scope and pace of the change make it a challenge of the highest degree for incumbents. As transition literature has documented, transitions represent not only a technological challenge, but require radical institutional change at the same time (Markard, Raven & Truffer 2012, Geels 2005). As the two previous chapters have documented, incumbents in that regard function in a highly turbulent contextual dynamic. But even beyond the challenges to manage technological change and contextual uncertainty, incumbents also need to reinvent their business model at the same time (Richter 2013, Richter 2012, Schleicher-Tappeser 2012).

Whether incumbents can overcome path dependency in this challenging dynamic remains a highly controversial matter. That incumbents struggle in the face of radical change and might not even survive the process, has been documented before in the context of technological change (Cooper, Schendel 1976, Tushman, Anderson 1986, Henderson, Clark 1990, Christensen 1993, Leonard-Barton 1992, Chandy, Tellis 1998). In the context of sustainability transitions, more recent research shows that incumbents also struggle with sustainability related change efforts (Bain & Company 2016). In fact, a recent survey strikingly termed the status quo with regard to sustainability innovation as “pilot paralysis,” highlighting the lack of scalability of many initiatives (Lacy et al. 2013). In contrast, other cases have been noted in which incumbents were successful and were able to leverage their assets and capabilities to speed up change (Chandy, Tellis 2000, Chandler 1990, Teece 1986, Srivastava, Shervani & Fahey 1998, Danneels 2004, Hockerts 2010). Building on the

structured method developed in chapter 3, this research utilizes a structured method to map incumbents' innovation portfolios with regard to scale and radicalness. This makes it possible to investigate whether incumbents suffer from optimization bias or pilot paralysis (see section 3.4). A further contribution is that this allows systematically mapping the innovation behavior on relevant antecedents and outcomes.

The presented case of the Dutch electricity sector provides a good basis to increase insight into the relevance of incumbent's innovation behavior. In this sector three relatively comparable incumbents are following distinct strategies. This thesis develops the line of thought that the mindset of the leadership of incumbents, and how this translates into different strategies, is responsible for these differences. This proposition builds on earlier CSR literature, which assumes four ideal type of CSR strategies of incumbents, varying from inactive to proactive (Maon, Lindgreen & Swaen 2010, Valente 2012, Van Marrewijk, Werre 2003). Especially the proactive ideal type, which assumes a future-oriented, sustainability-centered strategy is highly relevant in this respect. Empirical evidence in this respect is, however, lacking (Hart, Dowell 2011). One substantial contribution of this case study is to provide evidence that it is possible for an incumbent to follow a proactive strategy and that this also results in rather desirable outcomes.

7.1.2 Research focus linked to the propositions

Central in this chapter is innovation behavior of incumbents in the context of sustainability transitions. In line with proposition 7a & b (developed in chapter 3), the focus is on two key challenges of incumbents in transition. The first is the challenge to prevent lock-in, induced by investing mainly in incremental innovations. The second is the challenge to cross the "valley of death" by scaling innovations beyond the pilot stage. By mapping and analyzing the innovation portfolios of incumbents, specifically with regard to radicalness and scale, the degree to which incumbents are able to deal with the challenges is made apparent.

Proposition 7a: A proactive mindset leads to relatively less incremental innovation.

Proposition 7b: A proactive mindset leads to relatively more innovations of intermediate and radical (highest) level of radicalness, as well as a higher average scale for these innovations.

A second focus is how the incumbent's leadership mindset functions as antecedent of the innovation behavior. As argued in the same proposition (7), incumbents with a proactive mindset are likely to be willing to take more risk in showing leadership in overcoming the two challenges mentioned. This translates into fewer incremental innovations (7a) and a radicalness and average scale of their innovation portfolios (7b). Therefore, the mindset of the leadership of the incumbents is structurally mapped and analyzed upon its pro-

activeness. By comparing incumbents with different degrees of pro-activeness the differential impact upon innovation is considered.

Proposition 12: The incumbent's capabilities and strategic position moderate the relationship between a proactive mindset and innovation and context creating behavior.

Furthermore, it is considered whether the incumbents' current position moderates the execution of their strategies. This includes an important rival explanation provided by literature. The literature on incumbents in general (Henderson 1993, Leonard-Barton 1992, Christensen, Bower 1996, Abernathy, Clark 1985) and specifically also the transition literature (Geels, Schot 2007, Avadikyan, Llerena 2010, Safarzyńska, Frenken & Van Den Bergh 2012) have outlined the path dependency argument: due to the sunk investments in assets of the current socio-technical system, they struggle to successfully develop more radical innovations and business models. Nuancing this, others have pointed out that different positions in terms of complementary assets greatly influence the incumbents' ability to embrace radical innovation (Tripsas 1997, Danneels 2004, Farla, Alkemade & Suurs 2010, Avadikyan, Llerena 2010). As concluded in proposition 12, therefore, the incumbents' position can be considered a moderator of the ability of incumbents to execute a proactive vision and strategy. The capabilities of the incumbent as another potential set of moderating variables identified in the theoretical model were excluded for this empirical analysis. While the potential relevance of this set of variables was acknowledged in chapter 3, it is argued that that position is especially relevant to participate in the current debate on incumbents' relevance. Incumbents are mainly seen as locked-in by their current asset base. Besides, the gathering of sufficient, reliable data would require a data gathering method with more access to internal processes and dynamics of incumbents.

Proposition 9: Proactive innovation and context creating behavior increases the impact of the incumbent's behavior on the transition in the long run.

Proposition 10: Proactive innovation and context creating behavior increases the survival chance and future competitive advantage of an incumbent's behavior, especially from a long-term perspective.

Finally, the outcomes of the innovation behavior both on transition (system) level and firm level was investigated. As is proposed in propositions 9 and 10, proactive innovation behavior is most likely to translate into superior impact (environmental performance) and corporate sustainability (financial performance) in the long term. Because currently only the intermediate (midterm) outcomes can be judged, as the studied transition is still in an intermediate stage, the conclusions in this respect are considered preliminary.

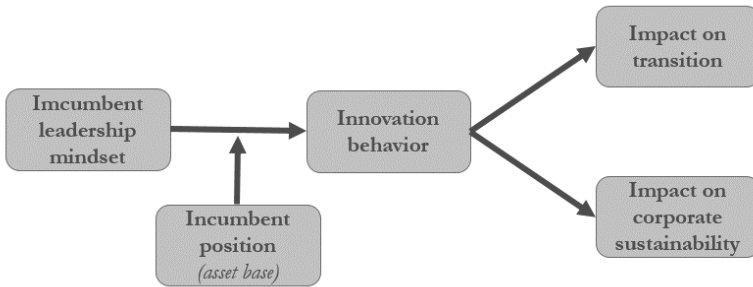


Figure 7.1 - Conceptual model used for analysis.

7.1.3 Link to theory and literature

The CR literature provides a theoretical framework to understand how the incumbent’s leadership mindset influences its behavior and the outcomes. Chapter 2 extensively discussed this important school in the CR literature; it studied the pro-activeness of firms with regard to societal issues. This has resulted in frameworks for categorizing motivations and behavior of firms and especially emphasized that pro-activeness in many cases is a good predictor of positive financial outcomes. These frameworks help to understand the complexity and diversity of incumbents’ strategies and behavior, building on the assumption that the firm’s mindset provides congruence in the firms’ behavior. However, only limited empirical insight into the proactive ideal type – as second stage beyond compliance - was developed. As discussed in chapter 2, causes for this gap are the focus of earlier literature on the transition from compliance (reactive) to voluntary (active) strategies, as well as a rather static operationalization. The contribution of this thesis is to improve the operationalization and provide evidence for the relevance of the proactive ideal type.

Linking the conceptualization to the innovation literature provides a robust operationalization focusing on the difference between incremental and radical innovation. Innovation literature has built up a considerable body of knowledge about why some firms are more successful than others in developing innovations. An important part of the incumbents’ response to transitions on the operational level is an accumulation of innovations (next to its context creating behavior). The innovation literature – which was also the place where the theoretical concept of incumbent was significantly elaborated - points at the relevance of the difference between incremental and radical innovation (Henderson 1993, Leonard-Barton 1992, Christensen, Bower 1996). Chapter 3 (Introduction) elaborated how this distinction can help to improve the operationalization of incumbents and potentially help to create clarity in the controversial debate on the incumbent role. A contribution of this chapter is to provide an empirical illustration of the application

of the model, as developed in chapter 3, which contextualizes this incumbent innovation literature in the context of sustainability transitions. A central proposition in this respect is that incumbents with a proactive mindset are more likely to embrace and scale radical innovation (proposition 7). This also links the discussion to the transition literature, which has illustrated that transitions are characterized by radical technological and institutional change and in general showed the lack of ability of incumbents (as part of the regime) to contribute to this change (Geels, Schot 2007, Avadikyan, Llerena 2010, Safarzyńska, Frenken & Van Den Bergh 2012). This chapter aims to provide evidence for proposition 7, which maintains that incumbents are not necessarily doomed to fail in the face of a sustainability transition, but their mindset induces significant differences in both their behavior and outcomes. Therefore, this chapter responds to the call within the transition literature to provide more insight into actor level processes (Markard, Raven & Truffer 2012, Farla et al. 2012).

7.1.4 Methodological approach

Comparing Eneco, Essent, and Nuon in the Dutch context provides a critical case to further understand proactive behavior of incumbents in sustainability transitions. In section 4.4 this thesis elaborated on theoretical case selection, which provided external validity because of its link with earlier developed theories. The selected case is critical in the sense that the three studied incumbents provide a good starting point to shed more light on the relevance of proactive strategies of incumbents (Yin 2008). Because the three incumbents share the same context, but differ significantly in terms of pro-activeness of their mindset (as is shown in section 7.3), the firm-specific effects of mindset and position can be analyzed. As elaborated in chapters 2 and 3, this provides much-needed empirical validation of the currently mainly theoretical, proactive ideal type.

The analysis builds on firm level reporting, supplemented with additional document analysis and interview data. As section 4.6.2 detailed, in total 109 firm level reports were analyzed, which included the corporate annual and sustainability reports of the three incumbents and their parent companies (as far as they reported on their subsidiaries and the Dutch context). Data on mindset, position, innovations, and outcomes was systematically extracted, enabled by the descriptive coding framework described in section 4.8. This provided for a rich dataset on each of these variables. It is, however, relevant to note that for the last two years (2013 and 2014) the available data for Essent and Nuon was less comprehensive than before, while national level reporting was reduced as a result of centralization. To account for this effect, especially for crucial quantitative analyses, the data over the period 2010-2012 was used because of its completeness. Data from 17 interviews, including 8 senior employees from the studied incumbents, was used especially to shed more light on motivations and internal processes underlying the observed dynamics (see section 4.7 for details on methods).

Finally, a targeted search for additional data was used to enrich and triangulate findings. This mostly applied to the outcome data analysis (see section 4.6.3).

Table 7.1 - Operational coding scheme for radicalness of innovations.

	Incremental	Intermediate	Radical
Radicalness	* Optimization/improvement to asset which is conventional in sector * Marketing which is largely complementary with current positioning	* Developing/implementing new technologies to sector that are (partly) complementary with system and infrastructure * Value-added services that are (partly) complementary and/or involve limited risk taking	* Implementing largely different business models and/or system adaptations * R&D with high risk taking by incumbents and/or into technologies with limited complementarity * Fundamentally rebranding the company

Systematic analytical coding of mindset and behavior data provided a robust foundation of causal inferences. The operationalization of the coding scheme was based on the frameworks developed in section 3.3 (mindset) and 3.4 (innovation behavior). For innovation behavior, the coding scheme was detailed further, so that innovations could be coded with regard to scale and radicalness (as illustrated in figure 3.2). To fit the empirical reality, the improved scheme distinguished an intermediate level of radicalness. In this threefold categorization, *incremental innovations* were characterized by their complementarity with the current firm and sector level technology and market institutions, assets, and infrastructures. In the context of the Electricity sector, this mainly represented efficiency improvements of conventional generation and add-on innovations to conventional power plants (such as moderate scale biomass co-firing). Innovations of *intermediate radicalness* were new to the sector’s technologies, which were, however, still (partly) complementary with current systems and infrastructures. For example, larger scale wind parks are largely complementary with current centralized infrastructures and business models. Finally, *radical innovations* in this coding scheme were innovations that required fundamental changes in current systems and business models, such as servicing prosumers, decentralized generation and decentralized energy management. When coding on radicalness, the level of risk actually incurred by the incumbent was also taken into account. So, if the incumbent participated in a project that involved a rather radical innovation, but did not incur the risk (e.g. because another party was leading or funding was largely provided from public sources), this reduced the radicalness. To ensure transparency of the important interpretative step in the radicalness

coding, a detailed coding scheme which includes each (type) of innovation coded is included in Appendix F.

With regard to scale, a threefold coding scheme was applied. In this scheme pilot level projects or research projects (in case they did not involve implementations at scale) were coded as low scale. With regard to actual implementation at scale, two more scale levels were distinguished. This provided insight into the potential preference for smaller (less risk, but relatively more administrative burden per output) or larger scale implementations (more risk, but relatively less burden per output). While boundaries always remained arbitrary to a certain degree, the specific boundaries were optimized based on the data- and sector-specific characteristics.

Table 7.2 - Operational coding scheme for scale of innovations.

	Low	Medium	High
Scale	Pilot scale & research projects Single building energy saving projects	Medium scale implementation (>1k customers, >5MW capacity, >10k solar panels) Area level energy saving projects	Large scale applications (>100k customers, >100 MW capacity)

While in the further analysis the counting of innovation projects played an important supportive role in the argument, it is relevant to define what an innovation project is in this regard. In the context of this analysis (innovation) projects are specific, reported activities with respect to knowledge creation and implementation of changes, products and (primary) processes of the firm, which were reported as improving the environmental performance and/or contributing to a sustainable energy system. As such, this definition focuses on innovation as R&D, product and process innovation, in contrast to context creating behavior (e.g. advocacy, coalition development, standard setting, see chapter 6 for more focus on this aspect). Second, the focus is on sustainability improving activities, but the authors did not scrutinize what was sustainable or less sustainable. For example, efficiency improvement in conventional power plants and developing nuclear power generation were also considered sustainability innovations, as long as the incumbent positioned it as such. If different stages or milestones of the same project were repeatedly mentioned in consecutive reports, this was counted as one project. This was another reason why the scale dimension was relevant, as one project/activity might accumulate massive scale, while others do not develop beyond the initial small scale implementation (e.g. single building, iconic projects). With regard to asset development projects, a substance threshold was utilized (investment decision reported) to improve the comparability. This filtered out the early stage activities and

accounted for the fact that sometimes developments and projects could be in a planning and dormant stage for a considerable time. When projects were terminated at some stage (e.g. because they proved unfeasible) these were still counted as project, but the termination was mentioned when discussing the innovations. Finally, closing assets, facilities, and/or divesting were also counted as specific projects, because they represented specific change processes and could have substantial impact.

Utilizing a two-researcher coding team increased the reliability of the analytical coding. For mindset data, the 2010 data was dual coded. All differences in coding were compared and this discussion was used to refine the coding scheme. For example, a discussed point was the energy trilemma (the need to balance supply security, cost, and sustainability). In most cases, the trilemma was used to explain that quick transition (sustainability) had strong negative impact on either cost or supply security. In that case, it clearly represented a reactive mindset. A more solution- and future-focused approach of using the trilemma could, however, also represent a more (pro)active approach. Afterwards the researchers each coded a subset of the remaining data and discussed the outcomes. For innovation behavior data, the 2010 sample was also dual coded, which was used to improve the coding scheme. Afterwards, one of the researchers coded the remaining data, but the second researcher individually screened all results. This resulted in 11 discussion points (out of 303 records). Each of these was again discussed to compare differences. For example, the Ed and Eduard marketing campaign of Nuon was discussed, whether this represented an incremental or an intermediate radicalness innovation. Eventually, it was coded as intermediate, considering it was a larger scale campaign and put sustainability rather central (as one of the two selling points) and thus represented a substantial investment and risk.

As a further means to improve the reliability, the preliminary findings and conclusions were validated by four informants. The general conclusions resonated and their feedback was either integrated, or was mentioned as an alternative view.

7.2 INNOVATION BEHAVIOR: DOING A LOT AND STILL STRUGGLING

7.2.1 Number of projects

The number of projects reported illustrates that the incumbents had clearly left the inactive stage. Table 7.3 below shows the number of projects reported. In total 380 projects were distilled from the dataset. For the definition of a project, see section 7.1.4. Over the studied period, Eneco developed significantly more projects than the other two (73%). This requires two remarks: first, the difference was less pronounced over the period 2010-2012. As discussed before, the lower number of projects from Nuon and Essent in 2013 and 2014 was

(at least partly) related to the centralization within the Vattenfall and RWE group. It was therefore not possible to conclude whether this was just a reporting bias (i.e. the number of projects did not differ, but simply fewer projects were reported), or a result of declining activity. There were, however, some indications that it was at least partially an actual decline of activity (interviews 5 & 17). Second remark: this simple counting analysis compared a broad diversity of projects, so the content-wise analyses in the next two sections (7.2.2 and 7.2.3) were rather important to improve the validity of the analysis.

Table 7.3 - Number of projects reported by the incumbents and comparison of Eneco with the other two incumbents.

	2010	2011	2012	Subtotal	2013	2014	Total
Essent	34	26	26	86	15	9	110
Nuon	32	32	22	86	6	2	94
Eneco	40	36	29	105	54	17	176
Total	106	94	77	277	75	28	380
Essent & Nuon avg	33	29	24	86	11	6	102
Difference Eneco	21%	24%	21%	22%	414%	209%	73%

7.2.2 Type of innovations

Essent

Most of the projects in Essent's portfolio represented R&D activities with a focus on bio-based solutions, storage, smart grid, and metering as well as offshore wind cost reduction. The characteristic of these projects was that they did not focus on implementation, but mainly on knowledge creation. Most of these activities were coordinated within and co-financed in the Top sector innovation program of the government (see section 5.2.1). Seven projects focused on bio-based solutions. This included upscaling biomass co-firing in coal power plants. In fact, Essent had a leading role globally in this respect. This was evident, for example, in their organizing of global biomass conferences, but most directly in the fact that they were even preparing to scale co-firing in their Amer PP to 50%. Essent also played a leading role in promoting the bio-based economy concept as an economic value creating opportunity for sectors such as agriculture, chemicals, pharma and energy. The central idea was, that by advanced bio-refining and applying specific substances in the highest value applications, bio-based materials could replace many of the depleting fossil resources. Essent was active in coordinating a Greenddeal with this focus and was involved in several pilot projects to experiment with bio-refining and new sources of biomass. Besides this, Essent participated in two large scale storage projects (PAC & OPAC, which both proved to

be not feasible later), and pilots with a consumer storage solution developed by RWE. Four projects focused on piloting with smart meters and smart grids, including the Hoogkerk project, which received attention as leading project in this respect. Essent was also an active participant in the offshore wind cost-reduction program FLOW. They offered their open spatial slot (Tromp) as a pilot location and installed a measuring pole to investigate the wind and weather patterns.

Second, Essent paid much attention to developing and improving efficient conventional power generation. In the studied period, 18 such projects were reported. While market-based reasons seemed to dominate in the investment decisions (see especially section 5.5), Essent positioned the three new conventional power plants (2x gas & 1x coal) it developed in the studied period as rather efficient in terms GHG emissions, in comparison to older PPs with the same fuel. It is relevant to see that efficiency gains often concurrently reduced emissions and costs. This is also why internal LEAN and efficiency benchmark programs can also be positioned as innovations, with positive environmental impact. Considering the reported projects and their development, the changing market conditions were also evident, as several launched overhaul projects were cancelled (Swentibold, Moerdijk I) and the two new gas PPs were mothballed within two years after their operational launch. Essent also announced closing the 1980s coal PP Amer 8, as a result of the 2013 EA. Essent and RWE actively participated in Dutch and EU level activities to improve transparency of coal sourcing and related labor conditions. Finally, Essent worked on expanding biomass co-firing both in their Amer 9 power plant (35-50%) and in their new Eemshaven power plant (10-15%).

As a third priority, Essent actively developed value-added services for buildings, agriculture, and electric mobility. Nine of the sixteen projects in this respect focused on electric mobility by developing charging facilities and charging smart cards. This concerned public charging poles, private solutions, which it implemented in partnership with Renault, a partnership with the Greenwheels car sharing program, as well as two pilots with fast charging solutions. Furthermore, Essent reported six projects that represented integral solutions for the building environment. This included four solutions for eye-catching large buildings (such as the FC Groningen football stadium) and two area level projects. In terms of solutions these were often combinations of local generation (biogas, solar) and energy saving (e.g. with heat exchangers). Finally, Essent actively facilitated decentralized generation in the agricultural sector with a trading platform (Powerhouse) and by partnering with Friesland Campina to support farmers with the ambition to develop new assets.

The other half of the reported projects consisted of a diverse mix of renewable generation, smart home, marketing, and energy saving projects. Renewable generation also predominantly focused on bio-based solutions (7 bio/green gas projects and two focused on biomass sourcing including developing a wood pellet factory in the US, mainly focused on

supplying the Dutch power plants). Only a limited number of projects with onshore wind (3) and solar (1) were reported. Essent launched several services targeted at facilitating consumer energy saving and self-generation (prosumers), which included offering several energy management and transparency apps, advisory services, energy saving products (from insulation to HR boilers), a financing solution (with Greenloans/ABN), and marketing smart thermostats (one it developed itself and later also the Google NEST). Also in the 2B sphere, Essent actively marketed energy-saving services and pilots with the ESCO business model. In terms of marketing the above, the marketing campaign slogan (“*Essent levert*” i.e. Essent delivers) positioned Essent as a customer partner to save energy. It has a portfolio of 2C & 2B green products (including a consumer-focused wind product). Furthermore, it developed channel partnerships with several retailers to market its energy-saving solutions and made sustainable, energy-focused contracts with Unilever and TBI. Clustered as “other” were mainly activities to reduce its internal footprint (e.g. housing, mobility and green IT) as well as the investigation of developing a new nuclear power plant (later cancelled).

Nuon

Within the 94 reported innovation projects, the most important category was value-added services. Most (16) of the 21 reported projects in this category focused on solutions in the building sector. This included partnerships with housing cooperatives to save energy, installing solar panels and sharing capacity. In this category, its partnership with Ymere was most elaborate and involved a broad array of activities. Furthermore, Nuon focused on integral solutions for commercial real estate in which its cooperation with Corio is an important example. Nuon executed some iconic projects targeted at heat solutions and solar panels for the Arena stadium and RAI exhibition halls. They also reported winning a tender to install solar panels on 16 schools. Nuon exploited several industrial parks in which it reported implementing new energy solutions. As another kind of value added services, Nuon reported four projects targeted at charging solutions for electric vehicles and developed a partnership with the city of Amsterdam.

Improving the efficiency of conventional generation was the second most reported innovation activity (19 projects). Nuon also developed three new large scale conventional power plants (2 gas power plants and one multi-fuel power plant, which it later refocused on gas, see section 5.4.2). In the studied period Nuon also closed the Buggenum coal power plant, but in contrast to Essent’s closure of Amer 8, this was on its own initiative and mainly due to economic reasons (probably pointing to the relative inefficiency of the applied coal gasification technique, as this power plant was constructed relatively recently in the 1990s). Besides developing new efficient conventional PPs, Nuon reported several specific process innovations, which improved the efficiency of operational power plants as contributions to

its sustainability efforts. Two projects focused on preparing to improve biomass co-firing, but the relative share was lower than Essent's Amer project (10-14% of fuel mix). Some projects focused on improving sourcing in the coal supply chain as part of the same collaborative processes that Essent participated in. Finally, Nuon mentioned expanding its gas storage in Epe.

Table 7.4 - Innovation project portfolios mapped on type of activity.

Essent	# projects	Nuon	# projects	Eneco	# projects
R&D	19	Value added services	21	Renewable generation	43
Conventional generation	18	Conventional generation	19	Value added services	37
Value added services	16	Heating nets	14	Marketing	25
Renewable generation	15	Renewable generation	10	Other	22
Smart home & prosumer	11	Consumer energy saving	8	R&D	15
Marketing	11	Marketing	7	Smart home & prosumer	12
Consumer energy saving	10	Other	7	Heating nets	9
Other	10	R&D	4	Conventional generation	8
		Smart home & prosumer	4	Consumer energy saving	5
Total	110	Total	94	Total	176

Active expansion of heating nets represented the third most reported activity of Nuon. The 14 reported projects represented Nuon's explicit ambition to expand its capacity in this respect. To do so, Nuon constructed infrastructure (pipelines) in Amsterdam, Almere, Rotterdam, the Arnhem-Duiven region, and Nijmegen to connect residential areas to heat sources (mainly waste incineration). In other situations Nuon owned the generation asset also, and in this respect, it reported acquiring assets in Almere and upgrading its CHP asset in Utrecht.

The remaining 43% of the projects focused on renewables and new business models (energy saving and prosumer), marketing, and R&D. The ten renewables projects focused on onshore wind projects (3), solar assets (2), as well as biomass sourcing and asset optimization. Nuon also provided energy saving (advisory) services (4), (re)sold energy saving products (4) and developed energy management apps for prosumers (4). Marketing (7) represented a combination of sustainability-related branding, green products, and large customer contracts (3) focused on sustainable energy. The relatively lower number of R&D projects (4) is remarkable: they focused on smart meters, biomass co-firing, CCS and cold nets. Under

“other,” besides the internal footprint reduction, it is relevant to mention that Nuon acquired an innovative thin film solar manufacturing concept (Helianthos), which, however, it decided to divest again in the studied period.

Eneco

Within the larger portfolio of Eneco (176 projects in total), renewable generation asset development was the most important activity. This included a much larger number of onshore wind projects (13), often of relatively smaller scale (5-20 MW). The relatively much higher activity in this respect was also facilitated by the targeted acquisitions of wind development firms and their respective project portfolios (Air Energy in Belgium & Evelop in the Netherlands). Eneco was the only incumbent to actively develop a Dutch offshore wind park in the Netherlands (Luchterduinen) in the studied period. To do so, they also developed a financing partnership with Mitsubishi, after Nuon prematurely exited the project. Its offshore capacity was also expanded by acquiring the remaining 50% of the Amalia offshore wind park from its development partner Econcern. Furthermore, Eneco developed solar projects (7), actively developed crowdfunding for wind projects (3) and worked on different biomass sourcing sustainability schemes (4). It also developed biogas/green gas projects (3), but fewer than Essent. In contrast to the other incumbents, Eneco focused mainly on standalone biomass plants including a 50 MW plant in Delfzijl. Finally, two geothermal projects were reported.

Of the 37 projects focused on value-added solutions, most focused on integral building solutions. This included area-level development projects, 10 large building ESCOs, 6 pilots with retail ESCOs, propositions on decentralized (solar) power sharing, as well as iconic building projects (such as the Feyenoord stadium). Eneco also acquired Luminext, which provided public lighting solutions and focused on housing cooperatives with a large scale upgrading (“label sprong”) proposition. Eneco furthermore launched two EV charging propositions and mentioned pilots with EV solutions in Utrecht and Rotterdam. However, the amount of attention paid to EV projects was relatively less, compared to the other two incumbents. Finally, some targeted propositions for agribusiness, shipping and energy program management were mentioned.

In marketing, Eneco differentiated itself with a more fundamental rebranding and more large customer deals. In branding, sustainability was more central compared to the others, but probably more remarkable, decentralized solutions were put in the center of the branding with its “Together for renewable energy” campaign. Considering the rather radical nature of the decentralization trend (see section 5.5), it is remarkable that Eneco focused the core of its branding on this aspect. The centrality in the branding was also evident in organizing large scale customer events (including a 50k consumer yearly event) focused on

sustainability and sustainable entrepreneurship (in the 2B sphere). With 12 large customer deals, Eneco was substantially more active in this respect. Comparable to the other two incumbents, Eneco had a portfolio of light and dark green products, however, also due to its agreement with WWF, it most actively promoted the dark green products (resulting in 20% share of its total supply portfolio in 2013). Finally, its green positioning probably also enabled active cooperation with ENGOs in market development, as it does with WWF and housing cooperatives in marketing the “Zon & Zeker” solar proposition.

The remaining 40% of the projects focused on consultancy, R&D, prosumer facilitation, energy saving, heating nets, and gas-powered generation and storage. Its fifteen R&D projects focused on smart grids, storage (power2gas), offshore wind cost reduction, two new bio-based solutions (algae & Jatropha) as well as tidal energy. With regard to smart home and prosumer facilitation, two aspects were remarkable. One was that Eneco, with TOON, most actively positioned its smart thermostat as platform for further smart home apps and actively focused on scaling the use of the platform. The second was the active facilitation of prosumers with solar generation including the targeted acquisition of a company selling integral solar solutions to consumers (Zon-IQ), launching a lease and loan proposition as financing solutions, and developing a solar projected output simulator tool. In contrast to the other two incumbents, the number of energy saving projects was rather limited (7). Heating net expansion was also an active priority of Eneco, resulting in nine projects in Rotterdam, Delft, Utrecht and Delfzijl. While Eneco had remarkably less focus on conventional generation, it still did develop one gas-fired power plant together with DONG (50/50), and invested in gas storage in Epe. Like Essent, Eneco was actively involved in the development of the LNG terminal in Rotterdam. As the market conditions for gas power turned adverse (see section 5.3), Eneco actively tried to reduce its exposure by terminating a PPA (Rijnmond) and temporarily selling a turbine of the Enecogen power plant. Relevant in the category “other” were the consultancy projects reported (10). These were iconic projects of the Ecofys consultancy, which Eneco acquired from Econcern. Ecofys, for example, developed energy strategies for governments and executed high profile studies into ETS, industrial energy efficiency, and future scenarios. Despite the fact that Ecofys operated rather independently from Eneco, this at least had a positive reputational effect for the group.

7.2.3 Radicalness & scale

Categorization for analysis

To illustrate the causal linkages, the innovation data was categorized further. As proposed in section 3.4 and summarized in proposition 7, several causal linkages could be expected between the incumbent’s leadership mindset and the corresponding innovation behavior, as reflected in the innovation portfolio composition. To structurally analyze whether the two

key biases (optimization bias and pilot paralysis) occurred, and whether incumbents with a proactive mindset indeed demonstrated greater ability to overcome those, a fourfold categorization is used. This further categorized the base data as formulated in the 3x3 matrix, based on the coding scheme introduced in section 7.1.4. In this further categorization, the two biases were translated into two aggregated categories of projects, which were more prevalent when incumbents were not able to overcome the biases. As such, more projects in one of these two categories indicated difficulty to overcome the related bias. To investigate proposition 7, the previous two categories were contrasted with a specific category of radical innovations (of medium to large scale). What remained were the medium to high scale projects of intermediate radicalness, which were combined in one intermediate category in this analysis.

The discussion below focuses on the comparison of the incumbents' portfolios, based on the categorization. To provide transparency, the data based on the 3x3 matrix is also reported in table 7.5. However, the discussion below focuses on the comparison of the portfolios with the help of the presented categorization (as also illustrated in figure 7.2). The differences are discussed referring to categories of innovations. The previous section, however, provided a more detailed discussion about the content of the innovation portfolios.

Incremental innovations

Nuon and Essent had relatively twice as many incremental innovations in their portfolio compared with Eneco. While Eneco had 13% incremental projects, Nuon and Essent respectively reported 29% and 25% incremental projects. Even in absolute numbers, Eneco still had fewer incremental projects, but the difference was smaller, because Eneco executed a larger number of projects in total. This difference was mainly caused by projects related to conventional generation. While Eneco reported 5 projects, Nuon and Essent respectively reported 16 and 14 projects. This difference was related to new asset developments as well as optimization projects. With regard to incremental marketing innovations (such as green products mainly based on certificate trade and channel development in which sustainable product sales were only part of the objectives), especially Essent showed more activity than the other two. In contrast, Eneco reported several projects which consisted of (long term) contracting of renewable capacity (7 projects), while the others did not report specific activity in this respect. Considering this represented contracting of already developed capacity, this was considered to be of incremental nature. Eneco also reported on more biomass sourcing development activities (4 projects vs. the others; both 1 project). With regard to its own footprint reduction, Essent and Eneco both reported 5 projects, while Nuon reported only 2 projects.

		Scale		
		Low	Medium	High
Radicalness	Incremental	Not relevant	Incremental	Incremental
	Intermediary	Low scale	Intermediate	Intermediate
	Radical	Low scale	Radical	Radical

Figure 7.2 - Portfolio categorization model used for analysis.

Low scale innovations

Eneco and Essent reported twice as many low scale projects as Nuon. While Nuon reported only 13% smaller scale projects of intermediate or radical nature, Essent and Eneco respectively reported 28% and 27% in this segment. The categories causing the largest differences were R&D and Value Added services. Nuon reported only 4 R&D projects, while the other two respectively reported 19 and 15 projects. With regard to value-added services, Eneco reported 24 low scale projects (mainly single building integral solutions), while Nuon (6) and Essent (5) reported less activity. With regard to renewable asset development (mainly smaller scale solar assets), Eneco (5) also reported more activity than Nuon (1) and Essent (1). This is also true for small-scale, sustainability-focused marketing (Eneco 3 projects vs. none for the others). With regard to prosumer facilitation, Essent most actively developed specific energy saving apps (4) as part of its portfolio, for which there were no indications that they developed substantial scale.

Intermediate innovations

Eneco and Nuon both reported more than 50% of their projects in the intermediate segment, making it the most prevalent project category. These were projects with at least medium scale, which represented implementation of new technologies or solutions, indicating substantial change, but were still partly complementary with the current systems. Essent

reported less (38%) activity, but for Essent also, this was the most important project category. Eneco in absolute numbers reported 42 more intermediate projects compared to the average of Nuon and Essent (47). More than 70% of the difference was caused by more renewable asset development (+17, especially wind projects) and marketing activities (+13, especially large customer deals). As mentioned, Nuon also reported relatively more intermediate projects than Essent. The difference (17%, 10 projects) was caused mainly by more projects in the heating net (+13) and value-added services segment (+5, mainly building solutions). In contrast, compared to Nuon, Essent reported more activity in renewable generation (+3, mainly green gas), consumer energy saving (2, mainly by extending the energy saving product range) and conventional generation (+3, scaling biomass co-firing and participating in developing a LNG terminal).

Radical innovations

Eneco relatively and in an absolute sense reported the most radical projects, however the difference is most pronounced compared to Nuon. In the reported period Eneco mentioned 17 radical projects, while Essent (9) and Nuon (3) reported lower numbers. In a relative sense, Essent (8%) was still close to Eneco (10%), while Nuon lagged behind (3%) with regard to the more radical innovations. Half of the difference between Nuon and the other two was caused in the category of new business models facilitating prosumers, in which Eneco (7) and Essent (3) reported several projects. Furthermore, the more radical renewable asset projects (green gas and geothermal) also represented an important part of the difference (Essent and Eneco both reported 3 projects). Finally, Eneco's more radical approach to marketing (both with respect to branding and NGO partnerships) resulted in an additional 2 project difference.

Comparison with the 2010-2012 data

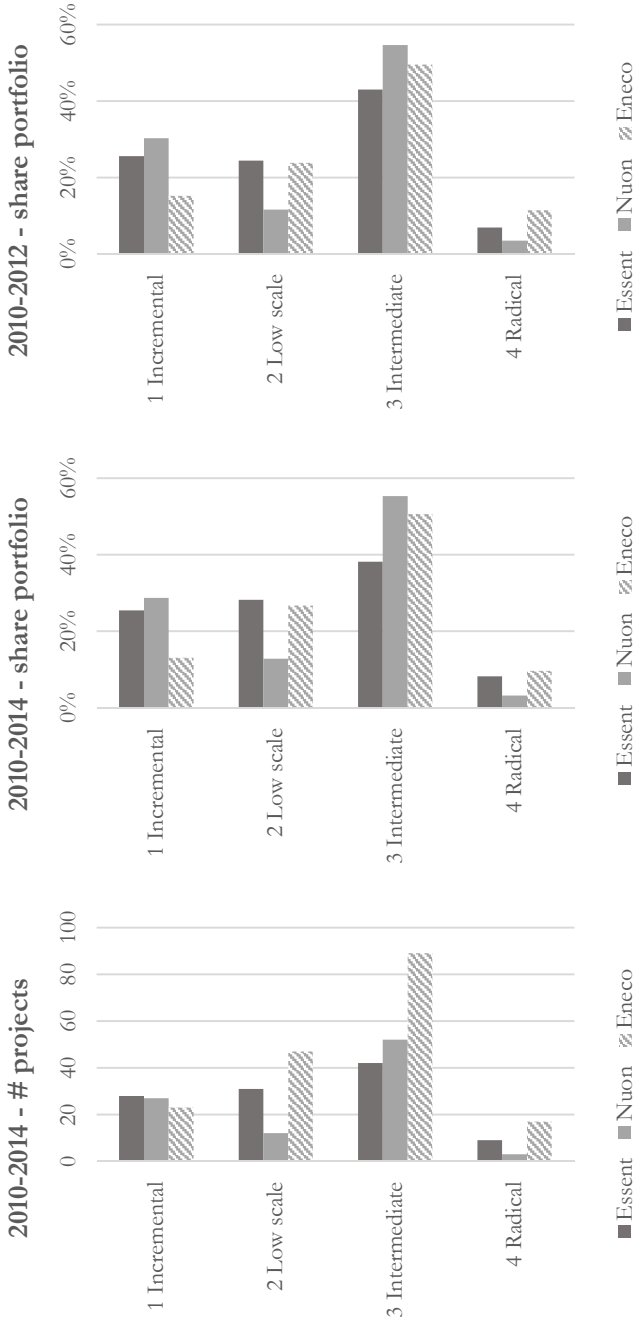
If the same data is compared on the 2010-2012 time frame, the outcomes do not shift substantially. As remarked before, Essent and Nuon both reported less activity in the last two years, of which a part of the difference might be caused by less active reporting (due to centralization). In 2010-2012 this potential bias was not applicable, so this period could be used to validate the analysis. If the differences of more than 1% shift in the relative share in the portfolio are considered, Essent had less low scale (-4%) and more intermediate (+5%) projects in the 2010-2012 period. Nuon had more incremental projects (+2%), compensated by smaller differences in the other categories. Eneco had relatively more incremental (+2%) and radical (+2%) projects and less low scale (-3%) projects in the studied period. However, this does not change any of the previous conclusions with respect to the relative prevalence of categories of projects. It is remarkable that the difference on proactive projects is larger in the 2010-2012 period (4% vs. 2% difference between Eneco and Essent). This was caused by a relatively larger number of low scale projects by Eneco (especially single building ESCOs, but also power2gas and smart grid pilots) as well as medium scale introduction of new (radical) solutions with regard to storage, smart thermostat, and solar financing propositions by Essent in the 2013-2014 period.

Table 7.5 - Base data of the portfolio analysis ('10-'14). Each table represents a scale (columns) x radicalness (rows) matrix as introduced in section 3.4). The upper row of tables represent represents # projects, while the lower row represents the share in the portfolio (# projects in segment/total # of projects).

	Essent			Total		Nuon			Total
	Low-pilot	Medium	Large			Low-pilot	Medium	Large	
Incremental	0	11	17	28		0	13	14	27
Intermediate	15	35	7	57		9	48	4	61
Radical	16	9	0	25		3	3	0	6
Total	33	53	24	110		13	63	18	94
Incremental	0%	10%	15%	25%		0%	14%	15%	29%
Intermediate	14%	32%	6%	52%		10%	51%	4%	65%
Radical	15%	8%	0%	23%		3%	3%	0%	6%
Total	30%	48%	22%	100%		14%	67%	19%	100%

	Eneco			Total
	Low-pilot	Medium	Large	
Incremental	0	15	8	23
Intermediate	16	81	8	105
Radical	31	15	2	48
Total	43	115	18	176
Incremental	0%	9%	5%	13%
Intermediate	9%	46%	5%	60%
Radical	18%	9%	1%	27%
Total	24%	65%	10%	100%

Figure 7.3 - Categorized data (see start of section). The two left-most tables represent the full period, while the right table compares the relative shares on the most comparable period.



7.2.4 Investment in innovation

When the actual capital expenditure is compared, the difference between Eneco and the other two becomes much larger. Whether the heating net activities (as relatively carbon efficient) are included or not, Eneco invested approximately three times as much as Nuon. Essent, in fact, even invested 50% less than Nuon. Besides its network activities - which are not applicable for the other two - Eneco invested 70% of its capital expenditure in renewable and heating net activities.

Table 7.6 - Reported capital expenditure 2010-2014. *: Nuon only specified the renewable & heating net Capex.

(€ m)	Essent	Nuon	Eneco
Conventional	€ 4.853		€ 362
Renewable	€ 220	€ 326	€ 1.066
Heating net	€ 54	€ 97	€ 317
Network			€ 1.901
Other/unclear	€ 0		€ 233
Total	€ 5.127	€ 3.431*	€ 3.879
Share renewable	4%	10%	27%
Share renewable + heating net	5%	12%	36%

Although both Nuon and Eneco increased their investments, the difference became larger over the studied period. While 2010 is an outlier for Nuon with only €7m investment (the average is €36m over the period 2006-2009), the investment substantially increased to average €80m over the period 2006-2009. Eneco's investment almost tripled since 2012 as many renewables projects evolved into the construction phase. In an absolute sense the difference between Nuon and Eneco increased from €75m to more than €200m per year in 2013 and 2014. Unfortunately, it was not possible to produce the same annual overview, because Essent reported investments per project, but did not report in a comparable way on when investments were made.

Table 7.7 - Capex in renewable asset development projects. Essent's data not available because no comparable overviews were included in reporting.

	2010	2011	2012	2013	2014	Total
Essent						€ 220
Nuon	€ 7	€ 56	€ 101	€ 89	€ 73	€ 326
Eneco	€ 81	€ 131	€ 273	€ 299	€ 282	€ 1.066

7.2.5 Acquisitions & divestments

It is relevant to note that Eneco's acquisition strategy strongly supported its (pro)active behavior. As part of the behavioral data, acquisitions and divestments have also been structurally mapped. In the studied period Eneco made several acquisitions that seemed mainly targeted at acquiring capabilities to develop in several sustainable market segments (wind, solar, public lighting). During the interviews, it was mentioned that the acquisition of the wind developers also leveraged Eneco's active wind development strategy, because it acquired several early stage projects (permits), which it could develop further (interviews 16 & 17). As is shown in the section on outcomes (7.5) Eneco was also more successful in selling solar propositions to prosumers, which seems likely to have been leveraged by the ZON-IQ acquisition. Apart from this, Eneco also made some more conventional acquisitions, targeted at acquiring developed capacity (Amalia offshore wind farm, Utrecht heating net) and market position (Oxxio). As mentioned earlier, the acquisition of Ecofys did, at least in terms of corporate branding, contribute to the sustainable image of the Eneco group. The two other incumbents reported much less acquisition activity. Nuon reported acquiring heating net units and the remaining stake of the Alexia wind farm, while Essent reported no acquisitions at all. It is noted that their parent companies might have on purpose concentrated acquisitions outside of the Netherlands.

As a result of refocusing, all incumbents also divested activities, but Nuon was most pronounced in this respect. Eneco divested several activities in 2010, however, it did not report on what these activities comprised (besides reporting the total €32m result impact, 10O-C1). Nuon divested its activities in Germany and Belgium, gas exploration and production as well as its earlier Helianthos acquisition (thin film solar manufacturing). This was linked to a strategy to generate liquidity, as a result of adverse market conditions, as well as to generate resources to invest in a transformation towards renewables (see section 7.3). Essent divested its heating net & CHP activities, which it earlier smartly branded Essent Local Energy Solutions, which supported their lower commitment to heating nets, as evident from the project data presented before.

Table 7.8 - Acquisitions and divestments reported in the data.

	Eneco	Nuon	Essent
Acquisition	Evelop, Windwise & Air Energy (wind developers & permits), Zon-IQ (prosumer solar solutions), Luminext (public lighting), Amalia wind park (50% share offshore asset), Oxxio (retail business), Ecofys (consultancy), Utrecht heating net	Heating net units Almere, Alexia onshore wind farm (from participation to full ownership)	
Divestment	€32m of non-specified activities	Nuon DE (retail business), BE (retail business), Gas & exploration, Helianthos (thin film solar manufacturing), Utrecht heating net & 3 smaller nets	Essent Local Energy Solutions (67 assets, mainly heating net and decentralized CHP)

Table 7.9 below provides an overview of the most important analytical conclusions in the previous discussion. In section 7.6 these observations are discussed further and related to antecedents and outcomes.

Table 7.9 - Summarizing the previous discussion on innovation behavior data.

General		Essent	Nuon	Eneco
Content top3		* focus on R&D (bio-based/smart), conventional & VAS (EV, smart)	* focus on conventional, renewable generation & heating nets	* focus on renewable generation, VAS & marketing
Quantity 2010-2014 (2010-2012)	* difference in period 2013-2014 could be partly related to reporting bias	110 (86)	95 (86)	173 (105)
Radicalness & scale		Mix of incremental, low scale and intermediate projects and some radical projects	Mostly incremental & intermediate projects, less focus on radical innovation (also low scale pilots with radical concepts)	Mostly intermediate and high radicalness projects (both low & medium scale), less incremental projects
Radical innovations		Green gas hub & injection, energy saving loans, integral solution (Zeevolde), agro trading platform	Ymere partnership, venture capital fund, Helianthos divestment	Green gas infrastructure, geothermal (The Hague/ AgroEnergy), branding (decentralized together), decentralized (Zon&Zeker, NGO-partnerships, ZON-IQ acquisition), WWF strategy partnership, TOON as smart home platform, agro trading platform

	General	Essent	Nuon	Eneco
Investment renewable <i>(2010-2014, €m)</i>	* Nuon/Essent mostly invest in the new conventional assets in the early period	€ 220	€ 326	€ 1.066
Acquisition/divestment		* Divest heating net assets	* Major divestments to free resources * some generation capacity acquisitions	* Several targeted acquisitions providing for specific growth enabling capabilities as well as more conventional market share & capacity acquisitions

7.3 MINDSET: ENECO EMBRACED SUSTAINABILITY AND DECENTRALIZATION EARLIER

The three incumbents each have a characteristic mindset reflected in their own discourse. Although each of the studied incumbents showed traces of the reactive, active, as well as proactive mindset, each has a clear accent of their own. As can be expected, therefore, inactive motives were not clearly found in any of their discourses. Below follows a discussion of how each of the ideal typical mindsets was reflected for each incumbent, while also highlighting how the combination resulted in a unique discourse for each incumbent. Table 7.10 summarizes the presence of each of the mindsets with illustrative quotes and these are referred to in the text, based on the numbering included in the table.

Essent: an aspiring leader found to be intensely occupied with defending its legitimacy

A key trait indicating the dominant reactive motivations in Essent's mindset was that it most often referred to external dynamics as determinant in its decarbonization efforts. Sustaining its legitimacy by taking the responsibility that is expected of a leading firm was a recurring motive (E1). Furthermore, its external focus was characterized by seeking stakeholder dialogue, but these dialogues often revealed fundamental disagreements of NGOs with its strategy (especially with regard to coal power and biomass co-firing). These dialogues focused on whether and how certain solutions could still be regarded sufficiently sustainable in the transition phase. They thus reflected the characteristic of reactive arguments, which start from the current situation rather than finding common ground in a sustainable future vision. Probably even more characteristic for reactive strategies, Essent consistently stressed the determining role of the government (E2) and blamed negative environmental performance trends on external causes (E3).

A second important characteristic revealing the reactive nature of its mindset was its active defense of coal and biomass co-firing. The arguments presented in its reporting closely resembled the (reactive) clean fossil discourse present in the public energy debate (see chapter 6). This discourse emphasized the remaining relevance of conventional power plants in the transition phase, negative consequences for reliability and affordability of a hasty phase out, and the contribution of incremental, efficiency-focused innovation can make in the meanwhile. In line with this argument Essent spent much effort to defend its new coal power plant (E4). Furthermore, Essent also presented biomass co-firing as cheap, renewable, and crucial to reach the midterm renewables goals (E5).

Even though Essent did show the active trait to translate sustainability into its business operation, the implementation remained closely attached to its reactive way of thinking. Essent reported on translating its goals into its business operation (E5, E6). This was also reflected in the fact that (until it stopped national level reporting in 2014 due to

centralization) it had a dashboard with concrete goals (400 g/kWh production efficiency & 20% renewable in 2020). Moreover, it did translate its goals in investing in new assets and developing products (E7). However, the way of the internal translation was very much in line with the reactive strategy mentioned just before, relying on incremental efficiency improvements and biomass co-firing as an incremental add-on solution. Another observation in this respect is that - in contrast with the other two incumbents - Essent focused on separate CSR reporting. While Nuon and Eneco produced integral reporting, which intrinsically revealed the business relevance of sustainability, Essent's way of reporting breathed more the traditional legitimacy-focused approach, by focusing on the societal dimension of CSR.

Characteristic for Essent's mindset was that it combined the reactive vision with (pro)active leadership on specific matters. More prevalent than with the other two incumbents, Essent claimed its role as leader both in commercial and sustainability aspects (E9). The firm also stressed that it had in the past been a frontrunner in several concrete aspects (E10). Some of these aspects, however, were challenged by, for example, NGOs with respect to their impact (e.g. green current, see chapter 5) and could also be challenged because they predominantly referred to the past. The second part of the contribution Essent frames as reflecting its leadership (e.g. biomass co-firing), can be challenged as being mainly a reactive approach (see the earlier discussion). However, especially with regard to Bio-based Economy and its manifestations, as far as they are less attached to coal power (such as green/biogas), Essent did show active leadership that seemed to be driven from a future, opportunity-oriented mindset. It is argued that, besides the reactive motives (its alignment with coal & biomass co-firing), this does show that proactive motivations were included in the Bio-based-Economy discourse as well.

In the context of the disruptive market dynamic, RWE announced a new strategy which showed more proactive ambitions. As section 5.3 has documented, the market dynamic between 2011 and 2013 had significantly negative business impact for the most important incumbents, both in terms of one-off write-offs, but also in structurally declining cash flows from their conventional generation businesses. Besides this, the decentralized generation trend also attracted attention and gained legitimacy. This led to a fundamental strategy change by RWE in 2013. The related unbundling of conventional and renewable activities engendered a new vision of the handicap the conventional business could be in the fundamental transformation of the business model. Furthermore, RWE positioned itself as the "holistic energy manager" emphasizing the embracing of the bottom-up trend, and how this negatively impacted the traditional supply business model. This also became evident in Essent's reporting, as they mentioned targeting 20-30% revenue from new business models. While the success of RWE and Essent in executing this new strategy remains to be seen, the strategy change does reveal them to embrace a new, proactive approach.

Nuon: seeking new anchors in the midst of fundamental transformation

Nuon also showed a substantial part of typical legitimacy-inspired motivations in its reporting. This was evidenced in an above average sense of societal responsibility (N1), probably partly rooted in the public ownership of its parent company and its own public history. Moreover, Nuon presented the transition dynamic, and how it impacted its business model, partly as an exogenous trend, and its decisions responded to it (N2). It should be remarked, however, that compared to Essent, this discourse is less strong and less one-sided.

As a result of the adverse market conditions, Vattenfall – and as a consequence also Nuon – responded with inward and financial focus, which can be characterized as a combination of reactive and active motives. In fact, in the studied period of five years Vattenfall and Nuon adapted their strategy three times. From one perspective, its response was active in the sense that it sought to sustain its ambitions (N4) and also frame the financial consolidation as preparing for transformation (N3). On the other hand, one could also argue that financial consolidation diverted the focus from sustainability and as such cannot be labelled active: the smart framing is more reactive in nature. During the interview, one interviewee who was rather closely involved stressed that the true motivations of the Vattenfall CEO in this respect were rightly doubted (interview 17, see section 7.6.2 for further discussion).

Nuon's motivations also strongly reflected the active focus on value creation and implementing concrete changes. Nuon seems to have had a stronger grasp of the opportunities that the transition provided for the company (N4, N5) compared to Essent. It also showed a greater commitment to reducing CO₂ emissions in an absolute sense (N6, compared to the relative targets of Essent). Its integral financial and CR reporting was another indicator of a more active focus. As already noted in chapter 6, Nuon had a much smaller attachment to the discourse of the clean fossil advocacy coalition to which most of the sector's incumbents belong. This was evidenced in its change of plans to cancel the coal side of its planned multi-fuel power plant. It can be remarked that - in contrast to both Essent and Eneco - Nuon did not report on concrete national goals and positioned its activities in relation to Vattenfall's overall goal (2030 -50% CO₂ reduction). Although this centralization resulted in less transparent reporting on the (national) outcome level, this does not negate the earlier observations on the more active motivations present in its discourse.

While Nuon observed that a fundamental transformation was ongoing, the data showed a more passive, less proactive role perception. Nuon did observe a "new normal" in the market, in which conventional generation was under heavy pressure (N7) and noted that this fundamentally transformed the industry (N8). It also stressed that this induced (the need for) new business models to facilitate prosumers (N9). It is remarkable, however, that its discourse in this respect was rather descriptive and passive. While Essent sometimes lost

some credibility in stressing its (ambition for) leadership, Nuon's discourse showed the opposite. As such, the dominant discourse can be clearly labelled a combination of reactive and most active motivations. Over the years, the motivations did become more active, but in contrast to Essent, there was a less fundamental leap forward. One notable exception of proactive discourse utilized by Nuon was reflected in its embracing of energy-saving services as opportunity (N7). Both on the behavioral and mindset level the company most emphatically embraced this opportunity. Also, considering the cannibalizing nature of energy saving this can be considered a more proactive stance.

Eneco: early adopter of decarbonization and decentralization

Eneco also reacted to external trends and stakeholders' expectations in developing its strategy, but showed the highest level of independence in this respect. Eneco mentioned the same important market trends (O1) and acknowledged its societal embeddedness and the importance of energy policy (O2, O3). A difference with Essent and to a lesser extent with Nuon was that Eneco more often emphasized that it sustained its strategy under adverse contextual conditions. Furthermore, Eneco showed greater independence from the institutional pressure, both from the dominant cognitive models (see section 5.5) as well as regulative developments. The separation case is a particularly clear example. Without ignoring that other financial motives played a role, Eneco showed strong endurance in sustaining the anti-separation case, motivated by a sustainability centered, future-oriented argument (see section 5.5.1).

Value creation and internal alignment as key traits of an active mindset were clearly present. Eneco embraced the opportunities to develop new products and services (O4) and differentiated itself with sustainability (O5). Moreover, it most explicitly worked on internal alignment, which even became a strategic KPI for the company (O6). As such, the motives characterizing the active mindset were clearly present in the discourse evident from the data.

Clearly differentiating Eneco's strategy as most proactive, however, was a commitment to fundamental transformation towards a collaborative and decentralized energy system. Eneco, like the others, described a fundamental transformation of the market. It was already rather unique in that it presented a more concrete vision on how the transition would evolve in three phases (O7) and how this would fundamentally transform the business model (O8). Unique for Eneco, however, was that it clearly defined this transformation as the center of its strategy, summarized in the motto: "Sustainable, Decentralized & Together" (O9). Although the adverse market conditions also impacted the company since 2012 (but less severely, due to its more limited conventional capacity base) and provided some reality check, no sign can be found of reducing commitment to this proactive vision.

Another observation stressing Eneco's proactive mindset was their early adoption of this new vision. They themselves claimed to have embraced the new vision already in 2006 (O10). As the two quotes below show, they indeed already talked about a sustainability transition in 2006 and aspired to take a leading and entrepreneurial approach in this respect.

Q140 We want to show that we are working hard to bring our operation and services to a higher level. We also want to show that sustainability is an important priority in that regard. We think about how we - as corporation - can play a role in the transition with a systematic approach. And whether the assumptions underlying our current mission still fit that picture. (O06-C1, p. 5)

Q141 But we want to be a frontrunner in the transition towards a sustainable energy supply. That we apply an entrepreneurial approach (in pursuing this position as frontrunner), should be considered normal in a free market. (O06-C1, p. 5)

Moreover, an analysis of their 2006 annual report showed that they already realized at that time that the dominant privatization-rooted cognitive model would be challenged by the emerging decarbonization trend. They also correctly identified that the new EU policy in this respect (and the resulting subsidy schemes) would have a strong impact on the market. As the discussion in section 5.5 showed, other incumbents misinterpreted this dynamic until it caused a forceful, disruptive effect on their businesses in the period 2011-2013. This makes Eneco's early adoption a rather interesting case of a proactive leadership mindset.

Q142 The original ideas underlying the formation of a European energy market are partly outdated. The European policy was mainly directed at creating a large and deregulated European energy market, rooted in the idea that competition induces lower prices. Recent developments mentioned above have stimulated awareness on the importance of two other pillars of energy policy: supply security and sustainability. The European Commission has issued plans - in January 2007 - for a new European energy policy, in which these two pillars have received a prominent role. Eneco supports this policy heartily. (O06-C1, p. 15)

With regard to decentralization, evidence was found of clearly embracing this trend since 2008. In the 2006 and 2007 reports, although sustainability became a central strategic trend, decentralization and local generation were more marginally present in Eneco's discourse. In the 2008 annual report the "sustainable, decentral, together" discourse mentioned earlier became clearly framed.

Q143 Eneco makes clear choices in what we want and do not want to do. We focus on increasing the sustainability of our activities and realize that we can only

achieve more in cooperation with others. (..) In 2008 we proceeded by giving meaning to the concepts of sustainable, decentralized and together [as central concepts in the mission]. In the interest of the current generation, but also for the future of our children. (O08-C1, p. 7)

A final unique trait of Eneco's proactive approach was that it co-created its strategy and performance indicators together with the ENGO WWF. In 2011 it announced this strategy, which centered around five 2013 strategic performance indicators (11O-C1, p. 14):

1. Renewable capacity (including PPA) >20% of its supply portfolio
2. CO₂/kWh of generated by owned asset < 300 g/kWh
3. 20% dark green (guaranteed additional renewable capacity such as wind) electricity supplied,
4. 0,5% dark green gas supplied
5. 50% reduction of the internal CO₂ footprint

When the period was completed, WWF and Eneco drafted a new "One planet" method to set targets for the next period. This method expressed Eneco's impact on several axes as to whether it remained within the planetary boundaries. This new phase at least showed that WWF was sufficiently satisfied with the collaboration to continue the strategic partnership.

Table 7.10 - Exemplary quotes illustrating how the different mindsets are present in the discourse reflected in the data.

	Essent	Nuon	Eneco
Reactive	<p>Q144 E1 As an energy firm in the Netherlands we want to take our responsibility and we are willing to sit down with all parties who want to discuss the topic in a fact-based manner. (2010)</p> <p>Q145 E2 The MEP-subsidies for large scale biomass co-firing expire in the period until end 2015. This induces the risk that the sustainable energy production of Essent will decline greatly in the coming years and also induce stagnation [of the growth of sustainable energy] on the national level. New policy is needed to support achieving the Dutch 2020 sustainable energy goal. (2013)</p> <p>Q146 E3 There were also negative developments. As RWE and Essent we still have to contend with a prevailing economic headwind. The margins on energy are low and that will not change in the short term. That has everything to do with the European energy transition. (2014)</p> <p>Q147 E4 Even if the Netherlands would succeed in realizing a spectacular growth of the share of sustainable energy and achieve the government goal of 14% by</p>	<p>Q156 N1 We want to limit the negative consequences of our production activities as much as possible and take responsibility for these activities. (2010)</p> <p>Q157 N2 The year 2012 was a difficult one for the energy sector. Market conditions deteriorated further, particularly in relation to electricity generation. (.) By focusing more on reducing costs and improving the commercial deployment of power plants, we have managed to partially compensate for the negative effect. (2012)</p> <p><i>Reactive/active:</i></p> <p>Q158 N3 During the consolidation phase, 2011-2013, the focus is on improving value creation by reducing costs, divesting non-core assets and revising the investment program. This will pave the way for a transition towards a more sustainable energy production portfolio. (2011)</p>	<p>Q166 O1 The increasing demand for energy in emerging economies, the political decision-making on increasing sustainability of the energy supply, as well as CO emissions, influence our strategy and performance. Besides these influences, crisis events such as the Tsunami in Japan, the credit crisis, as well as developments like the "Arab Spring" have impacted the development and volatility of the fuel prices. (2011)</p> <p>Q167 O2 The target of the Dutch government to produce 16% of the energy demand in a sustainable way - which exceeds the demand of Europe - was pleasing news. (.) Building on our experience and craftsmanship, Eneco is well positioned to make a fundamental contribution to achieving this target. (2012)</p> <p>Q168 O3 Eneco is rooted deeply in the Dutch society and respects the interests of stakeholders of our firm. We take these stakes into consideration and anticipate them whenever possible. This starts with involving the stakeholders in the formation of our strategy. (2012)</p>

	Essent	Nuon	Eneco
	<p>2020, still 86% of our energy would be generated from conventional sources in 2020. This naturally should be done as efficiently as possible. (.) The Eemshaven power plant is one of the cleanest and most efficiency power plants of its kind. (2010)</p> <p>Q148 E5 The large scale application of biomass as replacement of coal in power plants is indispensable to achieve the Dutch sustainable energy goal in 2020. (2012)</p>		
Active	<p>Q149 E6 By means of the "How on Earth... " campaign we have engaged with our employees on the necessity and added value of Corporate Responsibility and challenged them to personally consider sustainability more. (2010)</p> <p>Q150 E7 Corporate Responsibility (CR) is an integral part of the business approach of Essent. (2010)</p> <p>Q151 E8 This is assured by the thoughtful deployment of an asset base with increasing efficiency as well as the large-scale usage of biomass and wind power. We also offer concrete products and services to our customers to enable them</p>	<p>Q159 N4 Our ambitions are standing firm, although the uncertain economic climate has its impact on our corporation and we as a consequence have fewer resources available. Nuon strives for reliable and affordable energy, annual progress with regard to developing clean production techniques, gradual reduction of the CO₂-emissions, increasing the profit and value creation, and a stable future for our firm. (2010)</p> <p>Q160 N5 For our customers, the focus on value creation will translate into increasing operational excellence in our customer service, among other things. Nuon also remains strongly committed to helping our</p>	<p>Q169 O4 Eneco produces and supplies sustainable energy and develops smart sustainable energy solutions. We are among the cleanest energy firms in Europe and want to expand our position. (2011)</p> <p>Q170 O5 Eneco will continue to - besides competitive pricing - carry out the sustainable vision and create awareness among our customers of the possibilities to save energy and generate sustainable energy themselves. (2013)</p> <p>Q171 O6 The individual contribution of our employees to the implementation of our mission in their daily job is crucial: we call this "Internal Alignment." (2013)</p>

Essent		Nuon		Eneco	
	to lower their energy bill and contribute to a better environment. (2012)	customers realize energy savings and providing support to more vulnerable customers (2011) Q161 N6 The goal of lowering CO ₂ emissions is a key part of achieving this vision, and Vattenfall is continuing its work with methods to reach the goal of 65 million tonnes by 2020. (2012)			
Proactive	<p>Q152 E9 The new mission of Essent and RWE is to create value by leading as the most trusted and best performing partner in the European energy transition. (2014)</p> <p>Q153 E10 Essent has been contributing already for a long time. Already in 1987 we constructed our first wind farm at the Westerneerdijk near Urk and in 1995 we were the inventor of Green Current as consumer product. (2013)</p> <p>Q154 E11 In 2011 the green gas market in the Netherlands amounted 40 million m³. The expectation is that this amount will grow to 300 million m³ in 2014 and 2b m³ in 2020, which represents 5% of the total gas market. Essent is a market leader on the green gas market and aspires to maintain that position. (2011)</p>	<p>Q162 N7 Saving energy serves two key purposes: it contributes to the reduction of greenhouse gas emissions and helps households, business customers and industries minimize their energy costs. (...) Nuon uses its portfolio of products and services for energy management to create solutions for its customers. (2011)</p> <p>Q163 N8 In summary, it can be said that the market conditions for the energy sector continue to be highly challenging. (...) "This is the new normal," to quote Øystein Løseth, President and CEO of Vattenfall AB. (2012)</p> <p>Q164 N9 The entire European energy industry is undergoing a fundamental transformation. (...) During the year, it became even clearer that the traditional business model, based on large-scale</p>	<p>Q172 O7 The energy market develops in three phases: starting from centralized, fossil fuel-based generation to a fully decentralized, sustainable generation, with a phase which combines both solutions in between. (2012)</p> <p>Q173 O8 The sales of energy currently provides for a margin to Eneco because the revenues exceed the cost of production, procurement and transport. This is how we currently earn our money. But this business model will change.</p> <p>Q174 O9 Eneco chooses for sustainable energy and focuses on the customer and his or her demand in the improved strategy. Sustainable, decentralized and together, this is our vision and our responsibility. We develop a business model by which we</p>		

Essent	Nuon	Eneco
	<p>Q155 E12 Essent targets to realize 20-30% of its revenue from products other than electricity and gas. (2013)</p>	<p>electricity generation in conventional power plants, is being challenged. (2013)</p> <p>Q165 N10 These prosumers are creating new business opportunities for the energy companies (2013)</p>
		<p>together with our customers save energy and generate sustainable energy. (2012)</p> <p>Q175 O10 Since 2006 we have been projecting a revolution. From fossil to sustainable energy, from centralized, large scale energy generation towards decentralized generation, together with the citizen and customer. Now we are in the midst of this revolution. We do not follow, but we are the booster of this movement. (2014)</p>

Table 7.11 - Summary of the data with regard to the incumbent's leadership mindset & strategy.

	Essent	Nuon	Eneco
Mindset characteristics	<ul style="list-style-type: none"> * strongly points to external trends and other actors as driving the dynamic * actively defends the legitimacy of coal and biomass co-firing * shows a more "separate CSR" (vs integral) approach to translating sustainability in business * shows proactive leadership in Bio-based Economy aspects * the strategy change (2013) results in more actively embracing new service business models 	<ul style="list-style-type: none"> * points to external trends and other actors as driving the dynamic * seeks financial consolidation to mitigate short-term effects of changing market conditions and furthermore is seeking considering its threefold strategy change in five years * shows considerable grasp of the value creating potential and the need to make concrete changes and reduce CO₂ * With regard to fundamental transformation Nuon uses a rather passive discourse 	<ul style="list-style-type: none"> * acknowledges the influence of market trends and public policy, but shows the most independent position in comparison * shows focus on value creation and internal alignments as traits of an active approach * is clearly differentiated by an earlier (2006-2008) and fundamental adoption of decarbonization and decentralization * co-creates its strategic KPI's with ENGO WWF
Mindset pro-activeness	<p>Reactive motives dominate, but combined with some active and proactive approaches to specific matters. The new strategy of RWE announced in 2013 includes important proactive aspects</p>	<p>Combination of reactive and strongest active motives</p>	<p>Dominant proactive vision with reactive and active elements present</p>
Core strategy	<p>Coal + co-firing + bio-based economy</p>	<p>Gas & wind</p>	<p>Wind & solar, gas as support, early adopter decentralization/prosumer</p>
Targets	<ul style="list-style-type: none"> * Production focused targets (2020 400 g/kWh & 20% renewables -mainly biomass). Reaching targets strongly dependent on biomass support. * Shifts to RWE level target setting in 2013 	<ul style="list-style-type: none"> * No Nuon specific goals are set. Vattenfall has a 2030 -50% CO₂ target 	<ul style="list-style-type: none"> * Production (2013 20% renewable including PPA & <300 g/kWh) & supply (20% "dark green") targets * has concrete short term (2013) targets * later "One Planet" targets are less transparent

7.4 POSITION DATA: ENECO HAS A RATHER DIFFERENT STARTING POSITION

Owned generation capacity in the Netherlands is used as indicator of the strategic position of the incumbents. As discussed in section 3.7.2, assets can be complementary in a transition, but more importantly, they can be a barrier as sunk costs inhibit a quick transformation. Generation assets (besides networks in the case of Eneco) represent, on balance, the largest share of tangible asset value of the incumbents. Their lifespan is long (30-50 years). As such, those represent the largest sunk costs and indicate what value is at risk in a hasty repositioning effort. In contrast, a larger share of renewable generation assets can be considered a complementary asset for the incumbent aspiring to a leading role in the transition. Besides the direct capacity effect, the knowledge developed in the process of developing and exploiting these assets is complementary to developing new assets of the same category. For comparability purposes, contracted capacity (PPAs) were excluded as these can be more easily terminated and thus to a lesser extent induce rigidity. Furthermore, the comparison focused on the capacity in the Netherlands. While this was the geographical focus of this case study, outside of the Netherlands other group companies within the Vattenfall and RWE would have to be included. For transparency purposes, the table included in table 7.12 does include the capacity outside of the Netherlands that was reported by Eneco, Nuon and Essent. For Nuon and Essent this mainly included smaller gas-fired units in neighboring regions in Belgium and Germany. For Eneco this represented a relatively more substantial part of their onshore wind capacity located in Belgium and the UK.

The most pronounced difference was that Eneco owned a much smaller conventional capacity asset base. Both Essent and Nuon owned ten times as much capacity in total, compared to Eneco. In 2010 Nuon and Essent respectively produced approximately 60% and 80% of their supplied electricity with their own assets. Eneco historically did not develop or acquire much conventional capacity and consequently procured its electricity mainly on the wholesale market (both through PPAs and short-term trading). It should be noted that Eneco did aspire to develop more capacity, as owning capacity provides competitive advantage in the supply market (see section 5.5). In the studied period, Eneco completed one gas-fired power plant (Encogen), in which it had a 50% ownership. From the perspective of the transition, their relative lack of assets also provided them flexibility, and limited the financial burden of an accelerating transition.

All incumbents had already developed some position in renewables assets. Due to the much lower total capacity base, renewable assets represented 88% of Eneco's total asset base, while for Nuon and Essent this was 9% and 15% respectively. However, in an absolute sense and excluding biomass co-firing all three incumbents owned a relatively limited 200-350

MW capacity (in comparison to their total supply). Essent had a much stronger position in biomass co-firing, which is related to their strategic focus in this respect (see section 7.3). The most material contribution besides this is the onshore wind capacity developed by each of them since the late 1980s. A potentially relevant difference is that Eneco and Nuon both had experience with offshore wind and solar projects, while Essent had not yet developed these kinds of assets. However, it is noted that on group level, RWE does have this experience. The experience with river-based hydro assets was less relevant as no growth in this segment is projected.

Table 7.12 - 2010 capacity in terms of owned generation assets (excluding PPA).

	(MW)			(% total)		
	Essent	Nuon	Eneco	Essent	Nuon	Eneco
Coal	900	863	-	25%	22%	0%
Biomass	320	5	15	9%	0%	5%
Gas	2.205	2.693	32	61%	69%	12%
Wind onshore	198	209	159	5%	5%	58%
Wind offshore	-	108	60	0%	3%	22%
Hydro	11	24	1	0%	1%	0%
Solar	-	8	8	0%	0%	3%
Unknown	-	-	-	0%	0%	0%
Total NL	3.634	3.910	275	100%	100%	100%
Abroad conventional	133	89				
Abroad renewable	3	13	111			
Total business unit	3.770	4.012	386			

7.5 OUTCOMES: THE DIFFERENCE MAGNIFIES WHEN LOOKING AT THE OUTCOMES

7.5.1 Transition impact: decarbonization & renewables growth

A multi-perspective approach was used to capture the different angles from which incumbents made their contributions to the transition. The incumbents' position in the electricity sector value chain in fact combined two business models: electricity generation and supply (see section 5.2.5). Therefore, their contribution is best analyzed from both angles. Besides their direct impact, incumbents can also indirectly enable their customers to generate or save energy. Hence, their customer impact is also relevant to consider.

Incumbents also executed and contributed to R&D activities. As it takes a considerable period of time before these activities directly influence either generation or supply activities, a consideration of knowledge creation as intermediate outcome is relevant in this respect.

Generation: only Eneco outperformed the market

The growth of renewable generation (G1 in table 7.13) revealed different speeds. Whether the capacity or production is compared, Eneco (132% & 75%) grew much faster than Nuon (34% & 24%), while Essent even showed a negative development (-26% & -12%). A large part of the growth was related to growing wind capacity. As the behavioral data already revealed, Eneco had many more projects and this was also reflected in the outcome data. While their capacity grew with 111%, Nuon's and Essent's capacity grew with 39% and 9% respectively. It can be remarked that Essent had a 90 MW onshore wind project approaching its investment decision (Westerveerdijk, 14E-C4, p. 38) at the end of the studied period. Including this project, Essent's growth figures would have been approximately 50%. But even considering this, the growth in wind capacity of Nuon and Essent was much slower than Eneco. The negative trend of Essent can be explained by declining biomass co-firing, which shows the vulnerability of this strategy, as the expired subsidy scheme directly resulted in declining production. Nuon and Essent were part of larger groups and emphasized several times that due to lack of favorable support climate investments were diverted to other countries. To account for this potential effect, the growth of renewable production on group level was also compared. While this resulted in more favorable numbers for both Essent and Nuon, Eneco still remained as the leader and Essent/RWE especially showed a slower pace than the other two.

Reviewing the contribution of renewables production in relation to the total firm production and supply revealed the long way still to go (see G2a & G2b in table 7.13). In this context, it is relevant to account for the effect of hydro power. While Scandinavia provided for good opportunities, Vattenfall's performance was much more favorable. Including hydro power, Vattenfall could cover 20% of its sales with renewable production in 2014. For RWE, this number was much lower: only 4%. The advantage of Vattenfall was mainly a historical effect, as its current growth is mainly in other renewables. Eneco's faster growth is reflected in the fact that in the 2010-2014 period, it more than doubled its share of supply from renewable production (8% > 20%), while Vattenfall remained stable at 20%. But Vattenfall and Eneco with both 20% of their sales covered by renewable production, still have a long way to go to realize a sustainable generation base. For RWE, with only 4% as yet covered by renewable production, this is even more striking. It could be remarked that when comparing renewable production to total controlled production (so excluding the power procured on the market), Eneco is much further ahead with 49% covered by renewable capacity. This was, however, mainly caused by its smaller owned capacity base. Looking

forward, this does indeed give them more flexibility than the other two, but does not reduce the challenge to cover the remaining 80% of their supply with renewable production capacity.

The incumbents made a substantial contribution to the total Dutch renewable production, however the contribution is declining in some respects. If the owned renewable capacity is compared to the total installed base in the Netherlands, the three incumbents owned 33% in 2010 and this declined to 27% in 2014. Only Eneco increased its share in capacity from 6% to 10%, revealing an above market average growth of capacity. The shares of Nuon and Essent declined, caused by a below average growth in total and this decline was intensified by the decline of biomass co-firing of Essent. Furthermore, if the total production including contracted capacity is compared, the contribution of the incumbents grew from 53% to 65%. This reveals that the incumbents realized a large part of their growth by increasing the (long term) contracted capacity. Also in this respect Eneco showed the most favorable trend. It can be remarked that while their share was substantial, these shares still did not match their dominant position (80-85% market share, ACM 2015) in the (retail) market. Furthermore, as their share in the total Dutch electricity generation capacity grew from 31% to approximately 40% over the studied period, due to new conventional assets²¹, their declining share of owned renewable capacity (compared to the total renewable capacity in NL) can be considered negative.

Supply: only Eneco showed limited progress in reducing CO₂ emissions of supplied electricity

Looking at the supply resulted in comparable conclusions: there is still a long way to go and the trend is negative except for Eneco. In 2014 Eneco supplied 17% of its electricity based on renewable generation (see S1 in figure 7.4). Essent (15%) followed closely, while Nuon lagged behind in this respect (4%). It should be emphasized again that these percentages reveal the long way still to go in the transition of the electricity supply to renewable sources (NB: the percentage for Eneco was lower than the previous (G2) comparison on group level and this corresponded to the fact that Eneco developed approximately 40% of its capacity outside NL). For Nuon and Essent, the share of electricity generated based on fossil fuels and especially on coal grew (8% and 7% respectively), related to their extension of capacity.

²¹ Calculated by dividing the capacity reported by incumbents (ex PPA, source: annual/CSR report) by the total installed capacity as reported by CBS (Statline, Table: Elektriciteit; productie en productiemiddelen, retrieved September 16th 2016). Due to incomplete reporting by Eneco, it was only possible to determine shares for 2010 (31%), 2012 (41%) & 2013 (39%).

Table 7.13 - Renewable electricity generated by incumbents. Blue shaded cells represent estimates, see Appendix G for a discussion of method.

G1 - Renewable generation growth - Change 2014 vs 2010

	NL owned renewable capacity	Owned wind capacity	NL renewable production	Group renewable production
Eneco	132%	111%	75%	77%
Nuon/Vattenfall	34%	39%	24%	65%
Essent/RWE	-26%	6%	-12%	24%

G2a - Renewables contribution to incumbent product & sales - excluding hydro

	2010		2014	
	Production	Sales	Production	Sales
Eneco	16,0%	8,2%	49,2%	20,2%
Vattenfall	2,1%	1,9%	3,5%	3,1%
RWE	2,4%	1,7%	3,2%	2,6%

G2b - Renewables contribution to incumbent product & sales - including hydro

	2010		2014	
	Production	Sales	Production	Sales
Eneco	16,0%	8,2%	49,2%	20,2%
Vattenfall	22,7%	20,1%	23,4%	20,3%
RWE	2,7%	1,9%	4,8%	3,9%

G3 - Incumbent contribution to total NL renewable production

	2010		2014	
	Own capacity	Production	Own capacity	Production
Eneco	6%	15%	10%	25%
Nuon	11%	12%	9%	18%
Essent	16%	26%	8%	22%
Total	33%	53%	27%	65%

It should be noted that incumbents tended to present the share of hydro power also as renewable. This was, however, largely based on certificate importing and had limited to no impact on the transition of the Dutch electricity supply (see section 5.2.4). It is remarkable from this perspective that Eneco had decided in 2011 to cover the remaining share of fossil-based power in the retail market by hydro certificates, resulting in 44% hydro power in its supply mix in 2014. For the other two incumbents, the percentages were lower (Essent: 17% & Nuon: 10%), but still substantial. Considering this, it should be remarked that the incumbents were more dependent on conventionally generated power than these supply mix figures at first sight might indicate. In the case of Eneco, the share of power backed by imported hydro certificates in reality could only be generated by capacity in the Netherlands or neighboring countries (limited to the capacity of the interconnectors) and was therefore likely to be conventionally generated electricity.

Considering the CO₂ emission reduction, only Eneco achieved limited progress, while the other two showed a deteriorating performance. In this data analysis, the grams of CO₂ per supplied kWh were used as an indicator to compensate for volume effects. In the reported numbers, Essent and Nuon's performance decreased by 31% and 9% respectively. This was mainly related to the growing share of coal-fired power in their supply mix. Eneco reported to have reduced the CO₂ emissions per unit of supplied electricity by 53% over the same period. A large share of this improvement, however, can be attributed to the increase of hydro power certificates mentioned in the previous paragraph. When the effect of the hydro share was compensated, an improvement of 14% remains for Eneco, while the performance of the other two decreased by less (Essent -14% and Nuon -4%, related to a declining share of hydro power). Considering that one of the key drivers of the transition was decarbonization (to mitigate climate change), this adverse performance trend can be considered remarkable. It is also remarkable that over the studied period the performance gap between Eneco and the other two grew from 13% to 31%.

Customer impact: a lack of transparency made impact estimation complicated

Although the incumbents did seem to contribute to energy saving by their customers, the impact is not transparent. As discussed before, incumbents reported on energy saving facilitating activities: they provided advisory services, sold energy saving products (such as lighting and insulation), and provided integral building level solutions in the 2B segment. Unfortunately, there was no structural reporting on the effect of these activities. Nuon mentioned some volume numbers (e.g. 1,06 m² insulation material sold in 2010), but only on an incidental basis. Essent in the first years reported on a KPI named "CO₂ saved at

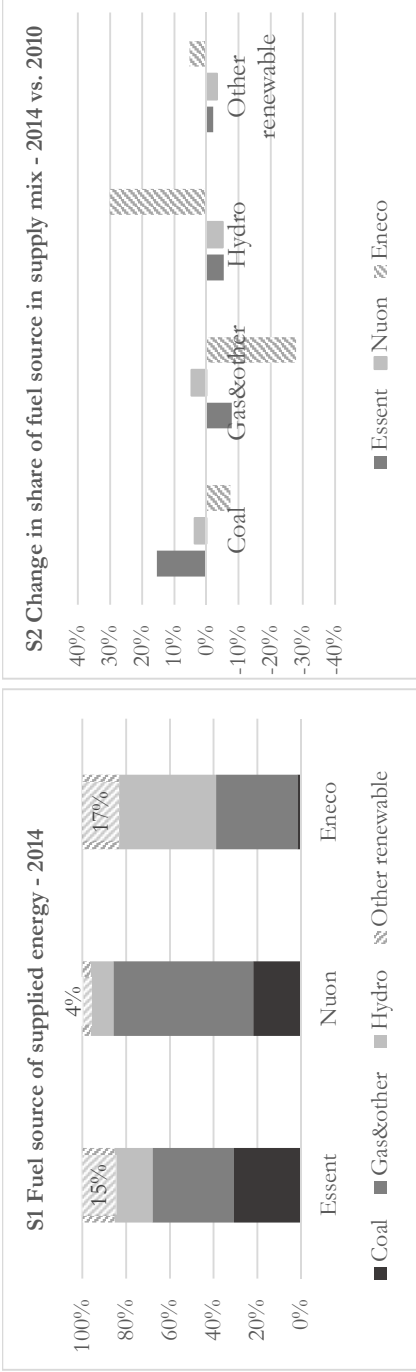


Figure 7.4 - Fuel source mix of the supplied electricity.



Figure 7.5 - CO₂ emissions per unit of supplied electricity. *: CO₂ original + share hydro * 375 g/kWh, assumes replacement with gas power.

customers” and reported 121 kton saved until 2012 in the operation of their customers (12E-C1, p. 40). This was partly done by providing compensation-based solutions for the gas segment (10E-C1, p. 56) and thus did not directly correspond to energy saving. Furthermore, all the three incumbents reported on value-added services for the building environment, which often included energy saving through insulation and/or utilizing heat exchange. Although projected savings are often mentioned per project, it is not always clear whether these saving were actually realized. An evaluation of governmental policy evaluation documents on energy saving programs also revealed that incumbents did play a role in these broader programs e.g. in advising consumers (PBL 2014, especially p. 129-138). The same documents, however, also acknowledged the complicated dynamic of stimulating energy saving and national level results have undershot expectations by far (5% saving vs. 17% projected for the building environment, in the period 2008-2015, PBL 2014, p. 30). Finally, all incumbents have developed apps to enable consumers to realize energy savings by providing transparency. A recent evaluation of the apps available on the market revealed that Eneco with its TOON has a leading position (33% share) and is evaluated positively (RVO 2016). All this said, it remains complicated to get a reliable estimate of their impact in this respect.

With regard to facilitating solar power generation there are some indications of leadership by Eneco, however also with regard to this segment transparency is lacking. In the studied period solar panel installation especially by consumers accelerated. None of the incumbents reports structurally on their ability to contribute to this development, although all mentioned some activities (e.g. offering panels as a product and financing propositions). Based on the reported activities, Eneco seemed to be leading. They structurally embraced the decentralization as part of their branding, cooperated with ENGOS in developing the market, and acquired a company with a specific proposition for consumer solar solutions (ZON-IQ). Based on recent occasional reporting on the number of panels sold by ZON-IQ and via the collective purchase program together with SN&M (Zon & Zeker), a market share of 5-10% in prosumer solar solutions was estimated (see Appendix G for methodological notes). The observation that the incumbents had a relatively limited position in the solar segment, and the relative leadership of Eneco was also concluded in a recent report by Roland Berger (Roland Berger 2015).

Knowledge creation: overall focus on incremental paths seems related to incumbent presence

Although the impact of the Topsector and the role of the incumbents within it cannot be exactly measured, it is remarkable that there was a tendency to select predominantly incremental pathways. The electricity sector had a tradition of collaborative and publicly

Table 7.14 - Summary of the evaluation of outcomes of the incumbents' innovation behavior in the context of the transition.

	General	Essent	Nuon	Eneco
Generation		* almost no new renewable capacity * renewable production decreases due to strong decline of co-firing (temporary?)	* moderate increase of renewable capacity (but below market average)	* doubles capacity and grows above market average
Supply		* strong increase of coal supply (+15%), other sources decrease	* moderate increase of coal & gas in mix, others decrease	* strong increase of hydro power (certificates) in mix and moderate increase of renewables
CO₂		* efficiency substantially declines over period, due to shift to coal & less biomass co-firing	* is worst in top3 & slightly declines in the studied period	* efficiency improves +14% over studied period (hydro effect excluded)
Customer/prosumer impact	* no player can as yet make transparent the scale and impact of these activities * the general impression of interviewees is that the scale is still marginal * energy saving: incumbents have an important role in advising consumers, but are distrusted. 2B segments are mostly reported in terms of single building projects * solar: role of incumbents seems to be more limited * public EV charging is scaled to medium scale (300-500 charging poles)	* reports 121 kton CO ₂ saved in the operation of customers, part seems to be compensation * reports stopping EV projects as being not economically feasible	* in early period reports on energy saving measures, e.g. including 1,06 m2 insulation installed (2010) and 5-10k savings advises per year	* found as clear leader in solar projects and prosumer sales (estimated 5-10% share) * smart home platform TOON has leading position (33% market share) and is praised for smart design * reports 10 ESCOs in 2012

	General			Essent			Nuon			Eneco		
Knowledge creation	<ul style="list-style-type: none"> * difficult to assess, also considering short time frame. Most measurable funding is €500m from private sector * >80% of funding is for gas, bio-based and solar programs, which seems to prefer incremental programs * the three incumbents are strongly present in Topsector, with Nuon less prominent than the other two 			<ul style="list-style-type: none"> * theme leader in bio-based economy, active on offshore wind & gas * Amer co-firing is noted as a best practice of incumbent-led knowledge creation. Cuijk 2.0/3.0 mentioned as central project 			<ul style="list-style-type: none"> * active in gas, bio-based and building solutions programs * Diemen heat buffer mentioned as best practice 			<ul style="list-style-type: none"> * strongest presence in smart grid/ cities programs and active in offshore, gas & building solutions * several projects mentioned as examples: Rotterdam steam pipeline & cooling net & Smurfit-Kappa CHP 		
Corporate financial sustainability	<ul style="list-style-type: none"> * transparency is lacking, especially with regard to new business models on the supply side * on the supply side, all incumbents are losing market share due to general competitive dynamic 			<ul style="list-style-type: none"> * heavily impacted by declining prospects of conventional activities and potential forced phase out * below market average growth in renewable generation 			<ul style="list-style-type: none"> * heavily impacted by declining prospects of conventional activities and potential forced phase out * below market average growth in renewable generation 			<ul style="list-style-type: none"> * much less exposure to negative trends in conventional segment due to earlier strategy change * increasing share in renewable generation * potential separation greatly impacted Eneco's overall profitability * some indications of scaling new business models (especially TOON), but still loss making 		

sponsored R&D. Before privatization, the sector had outsourced these activities to the KEMA institute. In a way, this collaborative tradition continued within the current Topsector program. Within the context of this program, €100-200 million per year of research funding is provided to a selection of themes. As was already remarked in section 5.2.1, almost 80% was spent in line with the current economic stakes of the Electricity and manufacturing sectors. The currently available policy evaluations unfortunately concluded that besides the raised budgets, no concrete impact can be reported yet (CE Delft 2014, p. 56). A text search of 66 documents did reveal considerable presence of incumbents in most programs, and mentioned some of their projects as best practices. As such, due to their clear presence, it seems appropriate to attribute the incremental focus to their influence, in line with a common hypothesis in the transition literature (Farla et al. 2012, Markard, Raven & Truffer 2012, Geels 2005).

7.5.2 Financial outcomes and corporate sustainability

To understand the financial impact, it is relevant to consider the impact on market share and profitability as well as the future sustainability of the business models underlying these trends. Based on the assumption that proactive strategies create a (long term) competitive advantage (proposition 10) it is logical to assume that this has a positive impact on the market share of the incumbent. To understand the sustainability of this market share gain, it remains relevant to consider that some business models might function as “stepping stones” or “transition solutions” (Farla, Alkemade & Suurs 2010, Suurs, Hekkert 2009b) and might only create an advantage for a limited period of time. Another consideration is whether the new business models realize a sustainable profit. First, the new models resulting from the innovation dynamic in the context of the transition can have a higher or lower profitability than the sector was used to. Second, because many innovations are supported with subsidies, or social investment, or are cross financed from other more profitable activities of the incumbent, their sustainable profitability remains questionable. Without an underlying sustainable profitability, business models might be greatly hampered in their scalability or even disappear again.

There are some important considerations to account for in the intermediate assessment of financial outcomes. First, most of the incumbents were heavily impacted by the declining prospects of conventional generation. Although these were material effects, the write-offs were one-off effects and this does not mean that earnings are no longer possible with conventional assets. Second, the incumbents were significantly altering their portfolios with acquisitions and divestments, which made analysis of the structural trend rather complicated. Third, revenues and profits of electricity sector incumbents are rather sensitive to temporary fluctuations of the global resource market and weather dynamics.

Table 7.15 - Future assumptions underlying the discussion of the financial sustainability of incumbents.

	Assumption of future scenario	Indicators of sustainability
Generation	<ul style="list-style-type: none"> * renewable generation will comprise a large part of generation * early phase out of part of (at least coal) the conventional assets 	<ul style="list-style-type: none"> * limited value at risk in conventional assets * market share in renewables generation * renewable share of own production
Supply	<ul style="list-style-type: none"> * direct supply revenues will dilute and will be partly replaced by new (value-added) service-based revenue streams 	<ul style="list-style-type: none"> * general market share development * revenues and profitability from new service-based models

The discussion below builds on transparent assumptions to understand current outcomes in the light of a likely future scenario. While transitions are not linear, dynamics and intermediate outcomes are not necessarily the same as the long-term outcomes (see section 3.6), and an assumption is needed about how current dynamics are related to future sustainability. It is immediately recognized that this remains a projection, but it is argued that this is the only available option and it is best to make the assumption explicit and transparent. For renewable generation, it is argued that it will be the dominant future model, although a limited share of conventional generation might be present for a considerable time. For the supply side, the future business model is still rather open, but it is argued that a substantial part of the current direct-supply revenues (earnings per supplied kWh) will dilute as customers increasingly generate their own electricity, energy efficiency improves further, and marginal cost of electricity structurally decreases. Consequently, it is relevant to understand future sustainability, whether incumbents are able to earn money in this context with models that build on new, value-added revenue streams.

Generation: Eneco’s proactive strategy led to an improved market position

The most pronounced difference is the lower exposure to negative financial impact in the conventional generation segment. While indeed the major write-offs (see section 5.3) do not indicate that there is no earning possible on midterm, it does indicate that the prospects have greatly declined compared to the assumptions underlying the latest round of investment in conventional assets in the late 2000s. Furthermore, current political dynamics both on national and international level make a forced and early phase out of conventional (or at least coal) assets a relevant scenario (see section 6.5). Eneco, with its proactive vision on decarbonization, already realized in 2006 that this would result in a fundamentally different

market dynamic (see section 7.3) and consequently limited its investment in conventional assets in the 2000s (only 50% of the Enecogen power plant). While RWE and Vattenfall respectively have transitioned 4,8% and 23,4% to renewable sources, Eneco augmented its generation capacity in 2014 to 49,2% renewable sources (see G2b in table 7.13). As such, their value at risk in the phase out of conventional assets is much lower.

Second, it can be concluded that Eneco as proactive player gained market share in the renewable generation segment. As concluded in section 7.5.1, Eneco grew market share in renewables compared to its incumbent competitors and also compared to the market in general (see G3 in table 7.13). As such, this data confirms the proposition that a proactive strategy results in a competitive advantage and market share (at least on mid-term).

Table 7.16 - Operational result (EBIT) of RWE per division (13R-F1, p. 66, 14R-F1, p. 44).

	2012	2013	2014	2013	2013	2014
	(EBIT €m)			(share of total EBIT)		
Conventional generation	3275	€ 1.384	€ 979	57%	26%	24%
Supply DE	1578	€ 1.626	€ 1.871	28%	30%	47%
Supply BE +NL	190	€ 278	€ 146	3%	5%	4%
Supply UK	286	€ 290	€ 227	5%	5%	6%
Central-East & South-East EU	1052	€ 1.032	€ 690	18%	19%	17%
Renewables	183	€ 203	€ 186	3%	4%	5%
Trading	-598	€ 831	€ 274	-10%	15%	7%
Other	-235	-€ 275	-€ 356	-4%	-5%	-9%
Total	€ 5.731	€ 5.369	€ 4.017	100%	100%	100%

There are several arguments to assume that renewable generation at the moment is also a relatively profitable activity. Only RWE reports separately on the profitability of its renewables activities. Based on this data two things can be concluded (see table 7.16). First, RWE is able to earn money with renewable generation. But, second, this is still a marginal part of their overall profits. Unfortunately, Eneco, Nuon and Vattenfall do not provide the same transparency. They do, however, less formally comment that renewables contribute to positive results. For example:

Q176 “The improved results from production and supply are, according to Eneco, induced by the start of service of some large windfarms, including Luchterduinen, Delfzijl Noord as well as farms in Belgium and the UK.” (Eneco spokesman Spruijt, Energieia August 5 2016)

Another argument also supports the claim that renewables assets are rather profitable at the moment. All larger assets are partly subsidized from the SDE+ government support scheme.

This scheme eliminated a large part of market risk, as it subsidized the difference between the market price and the actual cost and also allowed for a “reasonable profit margin” (7-8%, interview 6). Considering the balance between risk and reward, renewable generation is the most attractive activity in the market at the moment, according to several interviewees (interview 10 & 16).

It is likely that the leading position of Eneco can be sustained, but this depends on technological developments. The large gap in investment data discussed before (section 7.2.4) indicates that for the next period, Eneco is likely to maintain its leading position. The question remains, however, how long the currently developed assets will remain relevant. First, one can ask whether they are sustainable financially when subsidy schemes expire. In case of biomass the expiry of the scheme led to an immediate decline of market activity. It is argued that wind and solar assets are fundamentally different in a crucial aspect. While biomass costs are mainly resource based and as such marginal, wind and solar have rather low marginal costs because there are no resource costs. As the investments are sunk costs, their future market competitiveness (in case of operational assets) depends on their marginal costs and this makes their future sustainability much more likely. There is, however, another dynamic which does potentially reduce the lifespan of the currently developed assets. Further rapid technology development might bring down the cost price such that older renewable assets might still be prematurely replaced by newer renewable assets. Whether this will be the case can hardly be predicted at the moment.

Supply: incumbents in general struggle with the market dynamic

The market share of the incumbents is declining, but this seems more related to increased competition in general. The competition in the electricity sector has greatly increased as a consequence of privatization (see section 5.2.5). Over the past decade, many new entrants became active in the Dutch market. The overall market share of the incumbents (in at least the retail market) has declined by 5-10% in that time, but still remains rather dominant (see figure 7.6). During the interviews, especially challengers in the market stressed that the heavy cost structures of incumbents hampered their competitiveness when facing new entrants with lean and digitized operational models (see section 5.5.2). Although some of the new entrants actively competed with a sustainability-rooted strategy, many of the larger new entrants used a more generic, often price-based competitive strategy (Budget & NLE as well as the foreign incumbents Engie & EON). In fact, Greenchoice is the only new entrant of which evidence is available that they attracted more than 100.000 customers, mainly based on a sustainability-rooted strategy in the studied period (365.000 customers in 2015/16, analysis based on CE Delft 2015).

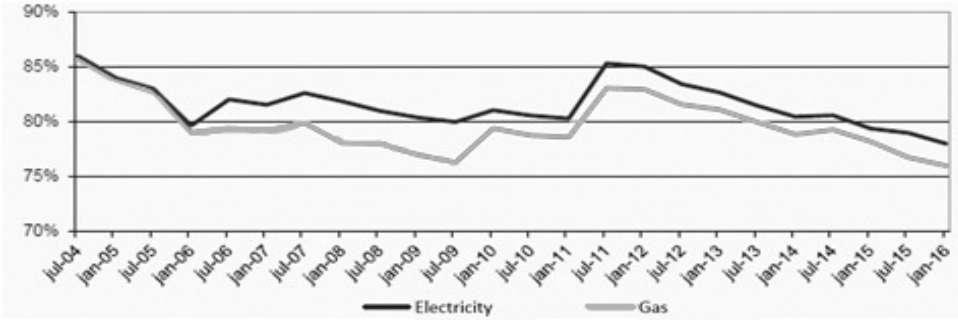


Figure 7.6 - Combined market share of the three incumbents in the retail market (source: ACM 2016).

The question remains whether the proactive strategy of Eneco has resulted in a competitive advantage. The spike visible in 2011 in figure 7.6 does relate to Eneco: namely the acquisition of Oxxio (400.000 customers). It is, however, argued that this can hardly be seen as a sign of success of Eneco’s sustainability strategy, but is a more generic market-based move. Another possibility is to compare electricity sales volumes of the incumbents. This does not, however, provide more clarity as Nuon’s data is affected by a reporting change and Eneco’s data is incomplete. This does at least not provide evidence for a fundamental performance difference between Eneco and the other two. In contrast, Eneco’s dependence on supply-side revenues (as well as network/DSO revenues), is a key risk for them as well. In the light of the potential legally-enforced separation (which seems most likely to be executed early 2017), this has a strong, negative impact on their future earning model. As such, the timely build-up of sufficient renewable generation earnings is a key activity for Eneco to ensure its future financial sustainability.

Table 7.17 - Indexed electricity sales volume development (source: annual reports, *: affected by reporting change).

	2010	2011	2012	2013	2014
Essent	100	95	95	105	91
Nuon	100	105	104	77*	78*
Eneco	100	112	103	90	

There are no indications that green product development has improved the low margins of supply-side activities. As discussed in section 5.2.5, the profitability of the supply business model has been low compared to the generation activities. While at the moment the major share of “green” products are sold at equal price (see section 5.2.4), the sustainability-related

green products do not seem to change this (except for a small segment of premium priced “dark” green products).

Finally, it is relevant to consider that there are no indications yet that incumbents have been able to develop substantial revenues based on new (service) business models. When customers – as generally projected – will generate a substantial share of their electricity needs themselves, the traditional revenue stream of incumbents will be severely diluted. While the revenue development in the studied period does not yet indicate such a (strong) disruptive trend, the fact that all incumbents did embrace this narrative in their strategies (see section 5.5 and 7.3) confirms the strategic relevance. In this respect, it is relevant to consider that there are no indications yet that incumbents have been able to scale new business models to substantial earnings. In the previous section it was concluded that incumbents are not transparent at all about the scale of these activities. Even more significantly, they do not report at all about whether these new activities result in substantial revenues and turn out to be profitable in practice. Eneco does report on “other revenues,” but the content of these activities is unclear and the growth in this respect is rather limited. The most mentioned example of a new business model of the incumbents achieving some scale is Eneco’s “TOON” smart home platform (Interview 2, 5, 8, 11, 16). A knowledgeable interviewee, however, revealed that it was at least until 2016 a loss-making activity (interview 16). Although this is in line with Eneco’s internal strategy that predicted a loss-making launch phase, the interviewee was skeptical to date on whether the current dynamic indicates a smooth turn towards a profitable activity in the near future. As such it is valid to conclude that the incumbents in general have not yet successfully addressed a key strategic risk facing their supply-based business or at least did not reveal any convincing evidence in this respect.

Table 7.18 - Other revenues reported by Eneco compared to the total revenues (source: annual reports Eneco).

(€m)	2009	2010	2011	2012	2013	2014
Other energy activities	€ 135	€ 158	€ 96	€ 106	€ 107	€ 96
Total revenues	€ 5.018	€ 4.722	€ 4.839	€ 5.082	€ 5.026	€ 4.343

7.6 DISCUSSION

In this section, the primary question is whether the rich data presented before provides evidence for the causal linkages proposed in chapter 3. The starting point in this analysis is the conclusion that Eneco is a case of an incumbent with a proactive leadership mindset and can be contrasted with Nuon and Essent, which are characterized by a dominant mix of reactive and active motives (section 7.3). This provides for the possibility to consider

whether the mindset in conjunction with the strategic position of the incumbents explains their behavior. And second, what are the outcomes both on firm and societal level of these differences in antecedents and behavior? The discussion starts with a reflection on the origins of the distinctive mindset and how its influence is moderated by Eneco's position.

7.6.1 Antecedents: leadership and the interaction with the strategic position

There is substantial evidence that Eneco's different strategy is caused by an explicit choice from its leadership. In section 7.3 it was already explained that document analysis provides evidence that Eneco between 2006 and 2008 developed a proactive strategy with regard to decarbonization and also saw the potential of the bottom-up movement. The evidence presented in section 5.5 emphasized that this was in strong contrast with the dominant cognitive models in the sector at that time. One interviewee recounts that this was the result of a realization of both the emerging transition and the opportunities that this provided and how this was rooted in specific leadership interactions:

Q177 In those times Ad van Wijk [then CEO Econcern] and Jeroen de Haas visited a bar together. Ad van Wijk explained how the whole world would demand sustainable, instead of grey energy in the future. He also explained how it is perfectly possible to acquire subsidies for these activities and from that moment Jeroen started making the switch: if we develop new capacity, then that will be sustainable capacity. (Interview 16)

Moreover, several interviewees asserted that the critical reactions which this vision at first triggered, indicated that there was indeed an explicit and purposive mindset shift happening.

Q178 Jeroen de Haas took office then and he saw that his world was changing. He saw a new future image emerging. But it is important to note that he - although I do not want to say reviled - was laughed at: "this is never possible." (Interview 13)

Q179 Then we were visited by the big four consultancy firms: "Eneco, please quit. Sell the assets. In only a few years, only four or five large energy players will remain." (Interview 13)

Q180 The shareholders stated: "Very nice this sustainability, but it seems that you should look for grey assets now." That is maybe the headwind he faced. And maybe also other CEO's who in the first two years looked at him thinking: "Excellent, but we will see who will laugh last..." (Interview 16)

It is relevant to add that the differential position of Eneco played a crucial moderating role in this process. As shown in section 7.4, Eneco, due to historical reasons, had an asset-light starting position. In section 5.5 it was explained that this was at the time perceived as a

competitive disadvantage. Some interviewees maintain that the strategic turn of Eneco should be interpreted as an initiative to catch up and was related to lagging behind in the competitive dynamic at that time.

Q181 Eneco always floundered a little bit in the rearguard without production assets, at a time when precisely these assets provided for bizarre returns. It was all about being vertically integrated [at that time]. They did like acquiring grey assets very much, but consistently came the day after the fair. (Interview 16)

Q182 If one looks at Eneco: they do not have any generation capacity, besides their one gas power plant. They saw this as an opportunity, because they had to carry less ballast. (..) But this is sometimes also born from necessity. (Interview 17)

It is, however, argued that their distinctive strategy can only be explained in combination with their proactive mindset. Although it is true that Eneco explicitly framed “vertical integration” as part of their strategy (see the relevant section below), their interpretation reflects their different mindset regarding the development of the electricity sector. While they – as a result of that strategy – also invested in a new conventional asset, they explicitly chose gas, limited their exposure by co-developing with DONG, and by partially working with PPAs. Second, they actively framed renewables as a strategy to leapfrog vertical integration. As such, this interpretation is in strong contrast with the more conventional solutions of that time to recover their competitive position by developing coal capacity or seeking a merger or acquisition.

Q183

2. Strengthening vertical integration

Eneco Energy Trade - with their procurement and sales activities - are pivotal in connecting production and supply to our customers.

The strengthening of vertical integration will be implemented by:

** Procurement of larger volumes from wind farms, biomass power plants and gas power plants controlled by Eneco.*

In 2012 70% of our supply portfolio is covered by our sustainable production, from Encogen as well as PPA's from other gas power plants. In 2009 this was 47,5% and in 2008 33,8%.

** Improving our position in the gas market, amongst other things by development of gas storage capacity and the closure of bilateral gas procurement contracts.*

In 2012 Eneco expects to acquire 60% of its supply volume by owned shipping instead of an agent mode. In 2009 this was 35%. (09O-C1, p. 31)

To conclude, Eneco's mindset – when it emerged – was strongly proactive and resulted in a distinctive interpretation of the dynamic in the sector and their position within it. Adding their strategic position – as moderator – however, enriches the causal understanding. It is Eneco's asset-less position which turned into an advantage and gave them a jumpstart in the light of this strategy. Or phrased differently: without their particular position, it would have been much more complicated to execute this strategy. The crucial thinking frame to see their asset-less position as an opportunity remains, however, a matter of (distinctive) interpretation.

7.6.2 Influence on behavior: overcoming optimization bias and pilot paralysis

The behavior data analysis shows that purely counting projects is insufficient to understand the difference between Eneco and the others. Over the most comparable period (2010-2012) Eneco had 22% more projects compared to the average of the other two. While this is a significant difference, it still is limited. If conventional projects are excluded the difference magnifies to 42% (over the same period). Based on the theoretical framework of incumbent motives presented in chapter 3, there is an important explanation why the difference on (simple) project count level can be expected to remain small. The reactive mindset prioritizes legitimacy and seeks to stay legitimate while minimizing cost. From this perspective launching new pilot projects often guarantees positive attention, while the costs are marginal compared to scaling new solutions. As such, the reactive mindset is likely to reinforce the pilot paralysis phenomenon. It is argued that this points to the relevance of going beyond superficial behavioral analysis and confirms the need to study incumbent behavior in conjunction with the underlying mindset and its outcomes.

In terms of innovation content the data highlights the broad range of different innovation types required in transformation and the relevance of open and cross-sector innovation. As highlighted in section 7.2.2, the innovation portfolios of the incumbents include a broad range of activities encompassing R&D, process improvement, asset developing, green marketing, product innovation as well as new business model development. This reveals the broad set of skills required from incumbents to be successful in the transition, as well as the fact that the electricity sector has already progressed way beyond the inactive stages. The most radical innovations included in the portfolios of the incumbents confirm the relevance of open and cross-sector innovation and partnership. For example, in the context of new business models empowering prosumers and EVs, incumbents become involved in activities that were traditionally defined as mobility and finance activities. A remarkable difference related to Eneco's proactive strategy is that they have been able to build up most material

partnerships with NGOs. They cooperated with WWF in drafting their strategy, but also, for example, cooperated with SN&M in selling solar solutions to consumers.

The data provides evidence that incumbents with a (re)active mindset are more prone to an optimization bias in their innovation portfolio. The difference between Eneco and the other two is most pronounced in the “incremental” project segment, where the other two have relatively twice as many projects in their portfolio. Section 5.3 to 5.5 already provided a rather extensive discussion of how cognitive institutions contributed to major investments in conventional assets in the late 2000s, which, with the wisdom of today, seems rather unfortunate. During the interviews, additional evidence was also provided of the presence of the “optimization bias” within the internal processes of the Vattenfall and RWE groups. For example, in case of Vattenfall as parent company of Nuon, it was noted that the consolidation strategy was closely related to the optimization preference of its leadership at the time. This contrasts with its external reporting in which the consolidation was presented as a deliberate choice to prepare the company for transformation.

Q184 Oystein [Loseth, CEO Vattenfall] himself was in a difficult situation, because the chair of the board was rather dominant. He was not an innovator either, he more resembled a technocrat with a strong capacity with regard to optimization of the status quo and cost reduction. But he lacked the guts to make a shift. Vattenfall owned lignite capacity in Germany at a large scale, in strong contrast to the preference of the shareholders. These assets, however, also represent the largest share of the cashflow of Vattenfall. (Interview 17)

Another quote about the internal dynamic within RWE reveals an example of the aversion towards cannibalization. This matches one of the important explanations within the innovation literature why incumbents resist more radical innovation (Chandy, Tellis 1998).

Q185 RWE differs enormously from Essent. If we consider RWE for a moment, then it is important to note that they - to a certain degree against their better judgement - are defending their current position. This also in the context that their firm is greatly dependent on conventional energy generation and they are the largest energy producers in Germany. (...) The ambition to scale a sustainable product [within Essent] did not trigger an enthusiastic response in Germany. They replied that the product would cannibalize the product portfolio, which is largely based on conventionally generated energy. (Interview 5)

The data shows that overcoming pilot paralysis also remains a struggle for Eneco as a proactive player. Although Eneco has the most projects in the category “radical” (10%), this remains for them a small percentage of their total portfolio and the relative difference with

Essent is small (2%). In contrast, both players have a large number of projects in the low scale category (27% in case of Eneco, Essent 28%) which fits the pilot paralysis hypothesis.

The interviews point to the challenge of ambidextrous leadership as a key explanation why scaling more radical innovation remains a struggle. Both Eneco and Essent have large innovation teams (30-50 dedicated employees) and have embraced many general innovation recommendations, such as cooperation with start-ups (e.g. Eneco's smart home platform TOON was developed by the start-up Quby). Structural factors thus do not seem to explain why they struggle to overcome the "valley of death." The interviews instead point mostly at the struggle of leadership: it is rather complicated to concurrently grow a new business next to an old model and it takes courage to commit to scaling a new model in a rather uncertain market. This could be termed a struggle to be ambidextrous as it is defined in the literature as the successful concurrent execution of exploitation and exploration activities (O'Reilly III, Tushman 2004, Raisch, Birkinshaw 2008). Both interviewees from Eneco mentioned that also within Eneco the leadership struggles to meet short-term performance expectations and that this leads to delaying or rejecting innovation projects.

Q186 Your situation can be compared to schizophrenia. On the one hand, you aspire to rapid growth. (...) But it is easy to every year reduce one's [innovation] targets quickly when the results disappoint. To say: "Let's reduce our ambition for TOON and introduce the service later." This is also because you are running in front. That is also the battle happening in the heads of the executive board members. Actually, it is rather simple: you know that the stress to achieve the [short term] targets for this year will always win. These targets are always financial targets. (...) The point of these targets is that they directly imply the ability to pay dividends to the shareholders at the end of the year. (Interview 16)

Second, the interviewees explained that from the internal perspective, a part of the leadership struggles to comprehend the degree of change required in the transformation.

Q187 Interviewer: If you were in the position of Jeroen, what things would you have done totally differently?

Eneco employee: I would have (harshly) replaced a few people. People who do not share the deep, deep conviction that the market is going to change. (Interview 16)

Furthermore, both stressed that there is a tendency to spread thin over many projects in the face of the uncertainty that still characterizes this face of the transition.

Q188 We know we are going in that direction. However, we do not have the guts, we still fear the future, because it is still rather uncertain where it is going (on a

more concrete level). Whether the path will go left or right. In this regard, we remain an incumbent that is risk averse and waits. (Interview 13)

Q189 And I would have made (clear) choices. (...) Whether these would be to invest in technology or servicing or whatever. But the point is making choices, instead of keeping all the balls in the air. (Interview 16)

The previous comments show the relevance of more transparency by incumbents on their new business model related innovation activities. As concluded in sections 7.2 and 7.4, there is a strong contrast between the transparency with regard to renewable asset development, compared to the reporting on new business model activities. While firms report with exact numbers how much renewable capacity they have developed, how much they have invested in this respect, and in some cases how much they are now earning with these assets, reporting on new business models remains qualitative and provides limited perspective on the future potential. Even in the case of TOON (mentioned by many as the greatest potential example of new business model innovation by the incumbents), Eneco only reports on the simple number of items sold. This might also be due to the fact that in the early stages, finding the actual business model is still a quest, as the following quote reveals.

Q190 TOON does not return much [profits] yet. But the potential is huge. It is - to a certain extent - comparable to LinkedIn. Does LinkedIn already earn much profit? It generates enormous amounts of data, which provides for many opportunities which are only utilized to a rather limited extent at the moment. At a certain moment one thinks: when do I stop investing in growing the numbers? But at the moment we are still very much focused on increasing the number of TOON devices. When have you achieved sufficient numbers to continue to the next phase of development? This is really the biggest quandary we are in at the moment. (Interview 16)

However, it is argued that precisely when the scale is still small and the innovation has not yet pivoted to a profitable model, it becomes even more relevant that the leadership makes its expectations in this respect transparent. The current lack of transparency reinforces the temptation to keep spreading investments thin over many, mainly early-stage projects. Incumbent leaders could more specifically indicate future profits and impact goals for new business model activities and provide transparency on how current projects match these expectations. This would potentially empower more courageous choices to select and scale-up in the face of uncertainty, while exposing the lack of courage and clear future perspective for others. In the face of the disruptive (prosumer) trend with regard to the current supply business model, more transparency about which of the incumbents is furthest down the road to transform their business model would also be highly valuable information for investors.

While only a part of the related proposition was supported, the data confirms the relevance of the matrix as tool to improve understanding of incumbents' innovation behavior. Only the relationship between pro-activeness and the optimization bias is directly supported by this data. In contrast, the proactive mindset of Eneco's leadership was not sufficient to overcome pilot paralysis as yet. As the previous discussion highlighted, this might require a combination of proactive leadership mindset and ambidextrous leadership capacities. The fact that all incumbents still struggle with this phenomenon, however, does confirm the relevance of transparency in this respect. Therefore, it is concluded that mapping incumbents' innovation portfolios differentiating radicalness and scale is a promising tool to further study incumbents' innovation behavior in transitions.

Finally, data on acquisitions and investments explicates the higher commitment of Eneco as proactive player. As is outlined in sections 7.2.4, Eneco especially in the last three years invested a threefold higher amount than Nuon in mainly renewable asset development. Furthermore, acquisition and divestment data reveal that Eneco used a targeted strategy to speed up its corporate transition by acquiring specific capacities and development positions that were very significant in the transition. During the interviews, it was emphasized that this aspect was extremely relevant to understand Eneco's accelerating performance.

Q191 The most important moment of acceleration was the acquisition of Econcert. The Econcert inventory included all kinds of permits for the development of wind and solar farms, which provided many benefits for Eneco in the past years. (Interview 16)

7.6.3 Outcomes: the positive relationship between pro-activeness and environmental impact

The analysis of outcomes shows Eneco outperformed its two incumbent competitors on almost all impact indicators. Eneco was much less dependent on conventional generation and did not depend at all on the most polluting coal-based power generation mode. In terms of renewables generation Eneco grew faster than the market while the others lagged behind in the studied period. While the differences were less pronounced, Eneco's supply portfolio showed incremental improvement towards sustainable sources while the others showed a negative trend. And Eneco's CO₂ emissions (per kWh) were improving by 14% while the others showed a moderate to strong negative trend. This led to the CO₂ performance gap between Eneco and the average of the other two to widen from 13% to 31% over the studied period. Although in terms of knowledge creation and customer impact the evidence is only indicative, it does point to better performance by Eneco in this respect as well. It is relevant that in terms of effort in energy saving initiatives Eneco in contrast shows a lower commitment. As one of the interviewees pointed out, that might also be understood from a future vision focused on renewables.

Q192 If one believes in abundance [of the availability of renewable energy sources] and one also believes that in a few years the problems of lack of energy as well as high prices will be solved, then energy saving simply does not make much sense. (Interview 16)

A second relevant observation is that the progress made by actors with a strong reactive mindset was more vulnerable to changes in their external context. The most striking example in this respect was the increase of coal firing in the supply mix over the studied period and the resulting, substantial negative impact on the CO₂ performance. As part of their reactive strategy, especially Essent (RWE) deliberately hedged energy sources by investing in all the relevant options. Based on this cognitive model, it was perfectly logical – and from that mindset exogenous to the incumbents’ sphere of influence – that if coal becomes more competitive, the generation and supply mix will shift to more coal. One could, in contrast, from a proactive perspective to decarbonization, also perceive this as a transition risk, because the short term environmental performance decreased and the lock-in risk increased as conventional generation became even more profitable. A line of consideration might be whether incumbents’ leadership had sufficient discretionary mandate to act in contrast to this market trend. Here, however, another perspective was discovered: the combination of three cognitive institutions made the reactive incumbent’s ability to transform its operation vulnerable to market trends. First, the belief that the marginal market price in all cases would determine which fuel source would be utilized. Second, that owning capacity was the most profitable activity in the market. And third, the belief that the best strategy, keeping in mind the previous two propositions, was to own capacity while diversifying its fuel sources. Eneco demonstrated an alternative cognitive model: from anticipating decarbonization it might be wise to circumvent this risk by striving for vertical integration, based on contracted capacity rather than owned capacity. It is argued that this is an example of a broader pattern that reactive incumbents see the market trend as guiding, while proactive competitors anticipate how to prevent that market risks derail their efforts to transform their business model.

Another example of the vulnerability of progress made by reactive players was observed with regard to biomass co-firing. As the data showed, when the initial subsidy schemes expired, the incumbents reacted by downscaling the co-firing and concurrently advocating new support. It is argued that this case is exemplary for the combination of incremental add-on solutions and extrinsic motivation. As the interviews also proved, incumbent leadership saw biomass as a temporary solution needed to prolong the legitimacy of coal-based power generation.

Q193 At that time I did say: guys, we need to put a credible biomass story on the table, otherwise this will be the end of the story [for coal power plants]. (Interview 17)

Q194 Biomass is ultimately only a bridging technology. Because the technology is connected to commercial power plants, which eventually will be replaced by solar and wind. (Interview 15)

These thinking frames then colored their interpretation of the business case. Because of its temporary relevance there was no long-term business case to invest when conditions deteriorated and this resulted in alternative behavior when the support conditions changed.

Q195 You have to invest quite some money [to co-fire biomass]. I believe approximately €35 million investment was needed and this besides the consequence that you replace cheap coal by relatively expensive biomass. This is not very smart financially. So then they state: you are allowed to invest €45 million, but only if you are certain that you will still receive subsidy in 5 to 10 years from now. (Interview 17)

Especially in the case of Nuon, alternative strategies and limited commitment to national level outcomes led to retreating behavior. During the interviews, it was indicated that during the studied period Nuon dismantled their onshore wind team and abandoned wind positions including its participation in the Q10 offshore wind park. As the interview data indicates, this was a result of another mindset of new leadership. In section 7.3, it was explained that Vattenfall in the studied period showed a pattern of continuously changing leadership, strategy, and organizational structures. This alternating behavior can as such be understood as a typical (reactive) struggle to identify how to react to a highly turbulent context. The quotes below reflect a focus on European level and a preference for large scale solutions. Both are considered to be exemplary for the “privatization” mindset, as discussed in section 5.5, and indicate that Vattenfall’s leadership did not yet fully and proactively embrace the emerging new institutional logic.

Q196 Then another person was made responsible for the wind activities and he said: I will evaluate the portfolio from a European perspective. I will start drawing a line: below a certain magnitude I will not develop activities anymore, nor if the development takes too much time. He said to me: the onshore wind team will be dissolved, because their activities make no sense considering the required development time. (Interview 17)

Q197 Regarding offshore, we had an agreement with Jeroen de Haas that we would participate for 50% in the Q10-farm, which is now the Amalia wind farm. Then again, another Vattenfall executive visited and he said: I prefer to have full control or otherwise to spend the money elsewhere. (Interview 17)

Incumbents have the largest part of the transition still ahead of them and new business models will become increasingly important in the next period. Although Eneco performed 31% better in terms of CO₂ emissions in 2014 (compared to the average of Nuon and Essent), Eneco also could “only” cover 20% of its supply portfolios with renewable generated energy in 2014. One can optimistically argue that based on the EA, renewables capacity is projected to almost quadruple in less than ten years (from 11% in 2014 to 40% in 2023, source ECN et al. 2015) and that incumbents are likely to co-evolve. Besides the questions of whether the incumbents indeed will be able to profit equally from this trend and what this means for their conventional assets, it is relevant to conclude that their struggle to scale new business models becomes even more relevant. As discussed in section 5.4.3, when renewables continue to grow, the fluctuating output becomes a clear issue. Considering the projected rapid growth, the tipping point approaches, after which there is no business case for additional renewable capacity. This could potentially be solved with new business models utilizing the opportunities for storage and demand management. However, these require radical innovations with which incumbents currently still struggle. In the era ahead, the ability of the incumbent to scale these new business models and concurrently change the institutional context (e.g. pricing and congestion management) will be crucial in whether the Dutch energy system can transition to a new stable, renewables-based situation.

7.6.4 Outcomes: the positive relationship between pro-activeness and financial performance

The case of the Dutch electricity sector shows that sustainability transitions potentially threaten the incumbents’ survival. As section 5.3 outlines, the market dynamic, in interaction with structural transition trends, had an intensely disruptive effect on incumbents. Considering however – as remarked in the previous section – that there is still a long road ahead to decarbonization and more radical business model change is likely to be necessary, the incumbents are far from safe yet. This was also reiterated in the interviews in which, almost across the board, doubts were expressed about the question whether the majority of the incumbents will survive the transition. The quote below is illustrative in this respect.

Q198 I am talking about maybe three or even fewer years ago, when the market was dominated by four or five firms and they were sovereign. Those firms are now at the edge of the abyss. Some of them are now trying to survive by unbundling their firms. However, their challenge should not be underestimated. This concerns firms which for a long time have developed in a certain direction. Those are supertankers which have to change course. That is terribly difficult. (Interview 14)

Some, however, also expressed the view that when the right leadership is present, there is always an opportunity to change. Furthermore, it was remarked that even if the incumbents would still exist, they would be radically transformed.

Q199 That average lifespan of a firm is, I suppose, about eight years at the moment. So who expects that this kind of firms will still exist [in 2036]? (..) Will they still exist in their current form at that moment? No: this is impossible and I do not believe it. New forms will emerge (..) and they will organize spin-offs. That is already happening, look for example at the case of Powerpeers. (Interview 11)

This remark triggers a philosophical debate on what firm survival means. If incumbents in name still exist, but are radically restructured in a short period of time in a way in which current assets play a rather limited role, what is then the difference with starting something new? The perspective in this thesis is that there are at least two reasons why it would be desirable to have the current structure transformed. First, if the current incumbent regime is not able to transform, it is likely to resist, delay, or even block the change process. Second, and most relevant in the context of this section, the process of the declining incumbent is likely to be rather value destructive (see section 5.3) for society at large, but especially in terms of financial outcomes for the firms' shareholders. One could counter that firm transformation in the context of the transition requires massive investment (even when partly neutralized by public support) and sacrificing short-term outcomes. The assumption underlying the further discussion is, however, that if the incumbent is able to transform itself, this will be a scenario that is financially more attractive than an eventual bankruptcy or even a planned dismantling of an incumbent.

The evidence presented in this case shows that Eneco's proactive strategy does result in significantly more positive financial outcomes on the midterm horizon. First, the strategy resulted in much less negative impact from the adverse market conditions in the period 2011-2013 and Eneco today has only a limited financial risk with regard to the further phase out of conventional capacity. Second, Eneco was able to improve its competitive position in terms of gaining market share in renewables generation. Acknowledging that Eneco in the 2000s was lagging behind in terms of vertical integration, one could also conclude that renewables provided an effective path for Eneco to partly catch up. Considering the broadly acknowledged relevance of renewables in the future electricity market, this provides them with a likely positive outcome in terms of competitive position in the long run.

Therefore, it is argued that the case provides evidence for proposition 10. The proactive strategy of Eneco makes them less affected by the disruptive dynamic and future phase out and as such increases their survival chance. And moreover, their market share in renewables is increasing, which indicates that they are able to improve their competitive position in the

context of the transition. As argued, however, when introducing the proposition in section 3.6, the full positive effects are only likely to materialize on the long-term horizon.

The previous conclusions require the nuance that for Eneco the transition also remains a rather risky process and success is far from guaranteed. First, Eneco is likely to separate its DSO activities in 2017, as the possibilities to legally and politically resist this regulation have been exhausted. This will negatively impact their cashflow and financial strength. It will at least for some time lower their ability to proactively invest and, in the worst case, could be a survival risk. Furthermore, the supply-side business model is facing a potentially radical change and the current evidence triggers the question whether Eneco will be successful in a timely scaling of new business models in this segment. In more generic terms, the turbulent dynamics of a transition are not without risk for proactive players. When different meta-trends with conflicting institutional logic interact (as demonstrated in section 5.5 for this case), the risk level is even higher.

7.6.5 Integration: mindset and performance enrich the behavioral perspective

The presented case emphasizes the relevance of combining behavioral data with mindset and outcome data. As chapter 2 discussed, the CSR literature on pro-activeness tends to utilize operationalizations on the behavioral level. Behavior can indeed show that an incumbent is able to implement its sustainability ambitions. However, in practice the materiality of these activities is often unclear. Furthermore, this case shows that in the case of some incumbents a rather large portfolio of projects was not able to compensate for countervailing negative trends apart from these projects. This thesis does demonstrate how a smart operationalization on behavioral data can demonstrate the incumbents' ability to overcome key biases.

Adding outcome data is needed to fully compensate for the mentioned caveats of a behavioral operationalization, as outcomes clearly demonstrate the materiality for the incumbent at large. Outcome data can also make clear whether activities are financially sustainable or are abandoned when (external) resources are depleted. Outcome data, however, also has some clear limitations as it lags behind practice and as this research shows (the way the incumbents report) is not transparent or available with respect to some critical indicators.

This underlines the relevance of adding mindset as an early indicator of where the incumbent will go. As the previous discussion illustrates, many of the differences on behavioral and outcome level emerge from differences in the mindset of the leadership. Only using mindset data, however, also has limitations considering that when a certain mindset becomes attached to legitimacy (re)active leaders are likely to embrace it as well. Therefore,

behavioral and outcome data are required to distinguish superficial commitment from higher levels of commitment. Although one could remark that even though all incumbents embraced both the decarbonization and decentralization discourses in 2012-2013, a more careful analysis of the discourse still reveals differences (e.g. less concrete translation and more use of passive language). This means that a knowledgeable coder can already arrive at many conclusions just by analyzing how the incumbents’ leadership discourse reflects the mindset ideal types. Second, the use of only mindset data brings the challenge to distinguish between different co-existing future or transition visions. For example, consider the proactive discourse of Essent with respect to the bio-based economy vision. With a broader contextual knowledge, the significance in the electricity sector transition can be challenged (e.g. because of the connection to conventional power generation or the limitations to bio-resource availability), but purely on the level of Essent’s discourse this is difficult to distinguish. Furthermore, the interpretations of the relevance of future vision – considering the unpredictability of transition - brings a certain level of subjectivity into the equation. Although it is argued that this is impossible to exclude when studying transitions in progress, the addition of behavioral and outcome data increases the overall validity.

Table 7.19 - The added value and caveats of each perspective reveals the value of the combination of all of them.

	Mindset	Behavior	Outcomes
Added value	Early indicator of the leadership’s ability to grasp the change and their intentions	Demonstrates ability to implement and ability to overcome biases	Demonstrates how material activities are on the whole and whether the firm can do so (financially) sustainably
Caveats	* prone to superficial copies * accounting for different future visions	* materiality often unclear * no indicator for overall performance	* late indicator * not always transparent

7.7 CONCLUSION

7.7.1 Conclusions

This chapter provides considerable evidence for the relevance of both the leadership mindset (proposition 7) as well as strategic position (proposition 12) as key antecedents of incumbent innovation behavior in sustainability transitions. It does so by illustrating that Eneco’s mindset with regard to decarbonization and decentralization can be characterized as proactive, while Essent’s and Nuon’s leadership demonstrates a dominant combination of reactive and active motives. Second, with regard to position, Eneco had an “asset light” starting position in respect of conventional assets, while the others owned considerable asset

bases. Contrasting Eneco's innovation behavior with Nuon and Essent, a portfolio with more projects in total, but especially with a higher radicalness is demonstrated. Data on investments and acquisitions also confirmed this difference in innovation behavior. Analyzing the causal relationship, it is argued that the proactive mindset is a necessary condition to understand the difference, while the position moderates the ability of the leadership to effectively execute that different vision. In contrast to proposition 7, even Eneco with its proactive mindset still struggled to overcome pilot paralysis. The interview data provided evidence that this is mainly related to a lack of ambidextrous leadership capabilities.

The analysis furthermore provides considerable evidence that the proactive approach of Eneco led to greater (environmental) impact (proposition 9) and better financial results (proposition 10). It is shown that the different approaches led to significantly fewer late investments in conventional assets, above average growth in renewables capacity, and a growing CO₂ performance gap. Also, it is concluded that sustainability innovations of (re)active actors are more vulnerable to external conditions and are earlier negated when conditions change. With regard to financial performance Eneco's strategy led to fewer write-offs of conventional assets and also less exposure in this respect looking forward. Second, Eneco's strategy has been shown to lead to a competitive advantage in renewables development, which enabled the firm to partly catch up its laggard position with respect to vertical integration. It is also arguably one of the most profitable activity in the market at this moment. It is shown, however, that only the first step of the transition has been completed as yet (approximately 10-20%, looking at the generation side of the market) and the process ahead is also risky for Eneco. Besides phasing out conventional PPs and continuing to grow renewables, the successful scaling of radical new business models will be a key condition for success. For Eneco specifically, the separation of DSO activities in 2017 will be at least a temporary set-back in its capability to invest. This confirms that transitions are inherently challenging and risky for incumbents.

7.7.2 Limitations

A few limitations are relevant to take into consideration with the previously presented conclusions. One limitation relates to the fact that two companies are subsidiaries of other parent companies. As is discussed, centralization within these groups in fact led to less reporting on the national level and the potential reporting bias has therefore been taken into consideration in the analysis. Furthermore, as the focus is on national level effects, relevant effects outside the scope of the geographical case were not taken into consideration. However, the national level remains rather relevant as Dutch (and other) electricity systems still depend for 85-90% on nationally generated electricity and national policy is highly influential.

With regard to the antecedents, the interaction between mindset and position remains a matter of interpretation. While the variance in mindset and position occurs concurrently, this case cannot provide a final answer in this respect. In the discussion section, it was illustrated that there are several arguments to confirm that the proactive mindset is a necessary condition and the differences could not be explained without the difference in mindset. The two propositions (9 & 10) with regard to outcomes indicate that in the context of transitions, long-term outcomes might be different from midterm. One reason for this effect is that incremental paths lead to better intermediate results but do not guarantee long term sustainability. However, considering that Eneco in fact has an innovation portfolio with a higher radicalness, this is not likely in this case. As is stressed, Eneco also has several risks with regard to the transition dynamic ahead, so an analysis of the long-term effect remains relevant.

7.7.3 Further research

Three points are highlighted as relevant points for further investigation:

- There is a good case to extend the longitudinal approach over a longer time horizon. As the propositions (especially 9 & 10) emphasize, transitions are not linear processes and so the dynamic might substantially change still. Because the electricity sector is one of the sectors in which the sustainability transition has reached more advanced stages, it is indeed a good candidate for further study.
- As explained in the discussion, the innovation behavior matrix provides very relevant insights into the incumbents' ability to overcome two key biases. Replicating this aspect of the method with larger, multi-sector datasets would be a highly relevant follow-up step. Relating this to mindset data would also be very relevant to investigate proposition 7 further.
- The interaction between pro-activeness (with regard to sustainability issues) and ambidexterity (ability to concurrently implement incremental and radical innovation) as two traits of incumbent's leadership requires further investigation. As this study illustrates, even the incumbent with proactive leadership struggled with scaling radical new business models. The explanations provided by interviewees point to the relevance of another set of leadership capabilities, which have been studied before as ambidexterity. An approach could be to consider how these aspects interact in internal decision making processes, e.g. with more focused interviews or action research. An alternative could be to map both variables with survey instruments for a larger sample of data.

7.7.4 Practical implications

Incumbent executives

This thesis, and specifically this chapter, provides considerable basis to recommend incumbent executives to adopt a proactive approach towards key sustainability issues. As this case study illustrates, a timely, proactive approach results in better financial and environmental outcomes and a lack of proactive approach might even put the firm's survival at risk. This needs to go beyond the pivot from a reactive to active approach that many incumbents have embraced.

This chapter also provides lessons for incumbent executives who want to pursue a proactive approach. First, this chapter illustrates how a proactive approach involves innovation across all business functions and provides a tool to map the innovation portfolio to prevent two key caveats. Furthermore, Eneco's example provides evidence that acquisitions are relevant, but then especially those acquisitions related to acquiring key capabilities in the context of the emerging future. Another determining strategy for Eneco was to remain flexible and limit exposure to (conventional) assets with limited future potential in the context of the transition. The case underlines the relevance of an open innovation and partnership approach. As Eneco illustrates, the credibility of a proactive player also opens unique opportunities for cross-sector partnerships with NGOs, which might even go as far as co-creating the firm's strategy and co-marketing solutions. Finally, the case shows that even for proactive players overcoming the pilot paralysis with regard to the most radical new business models remains a challenge. It requires courage in the midst of a highly turbulent and unpredictable environment to choose for a specific new business model and divert substantial resources to it. Further explicating their future visions and strategies with respect to the future business model(s) and taking calculated bets in this respect can, however, make a crucial difference in overcoming pilot paralysis and preventing disruption.

Policy maker & stakeholder

The evidence in this chapter shows the relevance of the contribution of incumbents to transitions. Beyond their crucial role in creating the context and advocating transition policies (as documented in chapter 6), incumbents also make a clear contribution to the needed innovation. As documented, for example, the top three incumbents were responsible for approximately two-thirds of the produced renewable electricity in 2014. Furthermore, they have large portfolios of earlier stage innovation projects contributing to knowledge creation and development of the next generation of solutions. This does not negate the fact that incumbents still depend on $\geq 80\%$ on conventional energy and on many occasions

depend on incremental solutions. The evidence presented, however, counts as an argument against simplistic representations in which incumbents are merely resisting change.

The difference between proactive and reactive incumbents provides for opportunities to further leverage impact. The documented case of Eneco proves that proactive strategies are possible for incumbents. Policy makers and stakeholders seeking to positively influence sustainability transitions could think about interventions stimulating proactive behavior and stimulating the development of a proactive mindset with incumbents' leadership. Collaborative strategies from NGOs (WWF & SN&M especially in this case) seem to play a crucial role in this respect. Referring back to the discussion in chapter 5 (especially section 5.4), policy makers could think of interventions stimulating radical innovation and focus policy goals and support on long term horizons.

Stakeholders seeking to benchmark the incumbents' contribution are advised to use incumbent-specific instruments mapping a combination of mindset, behavior, and outcome data. Considering the complexity of the transformation of an incumbent, simplistic comparisons with non-incumbent actors are likely to result in unfair representations. The framework developed in chapter 3 and further operationalized in this chapter provides a sound basis to develop these kinds of benchmarks. As discussed in section 7.6.5, a smart combination of mindset, behavior, and outcome data provides the best opportunity to differentiate proactive from reactive incumbents and has forward- looking relevance.

At this moment, a particularly relevant intervention for stakeholders is to further stimulate new business model development by incumbents. While conventional phase out and renewable capacity development remain relevant, new business models harnessing the potential of decentralized solutions and providing solutions for the mismatch between supply and demand are a crucial missing link. As documented, incumbents, even the proactive ones, struggle with scaling these new business models. Stakeholders can challenge incumbent executives to make their future visions, as well as the execution of those, more transparent and support the incumbent leaders who have the courage to choose and take risks in this respect. Moreover, stakeholders and especially policy makers can work on the institutional change required for these business models to flourish.

Chapter 8 – Discussion and conclusion

8.1 CONCLUSIONS

8.1.1 Incumbent mindsets: empirical evidence for the proactive ideal type

Because the mindset (of its leadership) brings congruence into the incumbent's behavior, this thesis has focused on developing a framework to study its influence. As shown in chapter 2, the pro-activeness framework has received broad attention in the CSR literature, but its operationalization has been rather static and focused on the behavioral level. In chapter 3, a framework has been developed and operationalized distinguishing four types of incumbent mindsets with regard to sustainability transitions: the dormant incumbent (inactive), the regime defender (reactive), the incremental innovator (active), and the transition leader (proactive). These mindsets are characterized by differing motives, role perceptions and transition visions. The relevance of this framework, besides addressing the specificities of incumbents, is that pro-activeness on the behavioral level can be explained from the mindset, as is demonstrated throughout this thesis.

Proposition 6: Four types of incumbent mindsets can be distinguished in practice based on the motives, role perception, and transition vision of incumbent leadership = Supported

6a: The inactive ideal type is characterized by its explicit positioning of sustainability aspects as irrelevant to business and ignoring activities which do not fit their general profit-focused strategy.

6b: The reactive ideal type is characterized by its focus on external demands and activities targeted mainly at sustaining public legitimacy.

6c: The active ideal type is characterized by its focus on implementing the internal strategy and capturing opportunities for value creation with incremental sustainability innovations.

6d: The proactive ideal type is characterized by its focus on leading systemic change and embracing collaborative and radical change.

The presented evidence supports the four distinct ideal types of mindsets and highlights the existence of the proactive incumbent. In chapter 7, it was demonstrated how this framework can be used to highlight distinct mindsets underlying the vision and strategy of incumbents. Each of the three studied incumbents shows a mix of the reactive, active, and proactive mindsets. However, one or a combination of two of these mindsets is clearly dominant for each individual incumbent. While Essent and Nuon predominantly show a mix of reactive and active mindsets, Eneco clearly demonstrates a proactive mindset. Eneco adopted

decarbonization as core to its strategy and strategically embraced the radical change of decentralization as well. It is important also that its leadership embraced this mindset five to seven years before the other incumbents. Furthermore, Eneco shows a clear understanding of the need and opportunity of broad collaboration and contributed strongly to the emergence of the Green Growth coalition and its collaboration with NGO actors from the Pro-environment coalition, as was shown in chapter 6. It is stressed that the case of Eneco provides much needed empirical evidence for the practical relevance of the proactive ideal type. Furthermore the practical evidence helps to shed light on the difference between the active and proactive ideal type, which before often had not been distinguished clearly.

8.1.2 Behavior and its antecedents: proactive incumbents show different behavior

The behavior of incumbents in transitions is best understood as a combination of innovation and context creating. Addressing the often static operationalization of pro-activeness, this thesis adds by showing how the concepts of innovation literature can help to bring a more dynamic operationalization. It is proposed that the difference between incremental and radical innovation is especially helpful to distinguish active from proactive behavior. This thesis also utilizes this distinction to present a matrix to analyze incumbents' innovation portfolios with regard to radicalness and scale. Doing so demonstrates to what degree incumbents are affected by optimization bias and pilot paralysis in their innovation behavior. Second, besides innovation, context creating behavior is highly relevant to capture in the operationalization, because incumbents have considerable leverage to co-shape the institutional context. Context creating behavior is therefore operationalized in chapter 3, focusing on the coalitions and discursive strategies incumbents are likely to employ following from their characteristic (combination of) mindset ideal type(s).

Proposition 7a: A proactive mindset leads to relatively less incremental innovation =
Supported

Considering the importance given to incremental innovation, there is a clear difference between proactive and (re)active incumbents. Eneco has relatively twice as few incremental innovations than Nuon and Essent (13% vs. 27% of their portfolio in 2010-2014). Furthermore, the difference grows even bigger if, specifically, the innovation with regard to (cleaner) conventional generation is considered (5% vs. 18%, 2010-2014). As such this demonstrates a much lower risk for Eneco (as proactive actor) towards optimization bias as well as the relevance of radicalness to capture the differences between the distinct types of incumbent strategies.

*Proposition 7b: A proactive mindset leads to relatively more innovations of intermediate and radical (highest) level of radicalness, as well as a higher average scale for these innovations = **Partly supported***

Eneco clearly differentiated itself with a higher level of radicalness in its innovation portfolio. In terms of relative shares that is the mirror image of the conclusion of the previous proposition. If absolute numbers of projects are considered (on the most comparable 2010-2012 period) Eneco had 37% more projects than (the average of) Nuon and Essent in this segment. It is relevant to remark that for all actors >80% of the projects that go beyond the incremental level are of intermediate radicalness (and consequently <20% of radical nature). So although the incumbents implement new technologies at scale, they still focus on solutions that are still partly complementary with the current system and infrastructure.

The data also demonstrates that even Eneco is still captive in pilot paralysis with regard to innovation of high radicalness. Essent and Eneco (and to a lesser degree Nuon) do experiment with radical new business models, for example, with regard to decentralized generation and servicing prosumers. However, for this part of their portfolio the projects are predominantly at a low/pilot scale. With regard to the radical innovations that are implemented on a medium to large scale, Essent and Eneco show comparable behavior (8% vs. 10% of their portfolio, 2010-2014). This leads to the conclusion that incumbents in general still struggle with implementing radical innovation. Following on from this conclusion, the proposition that a proactive incumbent will show more appetite to scale radical innovations should be rejected, based on this dataset.

*Proposition 8: A proactive mindset leads to creating cross-sectoral, multi-stakeholder coalitions around sustainability-centered, future-oriented visions = **Supported***

The presented evidence highlights Eneco's central role as coalition builder and advocate for pro-transition policies. In chapter 6 it was shown that Eneco had a central role as public advocate within the Green Growth advocacy coalition. Moreover, the data reveals that Eneco actively built coalitions with NGOs from the Pro-environment advocacy coalition. The analysis shows that many progressive elements in the 2013 Energy Agreement, as current energy policy consensus, can be attributed to the Green Growth advocacy coalition especially, or to this coalition in collaboration with the Pro-environment coalition. The interview data also support an active advocacy role of Eneco behind the scenes. In contrast, Nuon and especially Essent played a crucial role in the incumbent-focused Clean Fossil advocacy coalition, which has predominantly advocated more reactive policies.

The analysis in chapter 6 also highlights the relevance of incumbent mindsets in understanding how the public debate develops. It was shown that the Green Growth and

Clean Fossil advocacy coalitions with respect to their core beliefs closely resemble (respectively) the proactive and reactive mindsets ideal types. These diverging views of reactive and proactive incumbents in response to the transition provides understanding of how regime fragmentation and coalition building dynamics develop in the context of transitions.

Proposition 12: The incumbent's capabilities and strategic position moderate the relationship between a proactive mindset and innovation and context creating behavior =
Supported with regard to position

The case of Eneco confirms the relevance of a good starting position. A good strategic position in this case is defined as having fewer conventional assets (“stranded assets”) that will soon become obsolete, and more complementary assets. Eneco had a unique starting position, because they owned almost no conventional generation assets and actively improved their strategic position by acquisitions focused on acquiring specific relevant capabilities and positions (such as Evelop & Zon-IQ). Their advantageous position had a strong positive influence on their ability to execute their proactive strategy and, as such, the proposed moderation effect is supported. This has potentially broader relevance in the sense that incumbents with a different and positive starting position are uniquely positioned to pursue a proactive strategy.

Although the strategic position also influenced the formation of the proactive strategy, the chosen strategy cannot be understood without the distinct mindset. While their lack of conventional assets was a clear competitive disadvantage in earlier phases, Eneco faced the challenge of catching up with respect to vertical integration. As was extensively argued in the discussion of chapter 7, the way they pursued vertical integration in combination with proactive sustainability leadership still was a distinctive choice of its leadership. Therefore, Eneco’s behavior cannot be understood merely as a function of their strategic position, but the formation of a proactive mindset is a necessary condition to explain their behavior.

Due to a lack of evidence, no clear conclusions can be drawn with regard to capabilities, but there is some indicative evidence with regard to the relevance of innovation capabilities. Based on earlier literature from the resource-based perspective, the theoretical framework in chapter 3 outlined two sets of potentially relevant capabilities (CR capabilities & innovation capabilities). The methods used resulted in insufficient evidence to draw clear conclusions in this regard. The observed struggle of overcoming pilot paralysis can logically be related to (radical) innovation capabilities. Interview data presented in chapter 7 points in the direction of soft (ambidextrous leadership) capabilities, in contrast with hard (structure, resources) capabilities as underlying this struggle. This, however, should be considered to be indicative evidence.

*Proposition 11a: The influence of (a) stakeholder pressure, (b) supporting government policy, (c) market demand, (d) solution availability, and (e) competition is moderated by the pro-activeness of the incumbent's mindset = **Initially supported in a single case***

The embedded, multi-case approach rules out a deterministic view of the contextual influence. As chapter 7 demonstrated the three incumbents each showed a substantially different approach to the transition, and Eneco had a significantly higher level of pro-activeness. Considering their context was the same, this confirms that they can choose how to react to, or anticipate, contextual events and trends.

Evidence supports a newly developed differentiated approach to understand the contextual influence as moderated by mindset. As summarized in proposition 11a above, this approach assumes that different types of contextual influences stimulate mostly one of the ideal types of incumbent strategies. For example, with regard to public support, negative NGO campaigns most likely trigger reactive strategies, while constructive approaches support proactive strategies. In chapter 5 the developed framework of hypotheses was applied to analyze the contextual influence. This confirmed the ambiguous situation: while the influences stimulating reactive and active behavior were dominant, a substantial number of contextual influences also stimulated proactive behavior. Two things can be concluded from this analysis. First, that given such an ambiguous situation, incumbents in each case have to choose how to interpret their context and thus their mindset becomes important. Second, in conjunction with chapter 7, a parallel can be found between the dominant reactive-active influence of the context and the reactive-active strategies developed by Nuon and Essent and most other incumbents. During the interviews, the effect (stimulating mainly reactive-active incumbent behavior) was emphasized, especially with regard to the fluctuating government policies and solution uncertainty. The evidence thus does support that the dominant contextual effect and reinforced Nuon and Essent in their strategy. In contrast, Eneco demonstrated that this contextual effect was not deterministic. As such this seems to clearly point to a moderating role of the mindset in the relationship between contextual stimuli and incumbent behavior. Because the research design did not vary contextual influence, this conclusion is indicative. The conclusion and the developed framework do empower stakeholders to consider how they can stimulate proactive strategies.

*Proposition 11b: A proactive mindset positively influences embracing specific emerging cognitive institutions implied in a transition and, as such, a mindset change mediates the proactive behavior in anticipation of the transition = **Initially supported in a single case***

The empirical data also emphasizes the relevance of proactively embracing new cognitive models implied in transitions to prevent misinterpretation of structural trends. Chapter 5 demonstrated that a lack of anticipating decarbonization and decentralization led to a

disruptive dynamic in the sector with a greatly negative impact on the incumbents. Although unpredictable events played a role in this dynamic, it was concluded that many aspects related to structural trends. Based on the interviews, it was concluded that the misinterpretation of the structural trends could be explained by strong tensions between cognitive institutions of the current situation and those implied by these emerging, structural trends. The discussion in chapters 5 and 7 showed that Eneco, triggered by their proactive mindset, made a fundamentally different evaluation on how to anticipate these trends. Therefore, it is concluded – in line with the conceptualization of the mindset in chapter 3 – that besides motives and role perceptions, the transition vision of the incumbent is a crucial part of their mindset with regard to the sustainability transition. Furthermore, it is concluded that a proactive mindset supports embracing or adopting these new institutions. This again confirms the crucial role of the mindset in understanding incumbent’s behavior in response to transitions. As with 11a, this evidence is, however, only indicative, because the research design did not vary the contextual influence as an independent variable.

8.1.3 Proactive behavior leading to superior outcomes

*Proposition 9: Proactive innovation and context creating behavior increases the impact of the incumbent’s behavior on the transition in the long run = **Supported on mid-term horizon***

Eneco’s innovation behavior had more impact with regard to almost all indicators and also proved to be more sustainable in changing conditions. It was shown that the different approach of Eneco led to significantly fewer late investments in conventional assets, above average growth in renewables capacity (compared with the other two incumbents, but also faster than the market) and a growing CO₂ performance gap (widening from 13% to 31% in the studied five-year period). There is also indicative evidence that Eneco outperformed the other incumbents with regard to facilitating prosumers. Third, it is concluded that sustainability innovations of (re)active incumbents are more vulnerable to external conditions and are sooner negated when conditions change. It is shown how innovation activities of both Nuon and Essent were cancelled or negated when internal strategies or external conditions changed, while this effect was not clearly found for Eneco.

Second, the presented evidence emphasizes the strong relevance of the contribution of proactive incumbents to context creation. Eneco’s central role in the public debate and behind the scenes as part of the Green Growth advocacy coalition can be clearly related to progressive elements in the 2013 Energy Agreement. In contrast, the other two incumbents (Nuon to a lesser degree than Essent) played an important role in the Clean fossil advocacy coalition, which can be characterized by its reactive agenda and has mainly influenced the more defensive elements in the EA. The EA is characterized as the policy consensus in 2013

and is meant to be guiding the energy policy for the next decade. While the EA leaves many questions unaddressed, it does contribute significantly in developing a stable policy framework, accelerating renewables growth, and creating a precedent for the phase out of conventional power generation. Considering the importance of contextual factors and especially government policy, this indirect impact of the behavior of proactive incumbents should not be underestimated.

It should, however, be stressed that considering the turbulent and unpredictable dynamics of transitions, the long-term impact yet remains to be seen. Chapter 3 explained that superior performance on the mid-term horizon does not guarantee a successful transition if it is predominantly achieved with incremental innovations. Considering that Eneco demonstrated to be less prone to optimization bias, from this perspective their mid-term leadership is also likely to correspond with leadership from a long-term perspective. The case however also demonstrates several risks with respect to Eneco's path. First, the separation of Eneco's DSO activities – which it postponed and resisted maximally - can compromise their ability to sustain their leadership with regard to investing in renewables. Second, Eneco, like the other incumbents, still struggles with scaling radical new business models with regard to decentralized power generation and demand management, which seem to be crucial to scale renewable generation above a certain threshold. Third, the positive impact embodied in the EA also represents a fragile power balance between proactive and reactive forces and therefore it remains to be seen how this balance evolves further and whether the EA survives as central policy framework until 2023. These effects confirm that also for proactive incumbents, transition remains a risky process.

Proposition 10: Proactive innovation and context creating behavior increases the survival chance and future competitive advantage of an incumbent's behavior, especially from a long-term perspective = Supported on mid-term horizon

The documented case provides evidence that a proactive strategy results in superior performance and increases survival chances. It is shown that Eneco's strategy led to a competitive advantage in renewables development, which enabled the firm to partly catch up its laggard position with respect to vertical integration, and is arguably one of the most profitable activities in the market at this moment. Second, the case documented that market dynamics, influenced by trends related to the transition, resulted in severe market conditions and especially had a strong, negative impact on the incumbents with (re)active strategies. In fact, many interviewees doubted their survival chances. It was, however, also shown that only the first step of the transition is completed as yet (approximately 10-20% looking at the generation side of the market) and the process ahead is also risky for Eneco (same reasoning as proposition 9).

8.1.4 Integration: the mindset is crucial to understand incumbents in transition

Proposition 5: The higher the level of pro-activeness (of the incumbent's leadership mindset), the higher the impact of the incumbent = Supported

Following from the support for the previous propositions, the central proposition of this thesis can be considered supported. This thesis has both documented how a different mindset led to different behavior and how this behavior resulted in a higher impact (on mid-term horizon). Second, it provided evidence that the mindset of the incumbent is also important in understanding the effect of rival explanations for behavior and impact (position, capabilities, and context). These findings add up to the conclusion that the pro-activeness of the mindset (of the leadership) of the incumbent is a necessary condition in explaining the behavioral and outcome differences.

Proposition 5a: The relationship between pro-activeness of the mindset and impact is mediated by context creating and innovation behavior = Supported

This thesis confirms that both direct and indirect impact are important to understand the role of incumbents in the multi-level, iterative dynamic of a transition. Incumbents have a significant direct impact in terms of their innovation behavior (e.g. 65% of the renewable production in 2014 is realized by the top 3 incumbents). Their indirect impact through the context creating behavior is also crucial to understand the evolution of the transition and their impact on it (e.g. their influence on policy through the 2013 EA). The documented dynamic resembles the multi-level, iterative dynamic outlined in chapter 3. As chapter 5 documented, many different contextual factors influenced incumbent behavior. This influence is, however, not deterministic (the incumbents' interpretation and response differs) and incumbent behavior also shapes contextual factors (as chapter 6 documented). Therefore, both innovation and context creating behavior are very relevant to understand how the incumbents' mindset translates into impact on the transition.

8.1.5 Reflection on the foundational propositions from chapter 2

The previously discussed propositions, specifically on incumbents, are rooted in the general discussion on pro-activeness in chapter 2 (see table 3.8). Next it is discussed which conclusions can be drawn with regard to these propositions.

Proposition 1: There exist four distinct ideal types of CSR strategies; they can be linked to stages of CSR engagement, but in a non-linear mode; the distinction between the effectiveness on firm level and on societal level as well as planned vs. actual behavior is crucial to gain further understanding of the proactive stage.

In line with the conclusion on proposition 6, the four distinct ideal types can be considered supported in the context of incumbents. This is not surprising as CSR literature in general has focused on large firms since they are most often held accountable to their societal responsibility. This thesis sharpened the operationalization and addressed the important role of mindset as a central antecedent of the behavioral phenomena. The thesis has also shown how a lack of successfully addressing the issue underlying the transition (on societal level) leads to strong, negative influence on firm level. As such, firm strategies in transitions can only be successful when the issue is sufficiently addressed and this is also where the proactive mindset differentiates itself from the (re)active mindset. The distinction between planned and actual behavior is also useful. In this case, for example, Nuon and Essent also embraced the sector-wide perspective to reduce GHG emissions to zero in 2050, however in the documented period their behavior, in contrast, resulted in a negative trend with regard to GHG emissions (per unit of supplied electricity). Also, there is evidence that they more often canceled or rolled back innovations. But on the level of their intentions, also a clear difference between Eneco and the other two is present. Therefore, this thesis concludes that data on mindsets (including how they are captured in strategies and plans), behavior, and outcomes each have added value and caveats. Following from that conclusion, the evaluation of the impact of incumbents is best done by studying these three factors in conjunction.

Proposition 2: A proactive approach is equally triggered by internal as well as external drivers; internal drivers are based on a timely combination of core capabilities, the nature of the industry, values, and mindsets related to leadership; external drivers, which especially differentiate the proactive from active approach, depend in particular on the potential to engage external stakeholders in positive change.

Contextual factors, position, and mindset each influence the incumbents' behavior. However, mindset has a crucial moderating role in the influence of the other factors. As such the first part of the proposition can be considered supported (except that not all factors have been studied with empirical data), but pro-activeness is confirmed as a crucial underlying and moderating factor.

The second part is also supported, but it is asserted that the influence is bidirectional. Chapter six showed that the influence of incumbents on policy is best understood as part of an advocacy coalition. The incumbents have a crucial role in building these coalitions and the core beliefs and narratives of these coalitions relate closely to important elements of the incumbent mindset.

Proposition 3: A proactive strategy produces superior financial performance when considered from a long-term perspective and judged in relation to counterfactual scenarios

of the co-evolution of firm and sector. A proactive strategy can only be financially viable if mediated by the build-up of specific internal capabilities, mindsets and strategic leadership.

Following from the support for proposition 10, this proposition is supported, but most evidence points to the mediation of soft capabilities such as mindset and leadership. There is some evidence that especially (radical) innovation capabilities are important, but in this respect the indicative evidence points in the direction of ambidextrous leadership, in contrast to more hard resource-focused indicators (structure, staff, etc.).

Proposition 4: A proactive strategy produces superior impact (on the societal issue) especially when considered from a long-term perspective and judged in relation to counterfactual scenarios of the co-evolution of firm and sector.

Following from the support for proposition 9, this proposition is also supported by the available evidence.

8.2 LIMITATIONS

The central remaining question is whether the laborious, integral approach resulted in sufficient reliability and validity and was worth the effort. Against the current preference for focused and quantitative approaches in the business research community, this thesis builds strongly on a qualitative and integral method. In so doing, this thesis was inspired by recent calls from leading scholars to embrace the enlightening potential of qualitative research again (Corley 2011, Pratt 2009). In this attempt it remains crucial, however, not to sacrifice rigor for relevance (Gibbert, Ruigrok & Wicki 2008, Vermeulen 2005). Therefore, a reflection follows on the way in which three potential limitations to reliability and validity have been addressed. Even if the approach did result in reliable and valid results, the approach does remain very laborious. So at the end of this section a reflection is made on whether the integral, holistic approach was worth the effort.

The strengths of the multi-method, holistic approach have been utilized, while addressing important limitations with systematic methods. The empirical evidence presented in chapters 5 to 7 provides a unique perspective on the full causal chain of multi-level interactions in which incumbents in transitions are embedded. This allows for more perspective on how variables interact and how causal sequences develop, than earlier research, which often focused on a specific element of the causal chain. The integral approach, however, provides a challenge to study a large set of variables of a different nature. The empirical research therefore utilized a multi-method research design to capture this holistic perspective. Several techniques have been utilized to arrive at sufficient reliability and validity. First, a systematic data coding approach was adopted and partial dual coding was applied for key variables

(mindset and behavior data). Second, the research design provided many opportunities to triangulate observations between sources (e.g. newspaper data vs. firm reports) and between actors (e.g. NGO actors vs. business actors). Third, the findings have been validated and further developed through actor interviews and by validating with four informants at three stages in the research process.

A limitation - implied by studying an ongoing transition - is that findings on long-term impact remain preliminary. The research design allows for a rich picture on the dynamics in a five-year period of time (2010-2014) during which many relevant transition dynamics could be captured. In the discussions, these were supplemented with earlier research, discussion of earlier dynamics in the used dataset as well as specific datasets which captured a longer period of time (especially in section 5.3). Even with this broader perspective, this research remains characterized as studying an ongoing transition. This has implications, especially for the consideration of (long-term) outcomes. As is emphasized in the discussion, the transition is also highly risky for incumbents with proactive strategies, so mid-term outcomes are no guarantee for long-term survival and leadership. When relevant, this limitation has been stressed, and transparent future projections have been used on several occasions to discuss most likely future scenarios.

This research can be generalized due to its embedment in earlier literature and theoretical case selection, however, case specificities should be considered. As is shown in chapters 2 and 3, the research framework was founded on two systematic literature reviews and addressed several research needs arising from the status quo. Based on theoretical sampling criteria, the case of three electricity sector incumbents embedded in the Dutch context was selected. Therefore, the findings can be generalized back towards CSR, transition and radical innovation literature. The formulated and tested propositions facilitated this. It is emphasized, however, that the case has some specificities, which should be considered when generalizing. First, the findings on incumbents are less applicable to smaller firms, especially when firms have the role of challenger (such as start-ups, new entrants, etc.). These firms are probably less prone to caveats of reactive strategies, but the difference between active and proactive strategies is still assumed to be relevant. Second, the energy sector has a high public relevance and some other sectors might have fewer contextual complexities. In these cases, the relative importance of the innovation part of behavior probably increases, however, context creating is assumed to remain relevant. Finally, the Dutch electricity sector is highly consolidated (the top three have approximately 70-80% market share on the retail market). In more fragmented sectors the patterns of coalition building might be different and probably even more complex.

As a final remark, the author would like to stress that the integral approach was worth the effort. There are two reasons why the integral approach has yielded new insights, which

were not likely to be discovered with more focused or quantitative research designs. First, the integral approach provided a unique opportunity to show how the mindset is the linking pin in understanding the incumbents' behavior. As such it moderates most of the other causal dynamics. For example, although context and position are relevant causal factors, their influence is best understood in conjunction with the moderating effect of the mindset. This effect would have been much less likely to be discovered and convincingly illustrated with a narrower research design. Second, the integral design allows for the illustration of how iterative, multi-level dynamics shape the ability of the incumbent to transform itself in the context of transitions. So the effectiveness of the innovation efforts of incumbents strongly depends on their ability to influence their context and the way the context consequently influences their innovation strategy. Again, capturing this dynamic almost directly implies an integral research design. This is not to say that more focused research designs do not have value. On the contrary, the author sees strong value in replicating the conclusions on the propositions on larger samples with more focused designs, as well as the need for methodological innovations to reduce the effort of doing so. The freedom and space a PhD provides, however, gave a unique opportunity to attempt this daunting endeavor and make some key contributions from which other researchers and other approaches can continue to build.

8.3 FURTHER RESEARCH

Considering the lack of robust *impact research* until today, further investigations how incumbents and other types of firms contribute to societal impact and transitions remain a key research need. First, replicating the approach of this research in other sectors and extending the time range, especially in the acceleration and stabilization phases of transitions (Rotmans, Kemp & Van Asselt 2001), is important. Second, it seems relevant to search for early indicators of transition. For example, fragmentation of the regime coalition (Karltorp, Sandén 2012) is potentially such an indicator. If more evidence is found for this and other potential early indicators, it would be easier to study impact by relating behavior to these early indicators. Another avenue is to relate incumbent behavior to transition patterns (Geels, Schot 2007, de Haan, Rotmans 2011). For example, does a higher degree of pro-activeness of incumbents result in a more (gradual) transformation and does a lack of pro-activeness increase the chance of disruptive patterns such as the "squeezed" patterns defined by de Haan & Rotmans (de Haan, Rotmans 2011). A third relevant perspective is to compare the impact of incumbents to other types of firms such as SMEs, start-ups, and new entrants and to study the relevant interaction between those (Hockerts 2010).

Especially the origins and evolution of the *incumbent mindsets* can be further studied. Considering the relevance of the incumbent's (leadership) mindset, especially the origins of a proactive mindset can be studied further. This research could focus on triggers of mindset

change, and change trajectories, as proposed earlier by van Tulder et al. (van Tulder et al. 2014). Considering mindset evolution as a dynamic process, it is important to know what especially triggers the development of a proactive mindset, and whether firms can also evolve from higher to lower levels of pro-activeness. Chapter 5 found that cognitive model changes implied in transitions are often difficult to grasp for incumbents' leaders. It is therefore useful to investigate whether proactive leadership renewal (e.g. taking a younger generation on the executive board) and interaction with external actors (e.g. partnerships) positively influence the change of mindset.

Replicating the findings on *innovation behavior* can potentially shed light on how to overcome pilot paralysis. The innovation portfolio mapping method is suitable for use with larger samples of data. This could further shed light on the pilot paralysis and potentially on how incumbents in other cases and sectors are able to overcome this barrier. The findings in this research suggest relating these portfolios to innovation capabilities next to mindset and position as antecedent. In terms of innovation capabilities this could focus on soft capabilities such as ambidextrous leadership and culture (Raisch, Birkinshaw 2008, Siebenhüner, Arnold 2007, O'Reilly III, Tushman 2004), as well as hard capabilities such as firm structure and resources (O'Reilly III, Tushman 2004, Siebenhüner, Arnold 2007, Raisch, Birkinshaw 2008). Besides radicalness and scale, the content of the portfolios (types of innovations) could be studied in terms of how it varies over sectors, but also how it relates to impact. Finally, specifically in the case of the electricity sector, it is highly relevant to study the success of the corporate transformations and strategy changes announced by many incumbents (especially E.ON & RWE). They aspire to leap forward towards leadership and a proactive approach, but the success to date remains to be seen.

The influence of *context creating behavior* also deserves more and broader attention. The evidence documented in this thesis focuses specifically on advocacy in relation to the public opinion and policy. The discovered relationship between incumbent mindset and advocacy coalition's core beliefs should be replicated, as well as its impact on regime fragmentation (Karlton, Sandén 2012) and coalition formation. From this perspective it would be relevant to study effects of different configurations of coalitions. The eventual coalition supporting the EA 2013 was a rather broad coalition. For example, would a breakthrough coalition (of proactive incumbents, challengers and NGOs) less focused on building consensus with the reactive advocacy coalitions result in more proactive policy or, in contrast, have less impact due to a lack of power to provide stability? Besides the focus on advocacy and policy, one could study context creation, focusing on other behaviors, such as partnerships focused on knowledge creation or market formation (standards, labels). From this broader perspective, one could also study portfolios of context creating behavior or partnerships in a similar vein as innovation behavior.

8.4 IMPLICATIONS

Incumbent executives

Executives are strongly advised, based on the findings of this thesis, to develop proactive strategies to solve critical societal issues and challenge themselves to go beyond the limits of their current business model. The empirical material presented outlines how most incumbents at first applied reactive strategies and that this can lead to massive value destruction and risk the firm's survival. A crucial difference to develop a more proactive approach is to adopt another starting point. CSR practice and theory often starts from the current situation by focusing on the question of what firms can do and whether they can do so profitably. The proactive way of thinking, however, starts with another question: "what is needed to solve the societal issue?" The incumbent is often required to fully rethink and transform the business model and ecosystem in which it operates. This probably also requires engaging sufficient creative, outside thinking power, just as Eneco, for example, co-strategized with ENGO WWF. This is needed to understand what a sustainable future means, but also to develop radical new perspectives on how to transform the current system and business model.

Second, incumbents need to develop an innovation portfolio to match this future vision and can learn from the documented practices in this thesis. While there is no prescriptive advice on "the optimal innovation portfolio," incumbents can focus on circumventing optimization bias and pilot paralysis and utilize the portfolio matrix to do so. As especially Eneco's example shows, timely repositioning the asset base to limit implications of phase out of old assets, and acquisitions to develop key capabilities and positions, can positively reinforce proactive strategies. Furthermore, this case study highlights the importance of open innovation (e.g. TOON developed with start-up Quby) and cross-sector partnerships (e.g. marketing "Zon&Zeker" with SN&M). Even when doing so, pilot paralysis with regard to scaling radical new business models is likely to remain a challenge. This seems to be a matter of leadership: it requires enormous courage to commit to scaling a radically new business model in the hyper-turbulent and highly uncertain environment of a transition. While the authors cannot prescribe the right timing for such a decision based on this thesis, it seems that in this regard the risk to be late is larger than the risk to be too early.

A final recommendation is to take active leadership in developing a coalition, and in partnership create the context for the required transformation. This is probably also the reason why sustainability transitions are even more complex than radical innovation in the market, because the range of involved stakes and actors is so broad. Chapter 6 provides a perspective on how Eneco and others developed a Green Growth coalition and allied themselves with the Pro-environment coalition. This was both a process of developing a new future-oriented, inclusive narrative as well as engaging a broad range of actors for this vision.

From this perspective, the proactive incumbent is likely to find its allies not only among other incumbents, but more among front runners from other sectors and NGOs with constructive strategies. This requires careful thinking about which possible coalition can both share a sufficiently progressive agenda, as well as accumulate sufficient power to have a determining influence on key contextual factors such as public opinion, government policy, knowledge development, and market standards.

Policy makers & other stakeholders

This thesis shows that incumbents are relevant contributors to transitions. They have a large role in transforming their own business both with regard to phasing out old assets, as well as developing new assets which fit the timely path towards a sustainable future. In the electricity sector, the top three incumbents were responsible for 65% of the renewable electricity production in 2014, which can be considered substantial. While they struggle with scaling radical business models, they do put a lot of effort in knowledge development and piloting in this respect. Moreover, the role of incumbents is crucial because of their ability to show leadership in creating the context for transition. Without the context creating efforts of Eneco and front runners from other sectors (Shell, Unilever, Siemens, Akzo, DSM, NS etc.) at least the supporting government policy would have been much less progressive.

Furthermore, it is essential to differentiate between incumbents and think about how to stimulate proactive strategies. The polarized debate and critical perspectives on incumbents are mostly related to reactive behavior of (some) incumbents. As this thesis documents, this is not theoretical and can indeed be criticized. Stakeholders are, however, strongly advised to consider how they can stay critical on this behavior, but still endorse the positive role of other, more proactive incumbents. Second, they can consider how they can stimulate all incumbents to increase the pro-activeness of their strategies. In this thesis, a framework was developed to help stakeholders understand what stimulates proactive strategies. To be able to understand its implications it is crucial to see the difference between active and proactive strategies and that other tactics are required to stimulate those. Finally, this thesis has also developed recommendations (in chapter 7) on how best to benchmark incumbent behavior with a combination of mindset, behavior, and outcome data to be able to distinguish between the different ideal types of incumbent strategies.

Long-term and stable policies are crucial to stimulate proactive strategies; engaging more front runners in the policy process can help to develop them. While recommendations are possible for other contextual factors, the focus for now is on the crucial role of supporting policy. Essential in this respect is the stability of policy. While the promise still has to be proven in practice, a multi-stakeholder approach as applied for the EA is one strategy by which to arrive at a more stable policy. Reflecting on the current Dutch policy dynamic and

consensus, this still lacks a long-term perspective. Central in the policy process are midterm (2020) goals and relevant solutions are mainly selected from this perspective. The case also shows that front runners (incumbents as well as entrants) and their stakeholder bodies do not always have equal access to policy processes. For example, after initial resistance to provide access to them at all, DGZ (as a key stakeholder body for the Green Growth coalition) was not in the central committee of the EA, and the pro-decentralized coalition - partly also because of their own lack of organization - was relatively underrepresented in general.

Electricity sector

While the general implications outlined above also apply to the electricity sector, some specific recommendations can be made.

Electricity sector executives are advised to pay attention to phasing out their conventional assets, as well as creating the context to scale new business models. Without doubt, the sector now understands that ramping up renewable generation with massive societal support to do so is a crucial factor in their survival in the near future and can be done profitably as well. To be able to survive in the long term, however, it is crucial to phase out conventional assets and develop new business models. With regard to phasing out, an interesting question is whether innovative perspectives on how to create value from other applications of these assets can help shift the question away from the “who will pay the bill” discussion. If it is not possible to shift this perspective, the struggle between involved actors is likely to result in a late phase out. While most executives now embrace the shift to a more distributed electricity system in the near future, the scaling of new business models to be able to arrive at sufficient reliability by smartly utilizing and coordinating decentralized generation, storage, and flexibility management opportunities is crucial. This requires innovation as well as changing the relevant contextual systems (such as regulation, market models etc.), and incumbents are in a good position to take the lead in this respect with their considerable contextual influence. It still remains a question which business model (or combinations of business models) provides sufficient relevance and profitability for incumbents. Whether incumbents can provide a more concrete vision on their future business model is likely to be a key determinant for their legitimacy in the near future.

All stakeholders are advised to sustain the stability of the current EA, as well as actively work on addressing the many unaddressed issues. As this thesis maintains, the stability of the EA should not be taken for granted, considering the (fragile) compromise nature of the agreement. Based on the findings in this thesis as well as earlier research, protecting the stability of the policy framework after a decade of highly fluctuating policies is important to empower all actors to fulfill their role. As also emphasized by actors during the interviews, many questions remain unaddressed. While not attempting to make an exhaustive overview

here, a few deserve to be stated here. First, there is a risk of becoming detached from solving the underlying decarbonization challenge, because most efforts now focus on scaling renewables. Even if the goals of the EA are reached, the absolute reduction of CO₂ (vs. 1990) is projected to be 10% in 2023 (ECN et al. 2016, note that more progress is achieved in total due reduction of other GHGs²²). This makes evident the challenge still ahead. An important issue to achieve a successful decarbonization is the transition of fossil energy and resource use of the industry, which now often remains protected from more radical measures. Furthermore, developing a perspective beyond 2023 soon is crucial, as many innovations need to anticipate the longer horizon. It would be desirable to work not only on 2030 goals, but to develop these from a perspective that is needed to arrive at a full transition on a longer-term horizon. Finally, looking specifically at the electricity system, there is still a “missing link” in the sense that scaling renewables beyond a certain level will not be beneficial if no solutions are found to compensate for their fluctuating output with storage or demand management. Stimulating both innovation and institutional change (e.g. regulation and market models) to find sustainable solutions to these challenges deserves the highest priority in policy.

²² Please note that the GHG measurement which is used as official indicator for policy planning and evaluation by the government is based on a model projection and its methodology is subject to continuous discussion. In the 2016 projection the reference year data for 1990 for example was changed in a way that the actual reduction improved. However also considering all these discussions and the most recent changes the conclusion that the GHG reduction and especially the CO₂ reduction is only a first step.

Epilogue: never a dull moment in a transition

August 2017

This section represents an attempt at a selective reflection on recent developments in relation to the conclusions of this thesis. As has been noted in the discussion and conclusion sections of chapters 5 to 7, the study of ongoing transitions is a delicate matter. Although this thesis arrives at robust conclusions with regard to midterm horizon outcomes, the impact on the long-term perspective remains to be seen. When finishing the manuscript of this thesis, early August 2017, already two and a half years of new empirical reality have unfolded since the end point of the empirical dataset of this thesis. As the highly turbulent and accelerating transition dynamics continued in that period after 2014, many relevant events and developments can be noted. This section presents a reflection based on following the general energy news (esp. via the specialized Energeia news platform) as well as some selective further analysis. Of course, this cannot be considered a substitute for further systematic analysis of the transition dynamics.

The following discussion is structured around three questions linking closely to the three empirical chapters. The reflection starts with a discussion of the development of the Dutch energy policy. This links closely to *chapter 6* and especially the perspective in section 6.5.3 on the impact of the EA. Next, recent insights on the survival of the incumbents are considered that have a clear relationship with the conclusions in *chapter 5* as well as part of the conclusions in *chapter 7*. Finally, it is considered what recent developments show with regard to the transformation strategies of the incumbents. Are they able to develop radical new business models and embrace a new decentralized energy system? This links closely to a part of the conclusions of *chapter 7*.

Policy context: on the impact and stability of the EA 2013

The current developments seem to support several of the positive contributions of the EA. First and foremost, the agreement has persisted and provides the long-desired stable policy framework. Recent projections also reinforce the major leap in renewable capacity in the electricity sector in the period until 2023 (ECN et al. 2016). Although the 2020 projections lag behind the target (12,7% vs. 14%), the projections also show that it is still realistic that the 2023 target of 16% renewable energy can be achieved (15,9% projected). Strong positive developments can be seen in offshore wind cost reduction, for which the actual development is even more positive than expected. The EA also realized its promise to start the phase-out of fossils; after some initial legislative struggles, the five 1980s coal power plants have been closed without much further public opposition. Furthermore, prematurely closing the five other coal power plants is now at the least a serious option in the policy debate.

It remains important, however, to emphasize that the targets are far from achieved as yet and important power struggles remain visible. In this context, it is relevant to stress that 69% of the projected growth in renewables are still to be realized in the final three years (until 2020)²³. From that perspective, it is relevant to observe that struggles persist on several important building blocks of the EA. The onshore wind development – due to tough spatial planning processes - lag 20-25% behind the ambition of 6000 MW capacity in 2020 (CE Delft 2017). The plans for the 10 PJ additional energy saving by the industry have only become concrete after strong pressure with potential legal obligations. In fact, the recent projection shows that the total additional energy saving as a consequence of the EA might only add up to 68 PJ instead of the aspired 100 PJ (ECN et al. 2016). Furthermore, the incumbents are hesitant to make the required investments for the increase of biomass co-firing and demand “political clarity” due to a fear of a change in political sentiments in this respect (Energeia 2017).

Although there are signs of a further shift in the hegemonic discourse towards Green Growth, the power balance remains fragile. Contributing to a further shift are other concurrent events, of which the Paris Climate Agreement as well as the Urgenda case court verdict have the clearest influence on the Dutch policy debate. Based on the policy learning process preceding the EA, as well as these events, there is now a broad call to embed hard climate goals in the law (the “VET” law) as well as to develop a new 2030 EA at short notice. This call is also strongly supported by the business sector. For example, the 39 firm “Transition Coalition” is a manifestation of this support. Interestingly, this coalition builds again on the coalition between proactive fractions in the electricity and industry sectors as well as the support from the gas regime with Eneco, Siemens and Shell as three of the five core members (Energeia 2016). That Nuon, Essent and Engie also joined in later as supporters of this call for progressive regulation is a sign that the incumbent regime in the electricity sector is transitioning; probably this can be considered a consequence of the strategic changes and unbundling as a result of the crisis period around 2012-2013 (see section 5.3). It remains necessary, however, to note that it is still uncertain whether the new government will respect and protect the EA consensus and what will be the influence of the remaining struggles listed in the previous paragraph. Also, it is still important to stress that the Dutch economy is still far from decarbonized and that a recent report even doubts whether the first 25% of GHG reduction by 2020 ruled as mandatory in the Urgenda verdict will be achieved (CE Delft 2017). As such, even considering the positive signs of further mindset shift, the energy transition as a whole in the next three decades will most likely not be a calm and linear process.

²³ *normalized, 2020 vs 2013* (ECN et al. 2016, ECN et al. 2015)

*Coping with disruption: on incumbent survival in the transition*²⁴

Most recent insights indicate that Eneco's proactive strategy was not decisively derailed by the legally obligatory separation of its DSO business. After resistance till the last moment, Eneco eventually separated the DSO business on January 1st 2017. There are two indications that the remaining renewables generation and supply business can exist and thrive standalone. First, the annual results over 2016 (prepared from the separated perspective) show a low, but reasonable operating profit margin of 4%. Second, also in 2017, Eneco continued its strategy of targeted acquisitions and was able to acquire stakes in Eni Belgium (100%), ONZO (stake unknown), NextKraftWerke (35%) and Lichtblick (50%)²⁵. With four acquisitions in just the first half of 2017, Eneco shows its ability to grow and finance the growth even without the stable cash flow of the DSO business. More time is needed to establish a fully reliable picture of the impact. In the meanwhile, another major development emerged, as the (public) shareholders of Eneco started a discussion about selling their shares.

The other incumbents are still dealing with heavy losses on their conventional and nuclear assets. However, a new type of unbundled incumbent is also appearing. E.ON (€16.007b), RWE (€5.484b) and Vattenfall (€2.737b)²⁶ all have strongly negative net incomes. It can be noted, however, that Vattenfall divested its lignite assets and now again has a positive operating income from continued operations (1%, underlying even 16%). Also relevant is the performance of the unbundled Innogy corporation, which now relies on DSO, supply and renewables generation. Innogy reported a positive net income (€1.786b) and its operating profit margin was at a considerable 6,6% in 2016. It should also be noted that all of the mentioned incumbents had a positive cash flow in 2016. As such, even the conventional power generation based incumbents (especially RWE and Uniper – part of EON – and to a lesser degree Engie and Vattenfall) have a financial right of existence in the near future. It is even more remarkable that a new type of incumbent is emerging in the form of Innogy and that it seems to have a sustainable financial basis. Even for this new model the question remains how much of their business is cannibalized by prosumers. In this regard, it is relevant to observe that all incumbents show declining revenues (Innogy -4%, Vattenfall -7%, Eneco -12%, in 2016). There are, however, strong indications from volume numbers and statements by incumbents that these mainly relate to price effects and not to substantial market share losses or cannibalization effects. Only Eneco seems to indicate

²⁴ This discussion is based on a specific review of the financial performance overviews in 2016 annual reports of Eneco, Vattenfall, and Innogy as well as specific retrieval of numbers from the annual reports of RWE and EON.

²⁵ The data on acquisitions was available from the systematic survey of Eneco's news and press release mentioned in the next section.

²⁶ Calculated at exchange rate SEK/EUR of 9,5.

limited declines in the number of customers, but interestingly reports that this can be compensated by growing revenues per customer due to selling more different services.

Even for the (partly) unbundled incumbents, renewables and new business models are still a limited part of their business. Vattenfall still relies strongly on power generation (53% of the underlying EBIT in 2016) and distribution (22%). Their wind operation contributes 4% to the underlying operating profit. Innogy builds mainly on distribution (grid, 59% of adjusted EBIT) and supply (retail, 29%). Their renewables business is already more significant, with a contribution of 12% to the adjusted operating profit. Another relevant observation is that the renewable generation units have above average profit margins, especially compared to the supply business units. On other new business models, no specific figures are provided, however, the discussion following hereafter shows that their contribution to the bottom-line is probably still marginal. It should also be remarked that Eneco unfortunately does not provide transparency on how much its renewable generation business contributes to their financial results.

Escaping pilot paralysis continued: new business model development

One of the conclusions in chapter 7 is that incumbents have not yet been able to escape the pilot paralysis. Although their innovation portfolios do include projects focusing on radical new technologies and business models, there is hardly any evidence that they have achieved substantial scale or have proven to sustainably contribute in terms of impact and profitability. To understand what has happened since then, a systematic scan of corporate reports of 2016 as well as corporate new streams in 2016 and the first half of 2017 has been executed, with specific focus on radical new business models²⁷.

A first observation is that the decentralized energy system discourse has even more strongly been integrated in the way the incumbents communicate their vision. Chapter 7 concluded that Eneco had already embraced the emerging decentralization trend since 2008, however RWE and Vattenfall also embraced this trend in their strategy changes in 2013. RWE has since been unbundled and Essent is now part of the Innogy group. Already in the name the Innogy group hints at the relevance of innovation in this era. Furthermore, the group

²⁷ Sources: Eneco (IR), Innogy (AR & CR), Vattenfall (IR) and Nuon (AR) 2016 reports, as well as new items and press releases on the website of Eneco (84 items), Nuon (133 items) and Essent (73 items) from 2016 and 2017 (January-July). Note that Essent has not published a report in 2016. Scan: each of these sources has been systematically searched with a list of 88 keywords. These keywords refer to specific business models (EV services, storage, aggregation, prosumer support, decentralized solar solutions, smart home solutions, new financing models) as well as generic innovation key words (e.g. new business model). This resulted in 4.769 records which have been coded with regard to representing a mention of a specific innovation project and whether the record included specific information on materiality or scale of the project. 1.414 records included relevant information.

structures its strategy around three themes: digitization, decentralization and decarbonization. Vattenfall has adopted the slogan “Power climate smarter living,” which especially in the word “smart” is linked to the decentral energy system discourse. Second, in the representation of their portfolio strategy they explicitly embrace new business models such as “decentralized solutions,” “aggregation services,” and “storage” as part of the “growth portfolio.” Eneco still frames its way to achieve its mission “sustainable energy for everyone” as “Decentralised, Sustainable and Together.” As such, each of the three incumbents now has the decentralized energy system strongly embedded in the core of its vision.

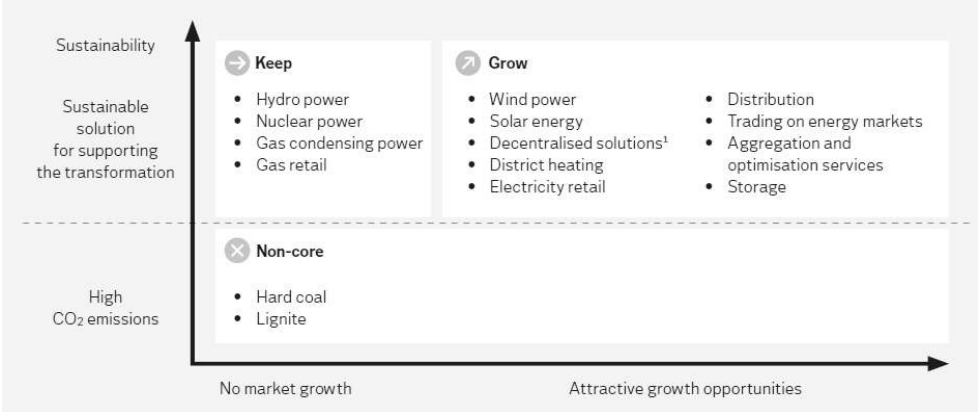


Figure EP.1 – Vattenfall’s portfolio strategy (16V-C1)

Considering their reports, each of the incumbents has further increased its activities on new business models. Eneco, for example, has established a specific Innovations and Ventures business unit, and reports a substantial number of targeted acquisitions (Next Kraftwerke, Lichtblick, ONZO, Simaxx, an expanded stake in Zon-IQ), continues to scale its TOON platform (now 320k users) and develops interesting experiments, especially in flexibility services (aggregating EV & home batteries to balance the grid). Innogy has developed a 130 employee strong innovation team and reports to have investigated 483 start-ups with which to potentially partner. Vattenfall seems more internally focused, but nevertheless reports on many projects and commits SEK 4b (approx. €200m) to solar and “other” (which includes storage and EVs) in the next two years. As such, the level of activity in the “radical” segment of the portfolio has increased.

The evidence that these new business models are achieving scale and have a sustainable climate and financial impact remains scarce, however. Although the space devoted to reporting on these new business models has greatly increased, reports remain predominantly qualitative. The limited number of quantitative data included can be mainly characterized as input (e.g. investment budgets dedicated to new business models or R&D and numbers of

dedicated staff) or simple output indicators (e.g. number of EV charging stations or panels installed in specific projects). Especially for EV charging services (esp. Innogy and Vattenfall, thousands of charging stations), Eneco with regard to TOON (320.000 users) and Eneco's Next Kraftwerke acquisition (2700 MW in capacity in an aggregation model, Eneco has a 35% share) there are indications of scale. However, in these reports and more broadly, it remains unclear what are the outcomes and potential impact of these activities. For example, relevant questions are: does Eneco earn profit from its TOON platform and how much has it contributed to energy saving? How much energy is being generated by prosumers in the incumbents' client base, and can the incumbents still earn money in these client relationships? And what is the impact on the overall GHG emissions and grid performance of aggregation and storage solutions? As such, it remains unclear to date whether incumbents in the meantime have developed a core for a new business model in the decentralized energy system. They are advised to increase transparency with regard to profitability and impact of these new models.

Final reflection

These recent observations – from my perspective – even further underline the relevance of the role of incumbents in sustainability transitions. Eneco was able to continue its proactive strategy and successfully managed some key risks such as the separation. Furthermore, the development of Innogy shows promising evidence with regard to the ability of incumbents with a less positive starting position to transform themselves and adopt a (late) proactive strategy as well. Also, the recent indications that several incumbents seem to be able to manage the severe disruption of their business models at least to a degree that they survive and can still make positive contributions should be noted. This does not negate any conclusions on the findings about the reactive role of many of them in the policy debate earlier as well as the value destruction caused by their strategies. On the contrary, it confirms the relevance that incumbents are to be studied and that their distinct mindsets and contributions should be carefully discerned when valuing their role.

Although one might hardly expect a different conclusion from a scientist, the recent developments also provide much new interesting data which deserve further systematic study. For example, the observed continuing core belief shift in the public debate triggers the question whether a mindset transition is also happening at the aggregated level of the regime. The new unbundled incumbents are a rather interesting phenomenon as well. Both with regard to the renewables and supply companies (Innogy and EON) as well as with regard to their conventional power generation counterparts (RWE and Uniper) it is highly relevant how they will develop further. Finally, although the incumbents did not yet convincingly show that they have escaped pilot paralysis, their high level of activity triggers the question whether they will succeed in this respect in the next decade.

Appendices

APPENDIX A.1 – DESCRIPTION OF SYSTEMATIC REVIEW SUSTAINABILITY INNOVATION

In the early stages (2011/12) of developing this thesis a systematic review on sustainability innovation played an important role. The findings from this systematic review are foundational for the conceptual model in chapter 3. While thinking and wording evolved in the course of the process of developing this thesis it was decided not to fully integrate the original text in the monograph of this thesis, but to integrate its findings in a more condensed way in chapter 3. In this appendix, the approach and most relevant findings are briefly summarized. The full version of the review is available on request.

Approach & methodology

The central objective of this review was evaluating the nature, findings, and strength and weaknesses of the emerging “sustainability innovation” literature. To do so, a set of systematic queries was executed with help of the Scopus database. The query had a number of characteristics:

- It searched for the combination of “innovation” and a set of keywords referring to societal issues, C(S)R and sustainability
- The journal scope was limited to the top 5 journals (based on ISI Journal Citation Report 2009) from five relevant fields (Technology management & innovation, Business & society, Marketing & consumer research, Entrepreneurship and Practitioner) as well as the top 10 highest ranking business & management journals (based on the same index)
- The time period was focused on the decade from 2000 until April 2011 (the time the query was executed)

Table A.1 - Basic query used for the systematic search. The colors highlight the different components of the query.

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TITLE-ABS-KEY(innovation AND ((sustainable PRE/0 development) OR (eco PRE/0 innovation) OR (environmental PRE/0 innovation) OR (environmental PRE/0 management PRE/0 system) OR (human PRE/0 rights) OR sustainability OR health OR societal OR (climate PRE/0 change) OR (natural PRE/0 resources) OR recycling OR green OR poverty OR (labour PRE/0 conditions) OR (“fair-trade”) OR (social PRE/0 innovation) OR (social PRE/0 change) OR (“corporate social performance”) OR (“CSR”))) AND SUBJAREA(mult OR arts OR busi OR deci OR econ OR psyc OR soci) AND PUBYEAR AFT 1999 AND (LIMIT-TO(EXACTSRCTITLE, “[top 5 titles per functional field & top10 general management journals]”))
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This resulted in 468 potentially relevant articles which were screened on whether they discussed sustainability innovation from the business perspective. Based on this screening

139 articles were selected for detailed review. To do so, focus, methods, and findings were systematically coded. This was the basis for presenting a structural evaluation of the findings and strength and weaknesses.

Relevant findings integrated in the thesis

- The reviewed literature revealed three dominant schools of thought influencing the debate: CSR, innovation, and transitions literature. This inspired the thought to integrate these three schools to develop an integral perspective on sustainability innovation in its context. The integration of these three schools is also a key underpinning of the conceptual approach of this thesis and its relevance is further outlined in chapter 1.
- From the analysis of the available literature, a framework of the antecedents was developed. The coding exercise identified 204 different independent variables proposed in the reviewed literature. During the analysis process, these were categorized in ten categories of internal and external antecedents, as summarized in figure A.1. Further developed during a pilot case study (see Appendix A.2), this conceptual model is the foundation for the conceptual approach developed in chapter 3 and the code book used for the basic coding of the dataset (see section 4.8).

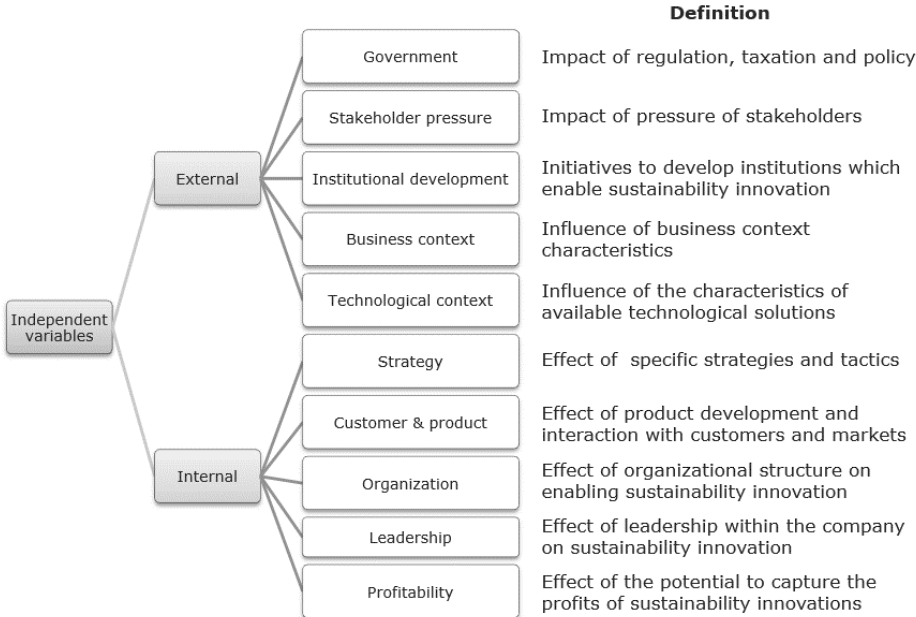


Figure A.1 - Categorization of sustainability innovation antecedents developed during the systematic review.

APPENDIX A.2 – DESCRIPTION OF THE PILOT CASE OF THE ELECTRICITY SECTOR

Next to the systematic review on sustainability innovation (see Appendix A.1), a pilot case study also played an important role in the process of developing the conceptual and methodological approach of this thesis. This Appendix summarizes the approach and methodology of the case and its implications for this thesis. The full version of the case study report is available on request.

Approach & methodology

The case utilized a comparable focus, scope, and method as the empirical case presented in this thesis (chapters 5, 6 and 7). The focus of the case was on the Dutch Electricity sector and it compared the three focus incumbents (Eneco, Essent, Nuon). Due to its pilot nature, the data gathering was scoped on 2011. The same multi-method dataset was used combining systematically selected media articles (178), firm reports (3) and interviews with incumbent representatives and stakeholders (7). The dataset was analyzed by systematically coding antecedents, behavior and outcomes in Nvivo with a coding framework developed based on a systematic review (see Appendix A.1), see figure A.2 for an overview. In a second round of analysis, mindset and behavior data were systematically analyzed on pro-activeness and linked to internal and external antecedents.

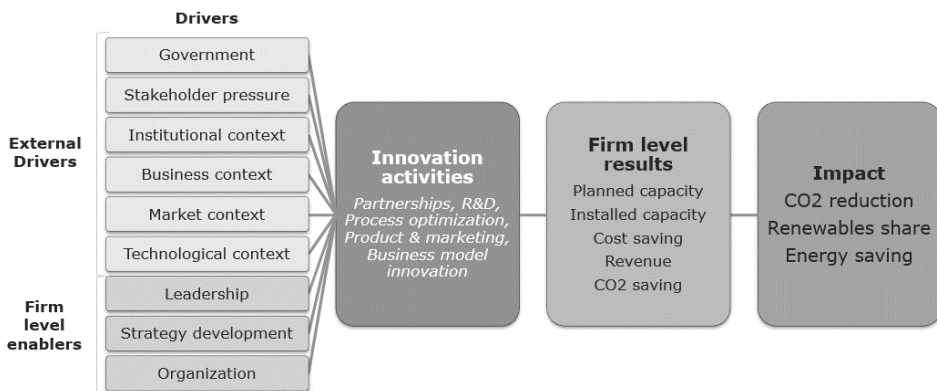


Figure A.2 - Coding framework applied for the basic analysis of the pilot case.

Relevant findings integrated in the thesis

- The pilot case was crucial in the case selection process and the case analysis revealed the potential of the case in terms of ongoing transition dynamics as well as different strategies of incumbents. This makes the case highly relevant to address knowledge gaps of the current literature and investigate the propositions outlined

in chapters 2 and 3. In section 1.3 & 4.4 the case selection and relevance is discussed in more detail.

- The multi-method approach to develop an integral dataset of incumbents and their context developed in the case was also implemented as basic method for the case study used in this thesis. Chapter 4 discusses each component with regard to content and limitations.
- During the case analysis, several important conceptual innovations were developed which are further refined and implemented in this thesis. These innovations include the way to conceptualize the mindset (including transition vision), the link between context and incumbent strategies (as differentiated), as well as the concurrent focus on innovation and context creating behavior. In chapter 3 these are discussed in more detail and related to earlier literature.

APPENDIX B – DUTCH QUOTATIONS WITH TRANSLATION

Table B.1 - Original quotations presented next to their translation as used in the main text of the thesis. NB: to avoid confusion quotations originally in English are also included.

Nr	Original quote	Translation
Q1	Jonker, Radboud University: Het idee dat kolenboeren als Nuon en Essent ons helpen aan groene energie is absurd. Als ze dat willen, is de consequentie dat zij zichzelf opheffen. (11_0175)	Jonker, Radboud University: The idea that "coal farmers" such as Nuon and Essent will help us to obtain green energy is absurd. If they would aspire to that, the consequence would be for them to liquidate their business (11_0175).
Q2	Wagendorp, Volkskrant: Je kunt hier op argumenten winnen, maar uiteindelijk verlies je van lobby's en gevestigde belangen ruimhartig gesteund door de verenigde lobbypartij CDA. (11_0281)	Wagendorp, Volkskrant: Even if you win in terms of arguments, you will eventually fail to beat their lobbies and vested interest as they are generously supported by a "united lobby party" i.e. the CDA (11_0281).
Q3	Rotmans, Erasmus University: 'De nieuwe orde botst nu al op de oude. De machthebbers zijn zich aan het barricaderen. (.) De strijd wordt keihard, het is darwinisme in de zuiverste vorm. En dan zijn het de slimsten die overleven, niet de aardigsten. (12_0375)	Rotmans, Erasmus University: The new order already collides with the old order. The current power brokers already barricade themselves. (.) The battle will be fierce; it is Darwinism in its purest form. Eventually the smartest will survive, not the most likeable actors (12_0375).
Q4	Koomstra, entrepreneur: Zo spreekt Jeroen van der Veer in zijn rapport over energie: duurzame energie is te duur en wordt alleen goedkoper door te investeren in innovatie i.p.v. exploitatie . Zijn advies gaat daarbij vrijwel volledig voorbij aan de revolutie van de duurzame energieopwekking die zich wereldwijd aftekent (11_0233)	Koomstra, entrepreneur: Jeroen van der Veer [former CEO Shell] writes in his report on energy: sustainable energy is too expensive and this can only be overcome by investing in innovation instead of exploitation. His advice nearly completely ignores the emerging global revolution in sustainable energy generation (11_0233).
Q5	Vendrik, Groenlinks: Tegelijk vindt hij dat Nuon en Essent boeter op hun hoofd hebben. „Terwijl ze moeten inzetten op meer schone energie, verpesten ze juist de markt door alleen kolencentrales te bouwen. (10_0127)	Vendrik, Groenlinks: At the same time, he states that Nuon and Essent can't be excused. "Whereas they should bet on more clean energy, they spoil the market by building only coal power plants" (10_0127).

Nr	Original quote	Translation
Q6	<p>Nabuurs, ex-KE&MA: gelooft dat de decentrale energievoorziening er hoe dan ook komt, maar niet \negdirect van de energieleveranciers. Een nieuwe orde vormt voor hen een bedreiging. Samenwerking van vele mensen is nodig om druk te geven op de leveranciers om zich aan te passen. (12_0321)</p>	<p>Nabuurs, ex-KE&MA: believes that a decentralized energy supply will emerge in any case, but not directly from the energy suppliers. The new order forms a threat to them. A broad collaboration from many people is needed to put pressure on the suppliers to adapt (12_0321).</p>
Q7	<p>Wit, SN&M: De opkomst van veel hernieuwbare elektriciteit vormt een structurele bedreiging van het verdienmodel van de kolen- en gasbedrijven. Meer zonne- en windenergie zorgen namelijk voor lagere elektriciteitsprijzen en zetten de winstmarges van conventionele elektriciteit onder druk. (13_0380)</p>	<p>Wit, SN&M: The emergence of much renewable energy forms a structural threat to the earning model of the coal- and gas companies. More solar and wind power result in lower electricity prices, which puts pressure on the profit margins of conventional power generation (13_0380).</p>
Q8	<p>Cools (Strategy&), Nillesen (PWC), Pollitt (Uni Cambridge): Traditionele energiebedrijven moeten hun rol fundamenteel heroverwegen. (.) Deze ontwikkelingen zijn spelers zoals Eon, RWE, GDF, Eneco en Vattenfall natuurlijk niet ontgaan, maar niet iedereen onderkent de noodzaak en urgentie om drastisch in te grijpen. (14_0150)</p>	<p>Cools (Strategy&), Nillesen (PWC), Pollitt (University of Cambridge): Traditional energy suppliers should fundamentally re-evaluate their role. (.) These developments have been noted by actors like Eon, RWE, GDF, Eneco, and Vattenfall, but not everybody acknowledges the need and urgency to drastically change course (14_0150).</p>
Q9	<p>Terium, RWE: Samen met twee nieuwe, enorme offshore-installatieshepen eisen alleen al deze twee windparken een investering van circa 3,2 mrd. Dat is meer dan alle investeringen tezamen die kleinere Nederlandse energiebedrijven de afgelopen jaren in duurzame energieproductie gedaan hebben. (11_0435)</p>	<p>Terium, RWE: Including the investment in two enormous offshore-installations, these two new offshore wind farms require €3,2 bn investment. This exceeds the investments in sustainable energy production of all smaller Dutch energy suppliers in the past years (11_0435).</p>

Nr	Original quote	Translation
Q10	de Rijk, WISE: Als propagandisten van lokale decentrale schone opwek hebben we te weinig oog voor de beperkingen van deze ontwikkeling. We hoeven het echt niet alleen via honderden lokale coöperaties te regelen. Ook de energiereuzen moeten steeds meer schone stroom gaan opwekken (12_0362)	de Rijk, WISE: As advocates of local, decentralized, clean generation we have neglected the limitations of this development. There are alternatives to the hundreds of local energy cooperatives. The "energy giants" should also generate more and more clean electricity (12_0362).
Q11	Krouwel, Ver Fed Duurzame Decentrale Energie NL: De grote bedrijven kunnen kennis delen die lokale partijen niet hebben, zodat deze het wiel niet opnieuw hoeven uit te vinden. De grote bedrijven, die op termijn hun inkomstenstroom bedreigd kunnen zien worden, hoeven door samenwerking niet aan de kant te staan. (12_0328)	Krouwel, Ver Fed Duurzame Decentrale Energie NL: The large firms can share knowledge which local actors lack, which eliminates the need to reinvent the wheel continuously. This also provides for an opportunity for the large firms to remain relevant, as their future earnings might be affected (12_0328).
Q12	VNO-NCW: Het oude denken is demonstrenen tegen vliegen, het nieuwe denken is aan tafel zitten met KLM en overleggen hoe het bedrijf zo milieuvriendelijk mogelijk kan vliegen, zoals op biobrandstof (11_0359)	VNO-NCW: Protesting against flying is old thinking. New thinking implies engaging with KLM to consult on options to limit environmental impact of flying, such as utilizing biofuels (11_0359).
Q13	Jurjus, Energie-NL: "Jammer, want halsoverkop in duurzame energie investeren, bedreigt de leveringszekerheid en de betaalbaarheid van stroom. En dan zitten we straks in het donker," zegt André Jurjus. "We kunnen in de huidige overgangsfase naar een duurzame energievoorziening niet zonder kolen." De Europese energiebedrijven hebben hun handtekening inmiddels gezet onder de belofte te streven naar een compleet CO ₂ neutrale energievoorziening in 2050. (10_0442)	Jurjus, Energie-NL: "It is unfortunate, because hasty investments in sustainable energy threaten the supply, security, and affordability of electricity. This will result in outages," says André Jurjus. "In the current transition stage towards a sustainable energy system, we cannot do without coal power." The EU energy suppliers have signed a pledge to aspire to a completely CO neutral energy supply by 2050 (10_0442).

Nr	Original quote	Translation
Q14	Jurjus, Energie-NL: Jurjus meent dat een bedrijf met stabiele inkomsten ook eerder kan investeren, bijvoorbeeld in duurzaamheid. "Grijs hoeft groen niet te verdringen." (10_0442)	Jurjus, Energie-NL: Jurjus believes that a firm with a steady revenue stream will also have more opportunities to invest, for example, in sustainability. "Grey does not necessarily drive away green" (10_0442).
Q15	Verhagen, ministry EL&I: Dat is maar een greep uit de ideeën die het bedrijfsleven geopperd heeft bij minister Verhagen (Economische Zaken, Landbouw en Innovatie). Het principe is simpel: Verhagen versoepelt de regels, bedrijven en lagere overheden trekken de portemonnee. (11_0327)	Verhagen, ministry EL&I: These are only some of the ideas the business community proposed to minister Verhagen (Economic Affairs, Agriculture & Innovation). The principle is simple: Verhagen eases the rules, businesses and local authorities pull out their wallets to invest (11_0327).
Q16	Atsma, ministry I&M: Ik heb vertrouwen in het bedrijfsleven. Iedereen daar is ervan overtuigd dat we stappen in de duurzaamheidsagenda moeten zetten. Het biedt een belangrijk concurrentievoordeel. „Ik geloof dat Ik geloof echt in de kracht van het bedrijfsleven. Daar moet het toch vandaan komen. Ik ben niet voor werken met de knoet." (11_0159)	Atsma, ministry I&M: I have confidence in the business community. Everybody over there is convinced of the necessity to implement the sustainability agenda. This provides for an important competitive advantage. "I strongly believe in the ability of the business community. This is where it should happen. I do not support utilizing the whip to force them" (11_0159).
Q17	"Ik wil maar zeggen: ook voor hernieuwbare energie heb je veel kapitaal nodig. De rol van grote energiebedrijven is nog lang niet uitgespeeld sterker nog, ze zijn broodnodig." (12_0019)	"What I just want to say: also for renewable energy much capital is needed. The role of large energy suppliers is far from irrelevant, their contribution is much needed" (12_0019)
Q18	Terium: 'Ja, in principe kan er van alles, met groene stroom. Maar je moet die stroom ook nog transporteren, en dan gaan al die groene types voor iedere hoogspanningslijn in aanbouw liggen. We moeten echt alle zeilen bij zetten om Duitsland van stroom te voorzien.' (12_0019)	Terium: 'In principle much is possible with regard to green power. But the power still needs to be distributed, which is a problem, considering that green activists oppose each power line under construction. It is all hands on deck to ensure the availability of electrical power across Germany.' (12_0019)

Nr	Original quote	Translation
Q19	Terwijl de RWE/Essent-topman Peter Terium (.) vorige maand met een persbericht kwam waarin stond dat de energierekening de komende jaren onbetaalbaar zou worden vanwege de groei van duurzame energie. (.) Hij deed er een schepje bovenop door te stellen dat de subsidies voor zonne-energie de energiemarkt ernstig verstoren. (Kooistra, 12_0190)	In contrast, RWE/Essent-CEO, Peter Terium (.) last month published a press release which stressed that the energy bill will rise to unpayable levels in the coming years. He even added that subsidies for solar power strongly disturb the market. (Kooistra, 12_0190)
Q20	Maar, zo weet Van Leathem (Essent) ook: Verder investeren in productiemiddelen heeft momenteel niet veel nut, of het nu duurzaam of conventioneel is, vanwege de overcapaciteit. (12_0238)	But Essent CEO van Laethem also knows: more investments in generation assets - renewable or conventional - are useless due to the excess capacity on the market. (12_0238)
Q21	„We gaan geen peperdure centrale neerzetten als hij slechts tien keer per jaar draait, zegt GDF Suez in een toelichting. Het bedrijf vreesst binnen vijf tot tien jaar enorme stroomtekorten en pleit met E.ON voor een speciale heffing op de energienota van huishoudens en bedrijven. (12_0330)	"We can't develop a rather expensive power plant, if the plant will only run for ten years," as GDF Suez explains. The firm fears for shortages in five to ten years and together with E.ON advocates a special surcharge on the energy bill of households and businesses. (12_0330)
Q22	De gesubsidieerde Duitse zonnestroom wordt op onze markt gedumpt, aldus de Essent-woordvoerder. Onze schone gascentrales, die nota bene zijn gebouwd om grillige duurzame energie te ondersteunen, worden nu uit de markt gedrukt. Een woordvoerder van energiebedrijf Eneco laat desgevraagd weten dat Enecogen, een splinternieuwe gascentrale die vorig jaar is geopend, om dezelfde reden maar weinig draait. (12_0237)	Subsidized German solar power is dumped on our market, according to the Essent spokesman. Our clean gas-fired power plants, which, as should be emphasized, were constructed to support fluctuating sustainable energy generation, are now forced off the market. A spokesman for energy supplier Eneco replied on request that Enecogen, their brand-new gas-fired power plant opened last year, is running idle much of the time for the same reason. (12_0237)

Nr	Original quote	Translation
Q23	<p>Bij onze oosterburen gaat het om meer. Er verdwijnen andermaal 'duizenden arbeidsplaatsen' bij RWE, zo liet topman Peter Terium gisteren optekenen. Liefst 30 tot 40% van de centrales van RWE draait rode cijfers door de sterk gedaalde stroomprijs, zei Terium. Hij vreest centrales te moeten uitschakelen. (13_0270)</p>	<p>In Germany more is at stake. Again, thousands of jobs will be lost at RWE, as CEO Peter Terium stated yesterday. A striking 30-40% of the power plants of RWE are running at a loss, because of the decline in the electricity price, according to Terium. He fears he may have to switch off these power plants. (13_0270)</p>
Q24	<p>Persoon: Vooral het gebruik van dat laatste woord (sustainable, zei hij om precies te zijn) is van een verwarrende brutaliteit. Duurzame energie is dus niet duurzaam, volgens Mestrallet, die deze mededeling deed in een hoorzitting voor het Europees Parlement anderhalve week geleden. (..) Mestrallet is niet alleen: ook de bazen van energiereuzen zoals Eon, RWE en Vattenfall trekken vloekend en tierend langs politici en volksvertegenwoordigers. Boodschap: help ons, we gaan ten onder. Door die verdomde, ongrijpbare groene stroom. (13_0348)</p>	<p>Persoon: Especially the use of that last word (sustainable, to be precise) is of highly confusing brutality. Sustainable energy is not sustainable, according to Mestrallet, who stated this at a hearing of the European Parliament one and a half week ago. (..) Mestrallet is not the only one: the bosses of the "energy giants" like Eon, RWE and Vattenfall also visit politicians and MPs with a ranting and raving temper. Their message: help us, we are sinking. They are strongly impacted by this cursed and elusive green electricity. (13_0348)</p>
Q25	<p>Ondertussen vechten de conventionele bedrijven voor economische overleving. Tien bestuursvoorzitters van de grootste Europese energiebedrijven riepen afgelopen vrijdag in Brussel de Europese Commissie en de lidstaten op om te stoppen met de subsidies voor zonne- en windenergie. (13_0380)</p>	<p>In the meantime, the conventional energy suppliers are fighting for survival. Ten CEOs of the largest EU energy suppliers appealed to the European Commission and member states last Friday in Brussels to stop subsidizing solar and wind power. (13_0380)</p>
Q26	<p>'Het huidige bedrijfsmodel heeft geen toekomst meer', zegt bestuursvoorzitter Johannes Teyssen van EON. (14_0345)</p>	<p>"The current business model has no future," says CEO Johannes Teyssen of EON. (14_0345)</p>
Q27	<p>RWE strategy doc quoted by EnergyPost: The European energy retail sector is "about to undergo a massive transformation in the coming years" (13R-O1, p. 1)</p>	<p>RWE strategy document quoted by EnergyPost: The European energy retail sector is "about to undergo a massive transformation in the coming years" (13R-O1, p. 1)</p>

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Q28	De gesubsidieerde Duitse zonnestroom wordt op onze markt gedumpt, aldus de Essent-woordvoerder. Onze schone gascentrales, die nota bene zijn gebouwd om grillige duurzame energie te ondersteunen, worden nu uit de markt gedrukt. (12_0237)	Subsidized German solar power is dumped on our market, according to the Essent spokesman. Our clean gas-fired power plants, which as should be emphasized, were constructed to support fluctuating, sustainable energy generation, are now forced off the market. (12_0237)
Q29	Energieproducenten bevestigen dat door de hoge gasprijzen momenteel de meest vervuulende kolengestookte elektriciteitscentrales in Nederland op volle kracht draaien, aldus Nuon. (...) Volgens De Haas staan minder vervuulende centrales die op gas worden gestookt stil of op een laag pitje. Dat komt doordat de kosten voor de uitstoot van CO ₂ 'belachelijk' laag zijn. (12_0125)	Energy producers confirm that, due to the high prices for natural gas, the most polluting coal-fired power plants in the Netherlands are running full throttle, as stated Nuon. According to de Haas, less polluting, gas-fired power plants are running low or idle. This is because the costs of emitting CO ₂ are "ridiculously" low. (12_0125)
Q30	En er is een nieuwe bedreiging uit onverwachte hoek: de recente opkomst van goedkoop schaliegas in de Verenigde Staten heeft tot gevolg dat elektriciteitsproductie met fossiele brandstof goedkoper wordt. (13_0071)	And there is an unexpected threat: the recent emergence of cheap shale gas in the US has lowered the cost of fossil-fuel-based electricity generation. (13_0071)
Q31	“These market conditions changed after the financial crisis in Europe, and demand for electricity has since fallen. Some electricity-intensive industry has been shut down or moved out of Europe.” (13N-F1, p. 8)	“These market conditions changed after the financial crisis in Europe, and demand for electricity has since fallen. Some electricity-intensive industry has been shut down or moved out of Europe.” (13N-F1, p. 8)
Q32	“De huidige prijs van CO ₂ -emissierechten is een fractie van wat enkele jaren geleden werd verwacht. Dit heeft meerdere oorzaken waaronder de economische crisis en weeffouten in het Europese emissiehandelstelsel. De huidige CO ₂ -prijsstelling in combinatie met hoge gasprijzen leidt tot lagere rendementen op bijvoorbeeld gasgestookte centrales.” (12O-C1, p. 8)	“The current price of CO ₂ -emission allowances is only a fraction of what was expected a few years ago. This has several causes, including the economic crisis and structural bugs in the EU-ETS. The current levels of the CO ₂ -prices in combination with the high prices for natural gas lead to low margins for e.g. gas-fired power plants.” (12O-C1, p. 8)

Nr	Original quote	Translation
Q33	Van Laethem, Essent: Verder investeren in productiemiddelen heeft momenteel niet veel nut, of het nu duurzaam of conventioneel is, vanwege de overcapaciteit.(12_0238)	Van Laethem, Essent: More investments in generation assets - renewable or conventional - are useless, due to the excess capacity on the market. (12_0238)
Q34	Het Regioorgaan Energie Transitie vreest dat de prijs van groene stroom echter in het gedrang komt door de plannen van ondernemingen voor de bouw van nieuwe kolencentrales. Als die allemaal worden gerealiseerd zal er een overcapaciteit ontstaan, die het niet aantrekkelijk maakt om te investeren in duurzame energie. (10_0026)	The Regioorgaan Energie Transitie (Energy Transition taskforce) fears that the price of green electricity will be negatively affected by the plans of businesses to construct new coal-fired power plants. If all plans are implemented, overcapacity will occur and this will make it unattractive to invest in sustainable energy. (10_0026)
Q35	“Maar de maakindustrie zat toen met dat probleem van hogere prijzen en vroeg ons daarom om een nieuwe centrale om het aanbod van stroom te vergroten. In 2007 besloten we, alles afwegend, om de nieuwste soort kolencentrale te bouwen in de Eemshaven.” (11_0151)	“But the manufacturing industry struggled at that time with higher (energy) prices and requested us to develop new power plants to increase the supply of electricity. In 2007 we decided, all things considered, to build the newest kind of coal-fired power plant in the Eemshaven region.” (11_0151)
Q36	Boer, EON: Voor E.ON is het beter in het buitenland te investeren omdat het beleid stabiel is. Daar is onze euro effectiever. Waar vooral behoefte aan is, is een langetermijnvisie. Niet iedere zoveel jaar het beleid veranderen.” (10_0085)	Boer, E.ON: Investing abroad is more attractive to E.ON due to a more stable policy context. This results in a higher return on investment. What is mostly needed, is a long-term vision, to prevent that the policy changes every few years. (10_0085)
Q37	SER committee: Het Nederlandse beleid om tot een milieuvriendelijker economie te komen, heeft tot nu toe gefaald, terwijl er voor Nederlandse bedrijven juist veel geld met duurzaamheid valt te verdienen. 'Het beleid is te gefragmenteerd en continuïteit ontbreekt', stellen de onderzoekers in het rapport. (10_0095)	SER committee: Until today, the Dutch policy to arrive at an environmentally friendlier economy has failed, even though Dutch firms could have earned a lot of money with sustainability. "The policy is fragmented and lacks continuity," as the researchers stated in the report. (10_0095)

Nr	Original quote	Translation
Q38	<p>de Haas, Eneco: Een toekomstvisie op verduurzaming van de energievoorziening ontbreekt. Dat is overigens niet alleen dit kabinet te verwijten. De afgelopen vijftien, twintig jaar zwalkt het energiebeleid. Dan wel allerlei stimulansen, dan weer niet. Dat is voor ons bedrijf fnuikend. Daar kunnen wij geen beleid op maken." (10_0393)</p>	<p>de Haas, Eneco: A future vision on the transition towards a sustainable energy supply is lacking. This should not only be blamed on this administration. The past fifteen to twenty years the energy policy has been drifting continuously. In some periods, all kinds of support were provided, while in others not. This cripples our firm's ability to contribute. We can't set a policy considering this continuous change. (10_0393)</p>
Q39	<p>Cohen & Samson, PvdA: Doordat de energiewetgeving ons al decennia verdeeld houdt, wordt het energiebeleid bij iedere nieuwe krachtsverhouding in het parlement gewijzigd. En bij iedere wijziging neemt de investeringszekerheid af en stagneert de vooruitgang. We lopen inmiddels in de Europese achterhoede. Zie daar 15 jaar Nederlands energiebeleid. (11_0125)</p>	<p>Cohen & Samson, PvdA: While the parliament has been divided on energy politics for decades, each time the power shifts the policy is changed. Each change consequently reduces investment security and stagnates progress. We have arrived at the rearward of the EU. This is the result of fifteen years of Dutch energy policy. (11_0125)</p>
Q40	<p>Thijssen, Greenpeace: Ondernemers en investeerders in duurzame energie hekelen dit soort inconsistente signalen als reden waarom schone energie in Nederland niet van de grond komt. We nemen in Europa inmiddels een schamele 23ste plaats in op het gebied van duurzame energie, nog achter Roemenië. (12_0253)</p>	<p>Thijssen, Greenpeace: Entrepreneurs and investors in sustainable energy criticize these inconsistent signals as reason why clean energy in the Netherlands is not taking off. We are at a meager 23rd position with regard to sustainable energy, even behind Romania. (12_0253)</p>

Nr	Original quote	Translation
Q41	<p>Profunda, commissioned by SN&M: Nederlandse pensioenfondsen laten duurzame energieprojecten links liggen. Ze steken er nog geen half procent van hun miljardenvermogen in. Van dat geld gaat het meeste ook nog eens de grens over. Dit ligt vooral aan het zwakkende overheidsbeleid op het gebied van duurzame energie. Als dat beleid stabiel wordt, dan zijn de pensioenfondsen bereid fors te investeren in bij voorbeeld windparken op zee. (13_0196)</p>	<p>Profunda, commissioned by SN&M: Dutch pension funds leave sustainable energy projects alone. Even less than 0,5% of the billions of capital is invested in this kind of project. Of this small share, most is even invested abroad. This is mainly caused by the continuously drifting government policy on sustainable energy. If the policy becomes more stable, pension funds are willing to strongly invest in, for example, offshore wind projects. (13_0196)</p>
Q42	<p>Essent: Zonder grootschalig bijmengen van biomassa denkt Essent dat het onmogelijk is om de milieudoelstellingen te halen, het verminderen van de CO₂-uitstoot met 30% in 2020. (10_0025)</p>	<p>Essent: Reaching the environmental policy goal of reducing CO₂-emissions by 30% in 2020 is impossible without large scale co-firing of biomass. (10_0025)</p>
Q43	<p>Echt fundamenteel een verandering teweeg brengen op je warmtelevering en hoe je de klant meeneemt, zit er allemaal niet in. Het is gewoon domme aantallen van windmolens en van ja, betaal me een hoop subsidie en ze komen vanzelf wel. (Interview 16)</p>	<p>Real fundamental changes in the heat supply and how to engage the customer are not included at all. It is about dumb numbers of wind turbines, which eventually can be realized considering the large amounts of subsidy provided to the sector. (Interview 16)</p>
Q44	<p>Overheidsbeleid zal een belangrijke rol spelen, niet zozeer met stimulerend overheidsbeleid, maar veel meer overheidsbeleid in de zin van het opzetten van de juiste policies. Stimulerend overheidsbeleid is subsidies voor wind. Ja, nou dat is niet waar ik het over heb, waar ik het over heb is bijvoorbeeld je aansluiting aan het netwerk. Hoe dat verrekend wordt. Heeft de klant een monetaire incentive om dan stroom te gebruiken als het noodzakelijk is? En dan in het net te leveren als het nodig is. Dus dan moet je het gaan eh, hebben over de hele tarievenstructuur, dat zal de grootste omwenteling zijn. (Interview 15)</p>	<p>Government policy will play an important role. Not in the sense of providing [monetary] support, but in the sense of developing appropriate policies. Stimulating policy means subsidies for wind. That is not what I am talking about. What I am talking about is for example the connection to the grid. How costs are calculated at that level. Are there incentives for the customers to use or supply power when it is necessary? The change of the rate plan will be the biggest revolution. (Interview 15)</p>

Nr	Original quote	Translation
Q45	<p>Omdat de Eemshavencentrale decennialang aanwezig zal zijn in Groningen, willen wij graag, naast de enorme investering en langdurige economische impuls voor de regio, ook een positieve bijdrage leveren aan andere aspecten in dit gebied. Dat doen we met allerlei partijen samen te werken aan uiteenlopende projecten op het gebied van economie en werkgelegenheid, sport en cultuur, kennis en innovatie en natuur en milieu. (12E-C1, p. 91)</p>	<p>Because the Eemshaven power plant will be present in Groningen for decades, we want to make a positive contribution to the region on several aspects, next to the enormous investment and long-lasting economic impulse for the region. This is realized by collaborating with a diverse set of parties towards projects with regard to economy and employment, sports and culture, knowledge and innovation, and nature and environment. (12E-C1, p. 91)</p>
Q46	<p>Milieuorganisaties als Greenpeace en Natuur en Milieu staan kritisch tegenover de bouw van de nieuwe energiecentrale. Essent heeft begrip voor hun standpunten en heeft hen dan ook vanaf het eerste moment uitgenodigd om de dialoog aan te gaan. Door kennisdeling en een constructieve dialoog wordt namelijk de basis gelegd voor een duurzame samenwerking tussen bedrijven en belangenorganisaties. (12E-C1, p. 92)</p>	<p>NGOS such as Greenpeace and Natuur en Milieu are critical about the construction of the new power plant. Essent respects their views and has invited them from the beginning to start a dialog. Sharing knowledge and constructive dialog provides a foundation for sustainable cooperation between businesses and NGOs. (12E-C1, p. 92)</p>
Q47	<p>We streven naar een evenwicht tussen een betrouwbare, betaalbare en duurzame energievoorziening en daarbij kunnen we de inzet van steenkool en andere fossiele brandstoffen nog niet missen. (.) Wel doen we er alles aan om steenkool zo duurzaam mogelijk in te zetten. (12E-C1, p. 121)</p>	<p>We strive for a balance between a reliable, affordable and sustainable energy supply and cannot, as yet, realize this without the usage of coal and other fossil fuels. (.) However, we take all possible measures to use coal in the most sustainable manner. (12E-C1, p. 121)</p>

Nr	Original quote	Translation
Q48	<p>Toen ikzelf in 2010 begon heb ik op een gegeven moment gewoon gemerkt, toen nog als een outsider, dat het allemaal helemaal geen zin heeft die interne discussies. Want het verandert buiten niks. Het gaat om wat je buiten wilt doet. En op datzelfde moment kwam (mevrouw X bij een andere NGO aan de leiding). En die had ook iets van, ja dit heeft allemaal geen zin al dat interne geneuzel. Dus laten we kijken wat we buiten kunnen doen. Dus we hebben met de groene clubs in dat G11-verband gelanceerd en gezegd we gaan samen strategieën ontwikkelen op dit onderwerp. Dus samen hebben we de energiestrategie gedaan. Ja, hoe kunnen we nou echt hier buiten het verschil maken? En toen heeft (NGO) knopen geteld. Die heeft gezegd, kan ik meer voor de BV Nederland betekenen door in het energieakkoord mee te doen, op die manier er meer uit te halen. Of buiten het energieakkoord te blijven en aan de buitenkant te roepen: "het is niet, niet genoeg." En uiteindelijk hebben we toen met haar, samen hebben we de afweging gemaakt, ik vind het fijn dat je meedoet. (Interview 12)</p>	<p>When I started this job in 2010 I noticed, at that time still as an outsider, that the internal discussions [of the NGOs] were not effective. Nothing changed in the outside world as a consequence of these discussions. What matters is the impact you want to make in the outside world. At the same moment Mrs X took charge of another NGO. And she agreed that this internal posturing made not much sense. So we agreed to see what impact we could make in the outside world. We launched the G11 as collaborative platform of 11 NGOs and started strategizing together. We drafted the energy strategy together. So, the question was how can we make a real impact? This is when (NGO X) re-evaluated their position and concluded that a more positive impact could be realized for the Dutch society (BV Nederland) by participating in the EA. This in contrast with continued appeals from the outside and shouting: "it is not sufficient." Eventually this process them to decide to join the negotiations, and we were happy that they did so. (Interview 12)</p>
Q49	<p>Er komt veel eerder een moment dat het geen zin heeft om zo'n hernieuwbare asset extra op te stellen. En dat is in de buurt van de vijftig procent al. Dan heb je dus nog vijftig procent in volume aan conventioneel vermogen, misschien nog wel meer. Omdat zon en wind gewoon altijd op het verkeerde moment komen op een gegeven moment. (Interview 7)</p>	<p>Much more likely there will be a moment when it makes no sense to add more renewable assets. This will be the case already close to fifty percent. Then we still have fifty percent of conventional capacity, maybe even more. An important reason is that solar and wind will be available at the wrong moment [out of sync with demand] (Interview 7)</p>

Nr	Original quote	Translation
Q50	Wat ik bedoel nu met invloed van de markt, consument, klant, is dat je klanten nu een keus ziet maken voor het zelf opwekken van de energie, dus de panelen op het dak, of het participeren in een windpark. En dat, vind ik, heeft dan wel impact op wat het bedrijf doet. (Interview 5)	What I mean by the influence of the market, consumer, customer, is that customers are now making the choice to generate energy, by installing solar panels on their roof or participating in wind projects. And that has an impact on suppliers' behavior, in my opinion. (Interview 5)
Q51	Onze grootste concurrent staat om de hoek en we zien hem niet zeg maar. Je ziet andere spelers binnen het speelveld komen en dat zijn niet de traditionele energiemaatschappijen. (.) Je hebt het over de Googles, maar ook over de IKEA's bij wijze van spreken. De IKEA's die al huizen aan het creëren is, maar ook al in de zonnepanelenmarkt zit. Dn dat wordt het, dan wordt het een ander verhaal. Je ziet steeds meer andere sectoren in die energiemarkt komen. Iedereen wil in dat huis komen. (Interview 13)	Our strongest competitor is just around the corner, but we didn't spot him yet, so to speak. Other actors are entering the arena and these are not traditional energy suppliers. This involves technology firms such as Google, but also firms like IKEA. IKEA creates homes, but has also already entered the solar panel market. This changes the storyline. Many more sectors are engaging the energy market, because everyone wants to enter consumers' houses. (Interview 13)
Q52	De grote strategie was natuurlijk we zitten en we gaan toe naar een Europese energiemarkt. Zeker in het Noordwest Europese deel gaan we dat, gaan we dat doen. Dat was ook het project van de grote energiebedrijven. Dus in hun hoofd zat ook dan kunnen wij dus gaan optimaliseren. (Interview 8)	The grand strategy, of course, was to establish a European energy market. This was certainly expected to happen in North-West EU. The large energy suppliers saw this as their project. This made focus on [international/cross-border] optimization a key aspect of their mindset. (Interview 8)
Q53	Voor RWE was het zo dat, ze hadden een kleine salesorganisatie, maar geen eigen productie in Nederland. En dus voor ons was het heel lastig om competitief, met name in de B2B-markt stroom te verkopen. Dus als je nou een centrale bouwt, kan je dat veel effectiever doen. (Interview 17)	RWE Netherlands, at that time, consisted of a small sales organization, but they had no generation capacity of their own. This made it rather complicated to compete, especially in the B2B market. However, if you build a power plant, you can be much more competitive. (Interview 17)

Nr	Original quote	Translation
Q54	<p>Dus al die bedrijven kregen een soort me too. Je moet ook niet vergeten, al deze bedrijven hadden voor het eerst een CEO. Daarvoor had je gewoon regionale directeur van energie Amsterdam of iets dergelijks. Maar gewoon, je bent ineens CEO, je moet ook assets hebben. (Interview 16)</p>	<p>Many firms showed a kind of "me too" thinking. What is relevant to consider is that at that time these firms, for the first time in their history, had a CEO [due to the privatization]. Before that time, the director was something like a regional director of energy supply in Amsterdam. Now they were suddenly CEO and then, of course, you needed assets (Interview 16)</p>
Q55	<p>Het eerste wat er gebeurde was een enorme overcapaciteit creëren, waar ze uiteindelijk voor gewaarschuwd zijn. Ik bedoel wij [een NGO] zeiden in 2007 al tegen al die bedrijven van jullie zijn veel te veel aan het bouwen. (Interview 2)</p>	<p>The first thing that happened was creating an enormous overcapacity. But they were eventually warned about that risk. I mean we [an NGO] already warned them in 2007 that they were developing much too much capacity. (Interview 2)</p>
Q56	<p>Teuling, Greenpeace: Dit kabinet geeft schone energie geen schijn van kans. De overcapaciteit uit de nieuwe kolen- en kerncentrales die dit kabinet wil bouwen, zal duurzame energie wegdrukken. (10_0405)</p>	<p>Teuling, Greenpeace: This government provides virtually no opportunity for clean energy. The overcapacity in terms of coal- and nuclear power plants, that this administration has planned, will push aside sustainable energy (10_0405)</p>
Q57	<p>Het Regieorgaan Energie Transitie vreest dat de prijs van groene stroom echter in het gedrang komt door de plannen van ondernemingen voor de bouw van nieuwe kolencentrales. Als die allemaal worden gerealiseerd zal er een overcapaciteit ontstaan, die het niet aantrekkelijk maakt om te investeren in duurzame energie. (10_0026)</p>	<p>The Regieorgaan Energie Transitie [Energy Transition taskforce] fears the price of green electricity will be negatively affected by the plans of businesses to construct new coal-fired power plants. If all plans are implemented, overcapacity will be developed and this will negatively impact the attractiveness of investing in sustainable energy. (10_0026)</p>

Nr	Original quote	Translation
Q58	<p>Want ik werk met bedrijven die heel verschillend zijn, sommige hebben een Nederlands hoofdkantoor zoals AKZO NOBEL en daar is bij wijze van spreken daar bemoeit de CEO wat er in Nederland gebeurt. Maar er zijn natuurlijk legio bedrijven waar je met een plant manager te maken krijgt die ja maar eigenlijk 1 opdracht heeft om zoveel mogelijk te produceren en verder niks. De grootste uitdaging is natuurlijk hoe kunnen we dat soort partijen? Dat geldt ook voor de elektriciteitssector eigenlijk: hoe kunnen we dat soort bedrijven toch in beweging krijgen in Nederland en dat er juist in Nederland wordt geïnvesteerd. (Interview 14)</p>	<p>I work with businesses that are very different from each other. Some have a Dutch head office such as Akzo Nobel and a CEO who is involved with what happens in the Netherlands. But there are many other businesses that just have a plant manager in the Netherlands, who has just one assignment: producing as much as possible. The biggest challenge is how: how can we engage these parties? This is also relevant in the Electricity sector: how can we get these firms to start moving and invest specifically in the Netherlands? (Interview 14)</p>
Q59	<p>De Boer, EON: Dat het beleid op het gebied van duurzame energie versnipperd is, klopt. Internationaal gezien valt Nederland buiten de boot. Voor E.ON is het beter in het buitenland te investeren omdat het beleid stabiel is. Daar is onze euro effectiever. (10_0085)</p>	<p>De Boer, EON: It is true that the policy with regard to sustainable energy is fragmented. On the international level the Netherlands is falling short. For Eon, investing abroad is more attractive, due to the more stable policy context. There our return on investment is higher. (10_0085)</p>
Q60	<p>Dit is gewoon de logische consequenties van de keuze om de markt te liberaliseren. Dus in die zin denk ik van ja, op het moment dat je de markt liberaliseert en gewoon ook puur op basis van de merit order en kosten laat bepalen wie wat produceert. (Interview 6)</p>	<p>This is just a logical consequence of the choice to privatize the market. In that case, it is just the merit order and cost that determine who will produce what kind of electricity. (Interview 6)</p>
Q61	<p>Dat we altijd dachten dat gascentrales de prijs gingen zetten. (.) We hadden een enorm team en wij wisten zoveel. Maar hoe de prijzen in de markt zijn beïnvloed door alle duurzame energie wat op het grid is gezet: er was niemand die dat vertelde, nee. (Interview 16)</p>	<p>We always thought that the gas-fired power plants would determine the price. (.) We employed an enormous team and we knew so much. But how the prices in the market would be influenced by the large volume of sustainable energy fed into the grid: there was no one telling that message, no. (Interview 16)</p>

Nr	Original quote	Translation
Q62	<p>De Haas, Eneco: 'Ja, maar splitsing werkt contraproductief bij de verduurzaming. In de toekomst zullen lokale opwekking, lokale netten en lokaal verbruik van energie hand in hand gaan. Dat moet je in samenhang bekijken. Waarin ga je bijvoorbeeld investeren? Het netwerk hangt heel erg af van de plek waar je de energie opwekt en verbruikt. In een integrale, ongesplitste onderneming kan beter de balans worden gevonden tussen die duurzame, centrale opwekking en de aanpassing van het net die daar bij hoort.' (12_0037)</p>	<p>De Haas, Eneco: 'Yes, the unbundling works counter-productively with regard to sustainability. In the future local generation, grids and usage of energy will go hand in hand. That should be considered coherently. Where do you need to invest? The appropriateness of the grid is strongly determined by the location of generation and usage of energy. An integrated, bundled enterprise is much better suited to find the balance between sustainable, decentralized generation and the adaptation of the grid needed as consequence.' (12_0037)</p>
Q63	<p>Dus de energiemarkt gaat verschuiven naar een data georiënteerde markt. (.) Wij richten ons echt op de service kant, dus wij beschouwen ons ook echt als een data- en energie-service company. (Interview 11)</p>	<p>The energy market thus will shift towards a data oriented market. (.) We strongly focus on the service aspect and consider ourselves really as a data- and energy-service firm. (Interview 11)</p>
Q64	<p>Toetreders: Wij (.) verdienen ook niet meer aan het leveren. Daarnaast hebben we coöperatie opgericht. De productiemiddelen zijn in handen van die coöperatie. De klanten zijn zelf de eigenaar omdat ze lid zijn van de coöperatie die de eigenaar is van de windmolens. (Interview 11)</p>	<p>New entrant: We do not earn any more on the [amount of] supplied energy. Second, we have founded a cooperative. The generation assets are owned by the cooperative and our customers are members and as such owners of the wind turbines owned by the cooperative. (Interview 11)</p>
Q65	<p>Toetreders: Wij zijn redelijk low cost. Wij kunnen een klant services op basis van het vastrecht wat die per maand betaalt. Dus wij zijn niet afhankelijk van die commodity. Dus ook als de klant zelf gaat terug leveren, maakt ons dat niet zoveel uit. (Interview 4)</p>	<p>New entrant: We have reasonably low cost levels. Therefore, we are able to service, based on the fixed-fee part of the monthly energy bill and are not dependent on the variable part of supplied volume. Thus, also in case the customer starts to feed-in energy, this does not matter for us. (Interview 4)</p>

Nr	Original quote	Translation
Q66	<p>Toetredter: Kijk, Eneco die doet heel veel op dit moment op de markt. (.) Eneco wil ook met coöperaties iets doen. Eneco doet ook iets met warmtepompen (.) Ze doen ook zon en wind. En dat is allemaal hartstikke leuk. Ze doen dat ook best wel goed. Wat je alleen ziet, het onderliggende businessmodel is een verlieslatende activiteit. (Interview 4)</p>	<p>New entrant: Eneco currently employs a lot of initiatives on the market (.). They want to develop activities with cooperatives. Eneco also has an initiative with heat pumps. (.) They are also involved with solar and wind. And that is all great fun. They also do that pretty well. However, it is important to note that the underlying business model is a loss-making activity. (Interview 4)</p>
Q67	<p>Ik herinner mij nog dat een van de eerste sessies dat ik naar Duitsland ging, naar het hoofdkantoor ging van RWE, en dat ik met de andere innovatiemanagers zat [ongeveer 2010]. Je moet je voorstellen, er waren daar altijd heel veel ingenieurs. Ik was de enige niet gepromoveerde dokter ingenieur. (.) En ik herinner mij dat bij de eerste discussie waar ik bij zat. Ze waren daar nog steeds zaten te discussiëren over het feit, dat het onmogelijk was om met zonne-energie te werken in Duitsland. Want het was toch echt niet efficiënt en, ik weet het allemaal niet meer. Er waren allerlei technische argumenten waarom dat nou echt onzin was dat ze dat in Duitsland deden. Terwijl, ja, het was natuurlijk al vol aan de gang toen. (Interview 3)</p>	<p>I still remember one of my first sessions at the German head office of RWE with the community of innovation managers [approx. 2010]. There were also many engineers participating. In fact, I was the only participant without a PhD in engineering. (.) I recall one of the first discussions in which I was participating. They were still debating the impossibility of relying on solar energy in Germany. From their perspective that was not efficient and they had many other technical arguments why it was madness that solar was employed in Germany. While at that time it [the strong growth of solar] was already fully under way. (Interview 3)</p>
Q68	<p>Zonnepanelen in Duitsland? Dat is als het telen van ananassen in Alaska', zei RWE-baas Jürgen Grossmann nog in 2011. (Persson, 13_0348)</p>	<p>'Solar panels in Germany? That is like growing pineapples in Alaska' as RWE-executive Jürgen Grossmann said even in 2011. (Persson, 13_0348)</p>
Q69	<p>Breithaupt, Grunneger Power: "Twee derde van de Nederlandse energiemarkt is in buitenlandse handen. De meeste winst gaat het land uit. Laten we dat terughalen, te beginnen in Groningen. Alle winsten van ons energiebedrijf gaan wij herinvesteren in lokale duurzame energieprojecten." (12_0213, Goals & Ambitions)</p>	<p>Breithaupt, Grunneger Power: "Two thirds of the Dutch energy market is controlled by foreign parties. Most of the profits flow across the borders. Let's take those back and let's start in Groningen. Our energy firm will reinvest all profits in local, sustainable energy projects." (12_0213, Goals & Ambitions)</p>

Nr	Original quote	Translation
Q70	<p>Wethouder Haarlemmermeer: Deze gemeentes gaan eigenlijk honderd jaar terug in de tijd. In het begin van de vorige eeuw richtten veel Nederlandse gemeenten en provincies ook eigen energiebedrijven op. (..) 'Sommige dingen waren vroeger nou eenmaal beter', zegt wethouder Nederstigt. Daarom is een toepasselijke slogan gekozen voor de lancering van het nieuwe energiebedrijf: 'De toekomst is gisteren begonnen'. (14_0083, Bottom-up &Solar)</p>	<p>Alderman Haarlemmermeer: 'These municipalities in fact move back one hundred years in time. At the start of the previous century many Dutch municipalities and provinces also founded their own energy firms. (..) 'Some things were better arranged in the past than today', according to alderman Nederstigt. 'This is also why they have embraced an appropriate slogan for their new energy firm: 'The future started yesterday.' (14_0083, Bottom-up &Solar)</p>
Q71	<p>Rotmans, Erasmus University: 'Er groeit een beweging van onderop van burgers die zeggen 'als de overheid en het bedrijfsleven het niet doen, dan doen wij het zelf wel'. (12_0350, Bottom-up &Solar)</p>	<p>Rotmans, Erasmus University: 'A bottom-up movement of citizens is growing. Their principle is that 'when government and the business community do not take action, we will do it ourselves.'" (12_0350, Bottom-up &Solar)</p>
Q72	<p>Directeur Tjerk Wagenaar van de Stichting Natuur en Milieu wijst er in een reactie op dat in het Energieakkoord is afgesproken dat in 2016 35% van de besparingsdoelstelling moet zijn gerealiseerd. 'Als blijkt dat dit niet lukt, is het logisch snel extra maatregelen te nemen.' (14_0271, Goals & Ambitions)</p>	<p>Director Tjerk Wagenaar of Stichting Natuur en Milieu in his reaction points to the agreement in the EA that in 2016 a 35% energy saving needs to be realized. 'If that is not achieved, it is logical to employ additional measures quickly.' (14_0271, Goals & Ambitions)</p>
Q73	<p>De adviecraden voor leefomgeving en infrastructuur, deze week [22 oktober 2011]: 'In de laatste decennia verliep de transitie naar een duurzame energievoorziening trager dan in andere Europese landen, waardoor Nederland een achterstand opliep.' (11_0361, Goals & Ambitions)</p>	<p>The advisory council for environment and infrastructure, this week [October 22nd 2011]: 'In the last decades the transitions towards a sustainable energy supply went slower than in other European countries and the Netherlands is therefore now lagging behind.' (11_0361, Goals & Ambitions)</p>

Nr	Original quote	Translation
Q74	Een rapport van stichting Natuur en Milieu, zaterdag [22 oktober 2011]: 'Opmerkelijk is dat Nederland meestal niet kan voldoen aan Europese milieufspraken, terwijl het kabinet zegt dat die leidend zijn.' (11_0361, Goals & Ambitions)	A report of Stichting Natuur en Milieu, last Saturday [October 22 nd 2011]: 'It is remarkable to note that the Netherlands are often not complying with European environmental agreements, considering that the cabinet calls these agreements leading.' (11_0361, Goals & Ambitions)
Q75	Dik, Christenunie: Dit kabinet zou moeten kiezen voor fundamentele, groene hervormingen. Op dit moment is er geen gelijk speelveld voor fossiele en groene energie. In de huidige situatie lopen de belastingvoordelen voor fossiele energie op tot bijna 6 miljard euro. (12_0371, Support measures)	Dik, Christenunie: "This cabinet should choose fundamental, green reforms. At this moment, there is no level playing field between fossil and green energy. In the current situation, the tax advantages for fossil energy amount almost 6 bn euro." (12_0371, Support measures)
Q76	Leider van milieuorganisaties: Alleen met wind op zee kan Nederland in 2020 14 procent van zijn energie duurzaam opwekken. (14_0013, Wind power)	ENGO leaders: The Netherlands can only generate 14% of its energy sustainably in 2020 by using offshore wind. (14_0013, Wind power)
Q77	ENGO leaders: Met forse investeringen in windmolens op zee bouwen we in Nederland een nieuwe economische sector op waar Nederland veel aan heeft: banen, exportkennis en op de lange termijn een goede prijs voor duurzame energie waarmee het klimaat is geholpen. (14_0013, Goals & Ambitions)	ENGO leaders: With considerable investments in offshore wind turbines, the Netherlands can build a new economic sector, which will provide many benefits: jobs, export of knowledge, and from a long-term perspective a good price for sustainable energy which will benefit the climate. (14_0013, Goals & Ambitions)

Nr	Original quote	Translation
Q78	<p>Hoek (DGZ), Rotmans (Erasmus University), van Keulen (Greenpeace): Een bedrijf dat niet actief aan duurzaamheid werkt, heeft over tien jaar geen bestaansrecht meer. Landen om ons heen vergroenen snel en zien winstkansen en innovatie. Als wetenschappers, bedrijven en maatschappelijke organisaties vinden we dat de overheid moet inzetten op fiscale kaders en consistent beleid om vergroening te versnellen. (12_0304, Goals & Ambitions)</p>	<p>Hoek (DGZ), Rotmans (Erasmus University), van Keulen (Greenpeace): A company which does not actively work on sustainability, will lose its license to operate in ten years. Neighboring countries are greening quickly and see many opportunities to make profits and innovate while doing so. As scientists, companies, and NGOs we call on the government to create supportive tax conditions and a consistent policy to accelerate the process of greening. (12_0304, Goals & Ambitions)</p>
Q79	<p>de Haas (Eneco): 'Er is op de lange termijn ook geen alternatief. In Nederland is de vraag daar ook naar: we hebben een redelijk groene thuismarkt. 'Made in Holland' zou een begrip kunnen worden, een bewijs van kwaliteit, van duurzaamheid. Andere delen van de wereld moeten dat brede welvaartsbegrip nog gaan begrijpen, maar zullen daar ook achter komen. Door nu al duurzaam te worden, creëer je een innovatief concurrentievoordeel. (12_0037, Ambitions & goals)</p>	<p>de Haas (Eneco): "There is no alternative from a long-term perspective. This is also obvious in the market demand in the Netherlands: we have a reasonably green home market. 'Made in Holland' could become a concept recognized for its quality and sustainability performance. In other parts of the world this broader conceptualization of welfare is not yet recognized, but this only a matter of time. If we become sustainable now, this will create an innovative competitive edge in the future. (12_0037, Ambitions & goals)</p>
Q80	<p>Van Velden (Gasunie): In een duurzame energie-economie moet Nederland blijven profiteren van de (aard)gasvoorsprong. In een slimme, integrale visie op onze duurzame energievoorziening helpt gas mee om hernieuwbare bronnen in te passen en te laten groeien. (12_0299, Conventional & CCS)</p>	<p>Van Velden (Gasunie): In the sustainable energy-economy, the Netherlands should keep profiting from its natural gas-based advantage. In a smart, integrated vision of a sustainable energy supply, natural gas facilitates the integration and growth of renewable energy sources. (12_0299, Conventional & CCS)</p>

Nr	Original quote	Translation
Q81	<p>PBL: Nederland heeft volgens het Planbureau „troeven in handen" op het gebied van bio-based economy, dat wil zeggen de productie op basis van hernieuwbare grondstoffen uit de natuur, zoals ethanol uit suikerbieten of aardappelzetmeel voor plastic. „We hebben een sterke kennis- en concurrentiepositie op het gebied van biotechnologie, voedselchemie, agrofood en chemie." (14_0016, Bio-based)</p>	<p>PBL: According to the environmental planning agency, the Netherlands owns key assets with regard to the bio-based economy. One example is the available knowledge on the production of renewable resources from natural sources such as the application of beet or starch to produce ethanol, and needed to make plastics. "We have a strong knowledge- and competitive position with regard to biotechnology, food chemistry, agri-food and chemicals." (14_0016, Bio-based)</p>
Q82	<p>Volgens Hans Alders, voorzitter van Energie-Ned, de belangenbehartiger van de Nederlandse energiebedrijven, gaan we het niet redden, de afgesproken 14 procent duurzame energie in 2020. We moeten daarom de blik richten op 2050, zei hij gisteren in de Volkskrant. Dat geeft weer even wat lucht. (12_0329, Ambitions & Goals)</p>	<p>According to Hans Alders (chair of Energie-Ned, the advocacy body of the Dutch energy firms), we will not be able to achieve the agreed 14% sustainable energy by 2020. Therefore, we should shift the horizon towards 2050, as he stated in the Volkskrant yesterday. That will provide for some breathing space for a certain period. (12_0329, Ambitions & Goals)</p>
Q83	<p>Terium: Zonder een duidelijk berekenbaar operationeel energiebeleid kan de energiesector niet investeren. Althans, niet in kapitaalintensieve energieproductie-eenheden waarbij de terugverdienperiode veel tijd beslaat. Zonder deze grote centrales of (offshore)windparken is de Europese energieommezwaai niet mogelijk. (11_0435, Ambitions & Goals)</p>	<p>Terium: Without a predictable and operationalized energy policy, the energy sector will not be able to invest. At least not in capital-intensive generation assets that have a long horizon to recover the cost. Without these larger power plants or offshore wind farms a European energy transition is not possible. (11_0435, Ambitions & Goals)</p>
Q84	<p>Gérard Mestrallet, baas van GDF Suez, het grootste elektriciteitsbedrijf ter wereld, durfde het gewoon te zeggen. 'We moeten het tempo verlagen waarmee Europa nieuwe windparken bouwt en zonnepanelen op de daken legt. Nu is dat niet duurzaam.' (13_0348, Ambitions & Goals)</p>	<p>Gérard Mestrallet, executive of GDF Suez, the largest electricity firm in the world, dared to state it simply. 'We should slow down the pace of constructing new windfarms and deployment of solar panels on our roofs. The current pace is simply not sustainable.' (13_0348, Ambitions & Goals)</p>

Nr	Original quote	Translation
Q85	<p>Jurjus, Energie-NL: Op 3 oktober [2011] sloot Energie-Nederland een Green Deal met het kabinet over de invoering van een verplicht aandeel duurzaam in 2015. Er ontstaat dan een echte markt voor groene stroom. Leveranciers concurreren om de efficiëntste aanbiedingen in de markt en leveren die aan hun klanten. (11_0374, Support measures)</p>	<p>Jurjus, Energie-NL: On October 3rd [2011] Energie-Nederland closed a Green Deal with the cabinet on the implementation of an obligatory share of renewable energy in 2015. This will create a real market for green power. Suppliers will compete to be able to provide the most attractive offering on the market and for their customers. (11_0374, Support measures)</p>
Q86	<p>E.ON medewerkers: De technenuten van de oude kolencentrale kunnen er met hun verstand moeilijk bij. „Iedereen is tegen ons,” verzucht Geers. Hij heeft net uitgelegd wat er allemaal aan installaties is aangelegd om de kwalijke uitstoot te beperken. Stikstof, zwavel en vliegast worden zoveel mogelijk opgevangen en uitgefilterd in ingenieuze systemen. Er wordt biomassa bijgestookt en er wordt samengewerkt met omliggende bedrijven om de uitstoot van CO₂ te beperken. Geers: „Als dat niet duurzaam is, weet ik het ook niet meer.” (13_0296, Conventional & CCS)</p>	<p>E.ON employees: The technicians of the old coal power plants are not able to grasp it. "Everybody opposes us," complains Geers. He had just before explained how many installations were deployed to reduce harmful emissions. Nitrogen, sulfur and fly ash are all filtered out of the emissions with ingenious systems. Furthermore, biomass is co-fired and the firm cooperates with neighboring firms to limit CO₂ emissions. Geers: "If this is not sustainable, my ideas are depleted." (13_0296, Conventional & CCS)</p>
Q87	<p>Volgens VVD-energiewoordvoerder René Leegte moet het doel als 'voorwaardelijk' worden gezien. 'Als dat niet rétel is, dus als het te duur wordt, dan stellen we het doel bij'. (13_0019, Ambitions & Goals)</p>	<p>According to VVD-energy speaker René Leegte, the goal should be seen as 'conditional.' 'If it proves unrealistic or if it becomes too expensive, we will adapt the goal.' (13_0019, Ambitions & Goals)</p>
Q88	<p>Leegte (VVD) zal aandacht vragen voor de dreigende 'energiearmoede', als gevolg van de stijgende energierekening. Het kabinet wil de kosten van groene energie, die oplopen tot 3,8 miljard euro in 2020 en de jaren daarna, financieren met een opslag op de kale energieprijs. Dat gaat gezinnen een paar honderd euro per jaar kosten (13_0019, Ambitions & Goals)</p>	<p>Leegte (VVD) will call attention to the threat of 'energy-poverty' as a consequence of the increasing energy bill. The cabinet plans to finance the cost of green energy, which will increase to 3,8b in 2020 and the following years, as a surtax on the basic energy price. This will increase the energy bill for families by a few hundred euros per year. (13_0019, Ambitions & Goals)</p>

Nr	Original quote	Translation
Q89	<p>de Groot, VNO-NCW: De werkgeversorganisatie is bang dat Europa een deel van zijn industrie verliest als het op eigen houtje ambitieuze klimaatdoelen nastreeft. Volgens De Groot zijn de werkgevers wel voor ambitieuze klimaatdoelstellingen, 'maar dan wereldwijd en met bindende afspraken die voor iedereen gelden'. (10_0232, Ambitions & Goals)</p>	<p>de Groot, VNO-NCW: The employer organization is afraid that Europe will lose a part of its industry if it unilaterally pursues ambitious climate change goals. According to De Groot, the employers do support ambitious climate change goals, 'but only in case of global and binding agreements that apply to everyone.' (10_0232, Ambitions & Goals)</p>
Q90	<p>Buijnk, ministerie EL&I: Volgens Buijnk moet Nederland de CO₂-reductie als uitgangspunt nemen en het aan de markt overlaten hoe die het meest efficiënt kan worden bereikt. Het doel voor de CO₂-reductie wil hij terugbrengen naar 20%, het niveau dat binnen de Europese Unie is afgesproken. Dit leidt volgens hem tot 'een significante verlaging van de kosten van het klimaatbeleid'. (10_0007, Support measure)</p>	<p>Buijnk, Ministry EL&I: According to Buijnk the Netherlands should take CO₂-reduction as a starting point and leave it to the market to find the most efficient solution. He proposes to reduce the goal for CO₂-reduction to 20%, the level agreed to earlier with the European Union. This will lead to 'a significant reduction of the climate policy cost,' according to Buijnk. (10_0007, Support measure)</p>
Q91	<p>CPB: Ook wijst hij op de deze week [20 juni 2013] verschenen kosten-batenanalyse van het Centraal Planbureau: door de lage stroomprijs verdienen windmolens zich niet snel genoeg terug en daarom is het beter vijf jaar te wachten met nieuwe turbines, luidt de conclusie. (13_0220, Wind power)</p>	<p>CPB: He also points to the cost-benefit analysis of the CPB published this week [June 20th 2013]: due to the low electricity price the cost recovery period of wind turbines becomes too long and therefore the conclusion is that it is a better option to wait five years before constructing new turbines. (13_0220, Wind power)</p>

Nr	Original quote	Translation
Q92	<p>Partijen zetten zich in dit verband in om de volgende doelen te realiseren: (1) Een besparing van het finale energieverbruik met gemiddeld 1,5 procent per jaar. (2) 100 petajoule aan energiebesparing in het finale energieverbruik van Nederland per 2020. (3) Een toename van het aandeel van hernieuwbare energieopwekking (nu ruim 4 procent) naar 14 procent in 2020. Een verdere stijging van dit aandeel naar 16 procent in 2023. (4) Ten minste 15.000 voltijdshbanen, voor een belangrijk deel in de eerstkomende jaren te creëren. (SER 2013, p. 11)</p>	<p>Parties will contribute - in the context of this agreement - to realize the following goals:</p> <ul style="list-style-type: none"> • a saving of the final energy usage of approximately 1,5% per year. • (2)a 100 PJ-energy saving in final energy usage in the Netherlands in 2010. • An increase of the share of renewable energy generation (currently >4%) to 14% in 2020 and a further increase to 16% in 2023. • Creating at least 15.000 fulltime jobs, of which a considerable share is created in the first years from now on. (SER 2013, p.11)
Q93	<p>Partijen leggen in dit Energieakkoord voor duurzame groei de basis voor een breed gedragen, robuust en toekomstbestendig energie- en klimaatbeleid. (SER 2013, p. 11)</p>	<p>With the Energy Agreement for sustainable growth the involved parties lay the foundation for a broadly supported, robust and future-proof energy- and climate policy. (SER 2013, p. 11)</p>
Q94	<p>Het akkoord is gericht op versterking van de economische structuur en zal de komende jaren miljarden aan investeringen losmaken in alle sectoren van onze samenleving. (SER 2013, p. 11)</p>	<p>The E.A targets strengthening the economic structure and will release billions of investments in all sectors of society in the coming years. (SER 2013, p. 11)</p>
Q95	<p>ETS: borging van de positie van internationaal concurrerende bedrijven (zogenaamde carbon leakage-bedrijven) door allocatie van 100% gratis rechten op basis van reële benchmarks en werkelijke productie, uitgaande van de best performance in de sector (SER 2013, p. 20)</p>	<p>ETS: assuring the competitive position of international firms (so called carbon- leakage firms) by allocating 100% free allowances based on realistic benchmarks, based on actual production levels and best-performance in the sector. (SER 2013, p. 20)</p>

Nr	Original quote	Translation
Q96	<p>De Nederlandse economie kent in vergelijking met andere Europese landen een groot aandeel energie-intensieve industrie. Door recente ontwikkelingen rond de winning van (schalie)gas kent Europa, in vergelijking met de VS en het Midden-Oosten, relatief hoge energie- en grondstofprijzen. Daardoor zijn internationaal concurrerende bedrijven zich nog meer dan voorheen bewust van het belang van een efficiënt gebruik en het duurzaam opwekken van energie. Dit akkoord draagt ook bij aan een goed investeringsklimaat voor de energie-intensieve industrie met de ambitie om qua energie-efficiëntie tot de wereldtop te behoren. (SER 2013, p. 31)</p>	<p>The Dutch Economy has a relatively large energy-intensive industry compared to other European countries. Due to recent developments related to the extraction of shale gas, Europe is confronted with high energy and resource prices compared to the US and the Middle-East. This has produced an even stronger awareness of the importance of efficient usage and sustainable generation of energy among internationally competing firms. By aspiring to world-class performance with regard to energy efficiency, this agreement contributes to the strong investment climate for the energy-intensive industry. (SER 2013, p. 31)</p>
Q97	<p>Verhoging van de energie-efficiëntie in de industrie en agrosectoren is van groot belang om de operationele kosten te reduceren, de kwetsbaarheid voor fluctuaties in de energieprijis te verminderen, bestaande werkgelegenheid te behouden en nieuwe banen te creëren, de concurrentiepositie van deze sectoren op de internationale markt te behouden en waar mogelijk te versterken, en de klimaatdoelen kosteneffectief te kunnen realiseren. (SER 2013, p. 55)</p>	<p>Increasing the energy-efficiency of the industry and agribusiness sectors is of paramount importance to reduce operational cost, the vulnerability with regard to fluctuating energy prices, sustain and create jobs, sustain and when possible improve the international competitive position of these sectors, and to realize climate goals cost-effectively. (SER 2013, p. 55)</p>
Q98	<p>Eventuele – overigens zeer beperkte prijseffecten – als gevolg van het sluiten van de oude kolencentrales zullen worden gemitigeerd door de aanzienlijk toename in hernieuwbare energie en gerechtvaardigd door de voorzienene milieu-effecten. (SER 2013, p. 22)</p>	<p>Potentially - rather limited - price effects due to the closure of old coal power plants will be mitigated by a substantial increase of renewable energy and justified by the predicted environmental effects. (SER 2013, p. 22)</p>
Q99	<p>In dit Energieakkoord combineren partijen ambitie en realisme tot de hoofdlijnen van een uitgekende uitrolstrategie die een optimale balans creëert tussen maatschappelijke kosten en baten, op de korte en op lange termijn. (SER 2013, p. 68)</p>	<p>In the E.A, parties combine ambition and realism in a smart implementation strategy which creates an optimal balance between societal costs and benefits, on the short- and long-term horizon. (SER 2013, p. 68)</p>

Nr	Original quote	Translation
Q100	Uitgangspunt is een kosteneffectieve uitrol die zekerheid biedt voor investeerders, additionele werkgelegenheid creëert, innovaties uitlokt waardoor de kosten worden verlaagd en die bijdraagt aan versterking van de concurrentiepositie van Nederlandse bedrijven in deze sector.(over hernieuwbare energie, SER 2013, p. 17)	The starting point is a cost-effective implementation, which provides security for investors, creates additional employment, induces innovation to lower costs and contributes to strengthening the competitive position of Dutch firms in this sector. (on renewables, SER 2013, p. 17)
Q101	Fossiele brandstoffen zullen in de periode tot 2050 nog een belangrijk onderdeel vormen van het energiegebruik, ook al richt het akkoord zich op een reductie van 80 tot 95% van de CO ₂ -uitstoot in 2050 (SER 2013, p. 20)	Fossil fuels will, in the period until 2050, still represent an important share of the energy usage, even considering the agreement targets of 80-95% reduction of CO ₂ -emissions in 2050. (SER 2013, p. 20)
Q102	Om op de lange termijn te komen tot een volledig duurzame energievoorziening zal afvang, gebruik en opslag van CO ₂ (CCS) onvermijdelijk zijn. (SER 2013, p. 21)	To realize a completely sustainable energy supply in the long term, the capture, usage and storage of CO ₂ (CCS) are inevitable. (SER 2013, p. 21)
Q103	Dit akkoord streeft naar duurzame groei. Dat vraagt om een goede balans tussen betrouwbaarheid, duurzaamheid en betaalbaarheid van energie. (SER 2013, . 31)	This EA aspires to sustainable growth. This requires a good balance between reliability, sustainability, and affordability of energy. (SER 2013, p. 31)
Q104	Begin 2015 zal de uitgifte vorm moeten krijgen om te bereiken dat de 25 PJ zal bijdragen aan het realiseren van de 14%-doelstelling in 2020. (SER 2013, p. 74)	The provision [of biomass support] needs to be implemented in early 2015 to ensure that the agreed 25 PJ [of biomass co-firing] will contribute to the 14%-goal in 2020. (SER 2013, p. 74)
Q105	De inzet van gascentrales op de Noordwest-Europese elektriciteitsmarkt blijft belangrijk. (SER 2013, p. 98)	The application of gas-fired power plants in the North West European Electricity market remains important. (SER 2013, p. 98)

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Q106	Uitgangspunt is een kosteneffectieve uitrol die zekerheid biedt voor investeerders, additionele werkgelegenheid creëert, innovaties uitlokt waardoor de kosten worden verlaagd en die bijdraagt aan versterking van de concurrentiepositie van Nederlandse bedrijven in deze sector.(over hernieuwbare energie, SER 2013, p. 17)	The starting point is a cost-effective implementation, which provides security for investors, creates additional employment, induces innovation to lower costs and contributes to strengthening the competitive position of Dutch firms in this sector. (on renewables, SER 2013, p. 17)
Q107	Partijen leggen in dit Energieakkoord voor duurzame groei de basis voor een breed gedragen, robuust en toekomstbestendig energie- en klimaatbeleid. (SER 2013, p. 11)	With the Energy Agreement for sustainable growth the involved parties lay the foundation for a broadly supported, robust and future-proof energy- and climate policy. (SER 2013, p. 11)
Q108	Energiebesparing draagt bij aan milieudoelstellingen, leidt tot een lagere energierekening, verbetert de concurrentiepositie van Nederlandse bedrijven en geeft een impuls aan de werkgelegenheid. (SER 2013, p. 13)	Energy saving contributes towards realizing environmental goals, lowers the energy bill, improves the competitive positions of Dutch firms and gives a boost to employment. (SER 2013, p. 13)
Q109	De negende pijler richt zich op energie-innovatie en -export. Het streven is dat Nederland in 2030 een top 10-positie inneemt op de mondiale CleanTech Ranking. (SER 2013, p. 23)	The ninth pillar focuses on energy-innovation and energy-export. The shared ambition is to achieve a top 10 position in the global CleanTech Ranking in 2030. (SER 2013, p. 23)
Q110	Door een slimme aanpak die volop inzet op innovatie biedt dit akkoord Nederland ook nieuwe kansen om te profiteren van de groeiende wereldmarkt voor schone technologieën. (SER 2013, p. 30)	By a smart approach which strongly targets innovation, this agreement offers new opportunities to the Netherlands to profit from the growing world market for clean technology. (SER 2013, p. 30)
Q111	Partijen leggen in dit Energieakkoord voor duurzame groei de basis voor een breed gedragen, robuust en toekomstbestendig energie- en klimaatbeleid. (SER 2013, p. 11)	With the Energy Agreement for sustainable growth the involved parties lay the foundation for a broadly supported, robust and future proof energy- and climate policy. (SER 2013, p. 11)

Nr	Original quote	Translation
Q112	Met dit akkoord willen partijen een besparing van jaarlijks gemiddeld 1,5 procent van het finale energieverbruik realiseren. Daarmee wordt naar verwachting ruimschoots voldaan aan de Europese richtlijn. (SER 2013, p. 13)	The parties aspire to realize a saving of on average 1,5% of the final energy use with this agreement. This saving is expected to amply comply with the European directive. (SER 2013, p. 13)
Q113	Indien blijkt dat we niet op koers liggen om de afgesproken doelen te halen, zullen aanvullende maatregelen worden genomen. Dit kunnen ook meer verplichtende en/of fiscale maatregelen of andere vrijwillige of niet-vrijwillige maatregelen zijn, waaruit meer zekerheid zal ontsiaan rondom het bereiken van 100 PJ energiebesparing. (SER 2013, p. 13)	If it becomes clear that actual progress deviates from the path towards realizing the targets, additional measures will be taken. These measures can be more obligatory and/or fiscal measures, or other voluntary or non-voluntary measures, whence more certainty will emerge with regard to realizing the 100 PJ energy saving. (SER 2013, p. 13)
Q114	ETS: een aanscherping van het reductiepad van het ETS-plaafond gericht op het bereiken van het langetermijndoel van 80 tot 95% reductie van broeikasgassen voor de hele economie in 2050 (SER 2013, p. 20)	ETS: tightening the reduction path of the ETS-ceiling targeted on the realization of the long-term goal of 80-95% reduction of greenhouse gasses in the whole economy in 2050. (SER 2013, p. 20)
Q115	Een belangrijk onderdeel vormt de decentrale opwekking van hernieuwbare energie door mensen zelf, en in de vorm van coöperatieve initiatieven, de derde pijler van het akkoord. (SER 2013, p. 19)	An important part is the decentralized generation of renewable energy by the people themselves, and in the form of cooperative initiatives; which represents the third pillar of the agreement. (SER 2013, p. 19)
Q116	Burgers en bedrijven worden ondersteund bij het nemen van maatregelen om woningen energiezuinig te maken en zelf energie op te wekken, waardoor ze hun energierekening kunnen verlagen. Deze ontwikkeling is al gaande. Steeds meer mensen nemen het initiatief om zelf energie te produceren, alleen of met anderen, in een coöperatie. (SER 2013, p. 31)	Citizens and companies are supported in taking measures to make their houses energy efficient and to generate energy themselves, which enables them to reduce their energy bill. This development is ongoing. More and more people take the initiative to produce energy themselves, either alone or together with others in a cooperative. (SER 2013, p. 31)

Nr	Original quote	Translation
Q117	<p>Marktpartijen en maatschappelijke organisaties streven ernaar dat minimaal 1 miljoen huishoudens en/of mkb-bedrijven in 2020 voor een substantieel deel via duurzame decentrale energie (DDE) in hun eigen elektriciteitsvraag voorzien en andere vormen van duurzame opwekking voor eigen gebruik toepassen. (SER 2013, p. 79)</p>	<p>Market actors and NGOs strive to enable 1 million households and/or SMEs to cover their own energy demand for a substantial part with sustainable, decentralized energy, or apply other forms of sustainable generation for their own use. (SER 2013, p. 79)</p>
Q118	<p>Energiebesparing draagt bij aan milieudoelstellingen, leidt tot een lagere energierekening, verbetert de concurrentiepositie van Nederlandse bedrijven en geeft een impuls aan de werkgelegenheid. (SER 2013, p. 12)</p>	<p>Energy saving contributes to realizing environmental goals, results in a lower energy bill, improves the competitive position of Dutch firms and gives a boost to employment. (SER 2013, p. 12)</p>
Q119	<p>En allemaal vinden ze dat Nederland veel te langzaam de omslag maakt naar een duurzame economie. Daarom hebben ze zich gebundeld, tot nu toe 34 bedrijven in totaal. Ze zijn een nieuwe ondernemersvereniging gestart, De Groene Zaak, die vandaag officieel is opgericht. Van Boxtel is er voorzitter van. „We willen de politiek stimuleren een snellere omslag te maken naar een duurzame samenleving,” zegt hij. (.) Bierman van Triodos Bank vraagt zich af waarom Nederland niet gretiger op deze duurzame ontwikkeling inspringt. „We weten dat we linksom of rechtsom van de fossiele brandstoffen af moeten. Waarom proberen we als Nederland daarin niet voorop te lopen,” zegt hij. Kansen zijn er volgens hem genoeg. (10_0036)</p>	<p>And all agree that the Netherlands is proceeding much too slowly in the transition to a sustainable economy. That is why 34 firms, up till now, decided to combine forces. They launched a new employers' association, De Groene Zaak, which was founded officially today. Van Boxtel has been appointed as chairman. He states: "We will stimulate politics to accelerate the transition to a sustainable society." Bierman of Triodos Bank wonders why the Netherlands does not more eagerly pursue sustainable development. "We know that we can't avoid abandoning fossil fuels. Why should the Netherlands not attempt to be a front runner?" He thinks there are many opportunities in this regard. (10_0036)</p>

Nr	Original quote	Translation
Q120	<p>Maar Verhagen kiest niet voor het vergroenen van belastingen, door bijvoorbeeld energie en grondstoffen te belasten en arbeid niet. Hij stapt niet af van het subsidiëren van fossiele brandstoffen. Voor de Groene Zaak, een platform van duurzame ondernemers zoals Eneco, Athlon Car Lease en Nyenrode, reden om de Green Deal niet te ondertekenen. (11_0324)</p>	<p>But Verhagen does not choose fiscal greening, by shifting tax pressure to energy and resources instead of labor. He does not abandon subsidies for fossil fuels. This is the reason why de Groene Zaak, a platform of sustainable entrepreneurs such as Eneco, Athlon Car Lease and Nyenrode, will not sign the Green Deal. (11_0324)</p>
Q121	<p>Want meneer Wientjes (voorzitter VNO-NCW) heeft ook een draai gemaakt in die periode. En dat zijn de essentiële dingen waardoor het anders is geworden. Maar in die eerste fase: ja je hebt gewoon onwillige paarden die je moet laten drinken. Ik denk, nou eerlijk gezegd ik weet het ook wel zeker, dat is macht. En gewoon daar is meneer Wientjes heel goed in, gewoon de realiteit zien. (Interview 12)</p>	<p>But Mr Wientjes (chair VNO-NCW) has had a change of heart in that period. And those are essential things which change the course of events. But in the first phase: one could compare it to making unwilling horses drink. I think, in fact I know for sure: this is power thinking. Mr Wientjes excels in this, which means facing reality. (Interview 12)</p>
Q122	<p>Nou, als VNO-NCW had geweten wat er allemaal in dat akkoord zou komen en wat er zou gaan gebeuren, denk ik dat ze het aan de voorkant hadden geblokkeerd. Dus ja, onderschat inderdaad niet de macht van VNO-NCW, maar die is dus wel wat aan het afbrokkelen. (Interview 6)</p>	<p>Well, if VNO-NCW would have known what would be included in this agreement and what would happen as result of it, they would have blocked the agreement in the early stages of the process. So yes, do not underestimate the power of VNO-NCW, but this power is also crumbling to a certain extent. (Interview 6)</p>
Q123	<p>Een van de punten was gewoon een heel verdeelde elektriciteitssector. Die was onderdeel van VNO-NCW. Maar die verdeelde elektriciteitssector, die heeft er wel voor gezorgd dat daar gewoon een soort ruimte ontstond om ook echt maatregelen te nemen op het gebied van duurzaamheid, die niet automatisch in het belang van het klassieke bedrijfsleven. (Interview 6)</p>	<p>One of the points was the strongly divided electricity sector. The sector was part of VNO-NCW. But this division in the electricity sector provided space to take measures with regard to sustainability that were not automatically aligned with the classic business stake. (Interview 6)</p>

Nr	Original quote	Translation
Q124	Het vermindert natuurlijk hun invloed want er komen meerdere geluiden, en dat is nooit handig. Maar ik moet zeggen, gebruikers van energie, of dat nou de kleine consument is of grote bedrijven, die vinden dat op zich wel lekker, want het zijn altijd monopolisten geweest. (Interview 1)	This does reduce their influence because diverging views are voiced, which is never beneficial. But I should say that the energy users, both the individual consumer as well as the large firms, do appreciate this development, because they [the energy sector] were always monopolists. (Interview 1)
Q125	Dat is eindeloos touwtrekken en bekvechten af en toe. En 26 versies van een brief maken. Dat is ook waarom dingen zo verschrikkelijk lang duren in die kringen. Ja dan zijn ze er gewoon nog niet uit. Alders die zat daar te onderhandelen namens de sector. Ja die moest continu terug naar zijn achterban om te kijken of hij alle kikkers nog wel in de kruiwagen had, omdat de belangen zo verschillend zijn tussen die bedrijven. (Interview 2)	This occasionally results in endless wrangling and squabbling. Drafting 26 versions of a letter. This is also why things take so much time in those circles. That is when they can't agree. Mr Alders was negotiating on behalf of the sector. Because of these largely diverging stakes of the different firms, he was forced to continuously consult his constituency to see whether all parties were still engaged. (Interview 2)
Q126	Het bestuur van VNO, de algemene ledenvergadering dan heb je dus zeg maar een aantal grote bedrijven en brancheclubs. De rol van meneer Benschop (CEO Shell NL) daarin. Hij heeft heel duidelijk gezegd: jongens je moet niet remmen, je moet gewoon genuanceerd meegaan. (Interview 12)	The board of VNO, the general members' meeting, consists of a number of large firms and sector associations. The role of Mr Benschop (CEO Shell NL) was important. He clearly stated: guys, you should not delay the process, but go along with the proposals in a nuanced way. (Interview 12)
Q127	De Akzo's en de DSM's en de Unilevers, waar duurzaamheid gewoon een heel prominent thema is geworden. (..) Maar die hebben dat gewoon wel onderkent en spelen daar slim op in. Dat heeft ook echt wel iets los gemaakt binnen VNO-NCW. (Interview 6)	Akzo, DSM, Unilever, and their likes have embraced sustainability as a very prominent theme. (..) They have recognized it and smartly pursue the opportunities. This also induced some developments within VNO-NCW. (Interview 6)

Nr	Original quote	Translation
Q128	<p>Hij (Ab van der Touw, CEO Siemens NL) is ook degene geweest die voorzitter was van de fafel van de industrie. Er bestonden vier [vijf, sectie 6.4.1] tafels voor het Energieakkoord. Hij heeft die tafel voorgezeten. Hij heeft door die rol in het opzetten van dat akkoord en zijn rol binnen VNO-NCW heeft hij heel veel in die beweging kunnen creëren (Interview 12)</p>	<p>He (Ab van der Touw, CEO Siemens NL) was also the chair of an industry working group. This was one of the four [five, see section 6.4.1] groups in the negotiation process for the Energy Agreement and he was the chair. In this role and his role within VNO-NCW he was able to set a lot in motion. (Interview 12)</p>
Q129	<p>Maar dat het milieubeweging aan tafel kwam. Er zijn hele felle discussies geweest of überhaupt de Groene Zaak ook mag worden beschouwd als een werkgeversorganisatie, die überhaupt in SER-verband aan tafel zou mogen komen te zitten. (Interview 6)</p>	<p>But the environmental movement joined the group at the table. There was fierce debate about whether de Groene Zaak could be considered an employers' organization that should be allowed to join the conversation in the context of the SER. (Interview 6)</p>
Q130	<p>En bijvoorbeeld met Eneco zitten wij (ENGOS) zelfs in een coalitie, in het kader van het energieakkoord. En de groene partijen proberen een blok te vormen en dat doen wij samen met de NVDE. (Interview 2)</p>	<p>And we (ENGOS) are part of a coalition with regard to the Energy Agreement of which Eneco is also a member. The green actors attempt to form a block [a well aligned coalition] and we cooperate with the NVDE in that regard. (Interview 2)</p>
Q131	<p>Ik had denk ik wel echt regulier contact, maar dan praat je één keer in de paar maanden en sprak ik sowieso altijd wel met Eneco. (.) Die wilden ook echt dingen van ons en die hadden ook gewoon ideeën. Dat was voor ons ook interessant om ook gewoon kennis en ideeën uit te wisselen en van buiten naar binnen te halen. (Interview 6)</p>	<p>I think I had regular contact with them, which means talking to them once every few months and that included Eneco in all cases. (.) Eneco had specific requests for us as well as concrete ideas. This made it interesting for us to exchange knowledge and ideas and to get those from outside into our internal sphere. (Interview 6)</p>

Nr	Original quote	Translation
Q132	<p>En ook bij E/Z merkten we dat we gewoon steeds meer individueel met bedrijven gingen praten om erachter: wat vindt Piet, wat vindt Jan'tje, wat vindt Klaasje, hè, dat zijn allemaal verschillen. (Interview 6)</p>	<p>We noticed within the ministry of Economic Affairs that we started to talk more and more to individual firms to find out their individual views and that they differed considerably (literally: "what does Pete think, what does Jan think and what does Klaas think, eh, their views all differ"). (Interview 6)</p>

Nr	Original quote	Translation
Q133	<p>Nuon medewerker: Dan zie je dat, dat er bijna, er wordt fundamenteel anders over de wereld gedacht binnen de leden van Energie Nederland. Dat heeft een enorme weerslag op de mate waarin je je kan organiseren-</p> <p>Interviewer: Jullie hebben ook wel een interessante positie. Ik bedoel als ik het puur uit de krant haal dan zeg maar aan de ene kant Greenchoice en Eneco. Andere kant E.ON, GDF en Essent, redelijk op één lijn en jullie zitten er een beetje tussenin.</p> <p>Nuon medewerker: Ja, dat klopt, dat heb je goed gezien. Ik denk dat het bij ons bedrijf past, die rol. Het geeft wel verplichtingen in die zin dat wij heel voorzichtig moeten zijn om niet om dingen te legitimeren. Als je nou kijkt naar de kolendiscussie. Heel plat gezegd vinden wij dat de kolencentrales uit moeten, maar we hebben wel een kolencentrale. Daar zit ook waarde in, een technische levensduur. Nou, dat duurt nog vijftien jaar. We hebben wel gezegd we hebben twee opties. We vinden dat kolen alleen, dat kan nooit de toekomst zijn, dus we zouden willen bijstoken, een bepaalde hoeveelheid. Maar we zijn ook bereid met de overheid in gesprek te gaan om, om die kolencentrale te sluiten. Dus dat brengt ons in ieder geval in het kolenkamp, maar de toekomst voor ons is gas. Grootchalige productie op basis van gas en daar vinden we inderdaad de andere kant van het spectrum meer aan onze zijde. (Interview 10)</p>	<p>Nuon employee: Then it becomes clear that the views of the members of Energie-Nederland on the world differ (almost) fundamentally. This strongly impacts the ability to organize as a collective.</p> <p>Interviewer: You do have an interesting position. What I mean is that based on newspaper analysis I see on one side Greenchoice and Eneco. And on the other side E.ON, GDF and Essent with rather well-aligned views. But your position seems to be somewhat in between.</p> <p>Nuon Employee: Yes, that is correct, you made a correct observation. I do think this role fits us as a company. This also induces obligations in the sense that we should be rather careful to legitimize specific proposals. When we take the coal debate as an example. Bluntly, our position is that coal power plants should be phased out, but we also do still operate a coal power plant. This asset still has a value and still has 15 years remaining of technical lifespan. We have said: there are two options for us. Stand-alone coal can't be the future, thus we would like to co-fire a certain amount of biomass. But second, we are also willing to engage with the government about phasing out this power plant. This makes us part of the "coal" side of the debate, but our future clearly resides in gas. Gas is the future of large scale energy generation and in this regard, we find the actors of the opposing side of the spectrum on our side. (Interview 10)</p>

Nr	Original quote	Translation
Q134	<p>En dat eigenlijk voor alle partijen, nog los van alle ander punten die er wel in staan, maar voor alle partijen erg belangrijk was namelijk: stabiliteit, draagvlak en bepaalde maat van consistentie en duidelijkheid van de gevolgen van het energiebeleid, en het behalen van onze doelstellingen. En ik denk dat dat uiteindelijk, nog los van alle afspraken die je maakt binnen het akkoord, dat dat uiteindelijk voor alle partijen ontzettend belangrijk is geweest. (Interview 1)</p>	<p>And that there was a clear priority for all parties, apart from the other specific points included in it: stability, broad support and a certain degree of consistency and clarity on the impact of the energy policy and achieving the included goals. Bottom line; this was extremely important for all parties, besides the specific agreements included. (Interview 1)</p>
Q135	<p>Dus wat je in toenemende mate ziet. Het akkoord zelf heeft stabiliteit en heeft dus in iedere geval duidelijk ook enigszins stabiliteit gecreëerd. Maar we zien dat de politiek op alle mogelijke manieren aan het knabbelen is. (Interview 14)</p>	<p>The agreement itself has stability and thus has also created a certain level of stability. However, we increasingly see politics crumbling aspects of the agreement in every possible way. (Interview 14)</p>
Q136	<p>We hebben een akkoord, het energieakkoord. Vervolgens komen hier nieuwe ontwikkelingen en nou is de vraag hoe zorg je ervoor dat deze doelen voor elkaar komen, gegeven deze nieuwe ontwikkelingen? (..) Tegelijkertijd speelde ook het Urgenda-vonnis een rol. Want het Urgenda-vonnis dat is weer een extern effect buiten dat energieakkoord, wat ineens ervoor zorgde dat we iets extra's kunnen gaan doen. Kijk en als we iets extra's gaan doen, wij zijn natuurlijk nooit tegen geweest ook om meer te doen. Dus in het spanningsveld kolen, biomassa is altijd de lijn geweest het energieakkoord staat overeind. Alleen we moeten altijd open staan voor nieuwe ontwikkelingen. (Interview 12)</p>	<p>We have an agreement, the EA. When new developments emerge - as was the case - the question becomes how can we still achieve the agreed goals given these new developments? (..) At the same time the Urgenda-verdict played a role. The Urgenda-verdict is an external effect outside of the EA, which, however, gives us the opportunity to make some additional progress. Of course, we do not resist the option to do more. Thus, in the tension with regard to coal and biomass our position has always been that the EA remains intact. However, we should always be open for new developments. (Interview 12)</p>

Nr	Original quote	Translation
Q137	<p>Ja, dat heeft ook tot behoorlijk wat chagrijn geleid, ja. Dat was: jongens, dat hadden we toch niet afgesproken. Maar je merkt gewoon dat de positie van de energiesector op punt van kolen zwak is. Op dat moment hadden ze niet de mogelijkheid om te zeggen: jullie onttrekken je aan de afspraken, dan lappen wij het energieakkoord ook aan onze laars. Voor de energiesector is dat een onvoorstelbare stap. Want dat levert domweg meer schade op dan winst (Interview 8)</p>	<p>Yes, that has led to considerable chagrin. That was: guys, this was not what we had agreed. But you notice that the position of the energy sector is weak with regard to coal power. At that moment, it was not a realistic option to say: if you evade the agreements, we will not comply with the EA either. For the energy sector, that is an unimaginable step. That would simply result in more damage than gain. (Interview 8)</p>
Q138	<p>Kijk het is bedacht vanuit het systeem. (..) En dat betekent dat natuurlijk dat in al die poldervarianten alle echt baanbrekende dingen, die pijn doen, eruit zijn. Transitie moet pijn doen. (Interview 11)</p>	<p>Look, this has been conceived from the system. (..) And this means that in all these polder variants [referring to the Dutch polder model, characterized by its compromises] all the really ground-breaking things, which hurt, have been removed. Transition, however, should hurt. (Interview 11)</p>
Q139	<p>Ik vind dat het Energie Akkoord uiteindelijk gewoon heel erg veel pijn zal hebben gedaan aan de energietransitie. De pijn zit hem dat het Energie Akkoord één groot compromis is om de kolencentrales in de lucht te houden. (..) Dat de echte issues die er in Nederland zijn, die zijn niet daardoor opgelost. En ik bedoel: waarom een Energie Akkoord? Er moet gewoon een visie vanuit de EZ komen. Die kant gaat het, dit gaan we behalen. Dit is gewoon geïnitieerd omdat er een wanhoop bestaat bij bedrijven. (Interview 16)</p>	<p>I think the EA eventually will have done a lot of damage to the energy transition. The pain lies in the fact that the EA is one big compromise to keep the coal power plants running. (..) The real issues in the Netherlands have not been solved by the EA. And what I mean: why an EA? The ministry of Economic Affairs should carry out its vision. They should point out the direction of development, the goals to be achieved. This agreement has been initiated because of despair existing in companies. (Interview 16)</p>

Nr	Original quote	Translation
Q140	<p>We willen laten zien dat we er hard aan werken om onze bedrijfsvoering en onze dienstverlening op een steeds hoger plan te brengen. We willen ook laten zien dat duurzaamheid daarin een belangrijke plaats inneemt. Wij denken erover na hoe wij met onze onderneming op een gestructureerde wijze een rol kunnen spelen in de transitie naar duurzaam en of de uitgangspunten van onze huidige missie daar nog wel bij passen.(O06-C1, p. 5)</p>	<p>We want to show that we are working hard to bring our operation and services to a higher level. We also want to show that sustainability is an important priority in that regard. We think about how we - as corporation - can play a role in the transition with a systematic approach. And whether the assumptions underlying our current mission still fit that picture. (O06-C1, p. 5)</p>
Q141	<p>Maar wij willen ook een voortrekkerspositie gaan innemen in de transitie naar een duurzame energievoorziening. Dat wij dat op een ondernemende wijze doen en blijven doen, is niet meer dan normaal in een vrije markt. (O06-C1, p. 5)</p>	<p>But we want to be a frontrunner in the transition towards a sustainable energy supply. That we apply an entrepreneurial approach (in pursuing this position as frontrunner), should be considered normal in a free market. (O06-C1, p. 5)</p>
Q142	<p>De oorspronkelijke ideeën achter de vorming van een Europese energiemarkt zijn deels achterhaald. Het Europese beleid was vooral gericht op het creëren van een grote geliberaliseerde Europese energiemarkt. vanuit de gedachte dat meer concurrentie tot lagere prijzen zou leiden. Boven genoemde recente ontwikkelingen hebben de bewustwording vergroot van het belang van twee andere pijlers onder het energiebeleid: voorzieningszekerheid en duurzaamheid. De Europese Commissie kwam begin januari 2007 met plannen voor een Europees energiebeleid, waarin deze twee uitgangspunten nu ook nadrukkelijk zijn opgenomen. ENECO ondersteunt dit beleid van harte. (O06-C1, p. 15)</p>	<p>The original ideas underlying the formation of a European energy market are partly outdated. The European policy was mainly directed at creating a large and deregulated European energy market, rooted in the idea that competition induces lower prices. Recent developments mentioned above have stimulated awareness on the importance of two other pillars of energy policy: supply security and sustainability. The European Commission has issued plans - in January 2007 - for a new European energy policy, in which these two pillars have received a prominent role. Eneco supports this policy heartily. (O06-C1, p. 15)</p>

Nr	Original quote	Translation
Q143	<p>Eneco maakt duidelijke keuzes in wat we wel en niet willen doen. We leggen de focus op verduurzaming van onze activiteiten maar beseffen dat we alleen samen met anderen meer kunnen bereiken. (.) In 2008 hebben we verdere stappen gezet om de begrippen duurzaam, decentraal en samen meer inhoud en betekenis te geven. In het belang van de huidige generatie maar ook van de toekomst van onze kinderen. (O08-C1, p. 7)</p>	<p>Eneco makes clear choices in what we want and do not want to do. We focus on increasing the sustainability of our activities and realize that we can only achieve more in cooperation with others. (.) In 2008 we proceeded by giving meaning to the concepts of sustainable, decentralized and together [as central concepts in the mission]. In the interest of the current generation, but also for the future of our children. (O08-C1, p. 7)</p>
Q144	<p>E1 Als energiebedrijf in Nederland willen wij onze verantwoordelijkheid nemen en zijn we bereid met die partijen om tafel te zitten die de discussie op basis van feiten willen voeren. (2010)</p>	<p>E1 As an energy firm in the Netherlands we want to take our responsibility and we are willing to sit down with all parties who want to discuss the topic in a fact-based manner. (2010)</p>
Q145	<p>E2 De MEP-subsidies voor grootschalige biomassa meestook lopen echter af in de periode tot en met 2015. Hierdoor dreigt de duurzame energieproductie van Essent de komende jaren sterk te dalen en dat van Nederland te stagneren. Om de Nederlandse duurzame energiedoelstelling in 2020 te halen is nieuw overheidsbeleid nodig. (2013)</p>	<p>E2 The MEP-subsidies for large scale biomass co-firing expire in the period until end 2015. This induces the risk that the sustainable energy production of Essent will decline greatly in the coming years and also induce stagnation [of the growth of sustainable energy] on the national level. New policy is needed to support achieving the Dutch 2020 sustainable energy goal. (2013)</p>
Q146	<p>E3 Er waren ook negatieve ontwikkelingen. Zo hebben we als RWE en Essent nog steeds te maken met de heersende economische tegenwind. De marges op energie zijn laag en dat zal op korte termijn niet veranderen. Dat heeft alles te maken met de Europese energietransitie. (2014)</p>	<p>E3 There were also negative developments. As RWE and Essent we still have to contend with a prevailing economic headwind. The margins on energy are low and that will not change in the short term. That has everything to do with the European energy transition. (2014)</p>

Nr	Original quote	Translation
Q147	E4 Zelfs als Nederland erin zou slagen om een spectaculaire groei van het aandeel duurzame energie te realiseren en de kabinetsdoelstelling van 14 procent in 2020 zou halen, dan nóg zal 86 procent van onze energie in 2020 op conventionele wijze moeten worden opgewekt. Dat moeten we natuurlijk zo efficiënt mogelijk doen. (.) De Eemshavencentrale wordt één van de schoonste en meest efficiënte centrale in zijn soort. (2010)	E4 Even if the Netherlands would succeed in realizing a spectacular growth of the share of sustainable energy and achieve the government goal of 14% by 2020, still 86% of our energy would be generated from conventional sources in 2020. This naturally should be done as efficiently as possible. (.) The Eemshaven power plant is one of the cleanest and most efficiency power plants of its kind. (2010)
Q148	E5 Om de Nederlandse duurzame energie-doelstelling in 2020 te halen is grootschalig gebruik van biomassa in elektriciteitscentrales als vervanger van kolen onontbeerlijk. (2012)	E5 The large scale application of biomass as replacement of coal in power plants is indispensable to achieve the Dutch sustainable energy goal in 2020. (2012)
Q149	E6 Door middel van de How on Earth... campagne zijn we het afgelopen jaar ook de dialoog aangegaan met onze medewerkers over nut en noodzaak van CR en hebben we ze uitgedaagd om zelf meer met duurzaamheid bezig te zijn. (2010)	E6 By means of the "How on Earth..." campaign we have engaged with our employees on the necessity and added value of Corporate Responsibility and challenged them to personally consider sustainability more. (2010)
Q150	E7 Corporate Responsibility (CR) is een integraal onderdeel van de bedrijfsvoering van Essent. (2010)	E7 Corporate Responsibility (CR) is an integral part of the business approach of Essent. (2010)
Q151	E8 Dit waarborgen we door een doordachte inzet van ons steeds efficiëntere productiepark en door de grootschalige inzet van biomassa en windenergie. Ook leveren we concrete producten en diensten die onze klanten helpen bij het verlagen van de energienota en die bijdragen aan een beter milieu. (2012)	E8 This is assured by the thoughtful deployment of an asset base with increasing efficiency as well as the large-scale usage of biomass and wind power. We also offer concrete products and services to our customers to enable them to lower their energy bill and contribute to a better environment. (2012)
Q152	E9 De nieuwe missie van Essent en RWE is om waarde te creëren door als meest betrouwbare en best presterende partner leidend te zijn in de Europese energietransitie. (2014)	E9 The new mission of Essent and RWE is to create value by leading as the most trusted and best performing partner in the European energy transition. (2014)

Nr	Original quote	Translation
Q153	E10 Essent levert al jarenlang een bijdrage. Reeds in 1987 bouwden we ons eerste windpark aan de Westerveermeerdijk bij Urk en in 1995 waren we de uitvinder van Groene Stroom als product voor de consument. (2013)	E10 Essent has been contributing already for a long time. Already in 1987 we constructed our first wind farm at the Westerveermeerdijk near Urk and in 1995 we were the inventor of Green Current as consumer product. (2013)
Q154	E11 In 2011 was de Groen gasmarkt in Nederland goed voor 40 miljoen kuub Groen gas. De verwachting is dat die hoeveelheid groeit van 300 miljoen kuub in 2014 naar 2 miljard kuub in 2020, zo'n vijf procent van de totale gasmarkt. Momenteel is Essent marktleider op de Groen gasmarkt. Onze ambitie is marktleider te blijven. (2011)	E11 In 2011 the green gas market in the Netherlands amounted 40 million m ³ . The expectation is that this amount will grow to 300 million m ³ in 2014 and 2b m ³ in 2020, which represents 5% of the total gas market. Essent is a market leader on the green gas market and aspires to maintain that position. (2011)
Q155	E12 Essent wil 20 tot 30% van haar omzet gaan halen uit andere producten dan elektriciteit en gas (2013)	E12 Essent targets to realize 20-30% of its revenue from products other than electricity and gas. (2013)
Q156	N1 Wij willen de negatieve gevolgen van onze productieactiviteiten zo veel mogelijk beperken en verantwoordelijkheid nemen voor onze activiteiten. (2010)	N1 We want to limit the negative consequences of our production activities as much as possible and take responsibility for these activities. (2010)
Q157	N2 The year 2012 was a difficult one for the energy sector. Market conditions deteriorated further, particularly in electricity generation. (.) By focusing more on reducing costs and improving the commercial deployment of power plants, we have managed to partially compensate for the negative effect. (2012)	N2 The year 2012 was a difficult one for the energy sector. Market conditions deteriorated further, particularly in relation to electricity generation. (.) By focusing more on reducing costs and improving the commercial deployment of power plants, we have managed to partially compensate for the negative effect. (2012)
Q158	N3 During the consolidation phase, 2011-2013, the focus is on improving value creation by reducing costs, divesting non-core assets and revising the investment programme. This will pave the way for a transition towards a more sustainable energy production portfolio. (2011)	N3 During the consolidation phase, 2011-2013, the focus is on improving value creation by reducing costs, divesting non-core assets and revising the investment program. This will pave the way for a transition towards a more sustainable energy production portfolio. (2011)

Nr	Original quote	Translation
Q159	<p>N4 Hoewel het onzekere economische klimaat ook zijn weerslag heeft op onze onderneming en wij als gevolg daarvan meer moeten doen met minder middelen, staan onze ambities fier overeind. Nuon streeft naar betrouwbare en betaalbare energie, jaarlijkse vooruitgang bij de ontwikkeling van schone productietechnieken, gestage vermindering van de CO₂-uitstoot, verhoging van de winst, meer waardecreatie en een stabiele toekomst voor ons bedrijf. (2010)</p>	<p>N4 Our ambitions are standing firm, although the uncertain economic climate has its impact on our corporation and we as a consequence have fewer resources available. Nuon strives for reliable and affordable energy, annual progress with regard to developing clean production techniques, gradual reduction of the CO₂-emissions, increasing the profit and value creation, and a stable future for our firm. (2010)</p>
Q160	<p>N5 For our customers, the focus on value creation will translate into increasing operational excellence in our customer service, among other things. Nuon also remains strongly committed to helping our customers realise energy savings and providing support to more vulnerable customers (2011)</p>	<p>N5 For our customers, the focus on value creation will translate into increasing operational excellence in our customer service, among other things. Nuon also remains strongly committed to helping our customers realize energy savings and providing support to more vulnerable customers (2011)</p>
Q161	<p>N6 The goal of lowering CO₂ emissions is a key part of achieving this vision, and Vattenfall is continuing its work with methods to reach the goal of 65 million tonnes by 2020. (2012)</p>	<p>N6 The goal of lowering CO₂ emissions is a key part of achieving this vision, and Vattenfall is continuing its work with methods to reach the goal of 65 million tonnes by 2020. (2012)</p>
Q162	<p>N7 Saving energy serves two key purposes: it contributes to the reduction of greenhouse gas emissions and helps households, business customers and industries minimise their energy costs. (...) Nuon uses its portfolio of products and services for energy management to create solutions for its customers. (2011)</p>	<p>N7 Saving energy serves two key purposes: it contributes to the reduction of greenhouse gas emissions and helps households, business customers and industries minimize their energy costs. (...) Nuon uses its portfolio of products and services for energy management to create solutions for its customers. (2011)</p>

Nr	Original quote	Translation
Q163	<p>N8 In summary, it can be said that the market conditions for the energy sector continue to be highly challenging. (.) “This is the new normal,” to quote Øystein Løseth, President and CEO of Vattenfall AB. (2012)</p>	<p>N8 In summary, it can be said that the market conditions for the energy sector continue to be highly challenging. (.) “This is the new normal,” to quote Øystein Løseth, President and CEO of Vattenfall AB. (2012)</p>
Q164	<p>N9 The entire European energy industry is undergoing a fundamental transformation. (.) During the year, it became even clearer that the traditional business model, based on large-scale electricity generation in conventional power plants, is being challenged. (2013)</p>	<p>N9 The entire European energy industry is undergoing a fundamental transformation. (.) During the year, it became even clearer that the traditional business model, based on large-scale electricity generation in conventional power plants, is being challenged. (2013)</p>
Q165	<p>N10 These prosumers are creating new business opportunities for the energy companies (2013)</p>	<p>N10 These prosumers are creating new business opportunities for the energy companies (2013)</p>
Q166	<p>O1 De groeiende vraag naar energie in opkomende economieën, de politieke besluitvorming rondom verduurzaming van de energievoorziening en CO₂-emissies zijn van invloed op onze strategie en prestaties. Daarnaast hebben catastrofes zoals de tsunami in Japan, de kredietcrisis en ontwikkelingen als de ‘Arabische Lente’ effect gehad op de ontwikkeling en volatilititeit van de brandstofprijzen. (2011)</p>	<p>O1 The increasing demand for energy in emerging economies, the political decision-making on increasing sustainability of the energy supply, as well as CO emissions, influence our strategy and performance. Besides these influences, crisis events such as the Tsunami in Japan, the credit crisis, as well as developments like the "Arab Spring" have impacted the development and volatility of the fuel prices. (2011)</p>
Q167	<p>O2 De doelstelling van de Nederlandse regering om in 2020 zestien procent van het energiegebruik duurzaam op te wekken – meer dan Europa van Nederland vraagt - was verheugend nieuws. (.) Vanuit onze ervaring en ons vakmanschap is Eneco uitstekend gepositioneerd om een fundamentele bijdrage te leveren aan het behalen van deze doelstelling.(2012)</p>	<p>O2 The target of the Dutch government to produce 16% of the energy demand in a sustainable way - which exceeds the demand of Europe - was pleasing news. (.) Building on our experience and craftsmanship, Eneco is well positioned to make a fundamental contribution to achieving this target. (2012)</p>

Nr	Original quote	Translation
Q168	O3 Eneco staat midden in de maatschappij en respecteert de belangen van betrokkenen bij ons bedrijf. Wij nemen deze belangen in overweging en spelen daar waar mogelijk op in. Dit begint bij het betrekken van belanghebbenden bij onze strategie.(2012)	O3 Eneco is rooted deeply in the Dutch society and respects the interests of stakeholders of our firm. We take these stakes into consideration and anticipate them whenever possible. This starts with involving the stakeholders in the formation of our strategy. (2012)
Q169	O4 Eneco levert duurzame energie, produceert deze en verzint slimme duurzame energieoplossingen. We behoren tot de schoonste energieondernemingen van Europa en willen dit uitbouwen. (2011)	O4 Eneco produces and supplies sustainable energy and develops smart sustainable energy solutions. We are among the cleanest energy firms in Europe and want to expand our position. (2011)
Q170	O5 Eneco blijft zich inspannen om naast een concurrerende prijsstelling ook de duurzame visie uit te dragen en klanten bewust te maken van de mogelijkheden om energie te besparen en zelf duurzaam op te wekken. (2013)	O5 Eneco will continue to - besides competitive pricing - carry out the sustainable vision and create awareness among our customers of the possibilities to save energy and generate sustainable energy themselves. (2013)
Q171	O6 De individuele bijdrage van medewerkers aan de realisatie van onze missie in hun dagelijkse werk is cruciaal: dit noemen we 'Internal Alignment'. (2013)	O6 The individual contribution of our employees to the implementation of our mission in their daily job is crucial: we call this "Internal Alignment." (2013)
Q172	O7 De energiemarkt ontwikkelt zich in drie fasen: van centraal fossiele opwekking via een combinatie met decentraal duurzaam naar volledig decentrale duurzame opwekking. (2012)	O7 The energy market develops in three phases: starting from centralized, fossil fuel-based generation to a fully decentralized, sustainable generation, with a phase which combines both solutions in between. (2012)
Q173	O8 De verkoop van energie levert Eneco meer op dan de kosten die wij kwijt zijn aan vooral de productie, inkoop en transport ervan. Daar verdienen wij nu dus ons geld mee. Maar dat bedrijfsmodel gaat veranderen.	O8 The sales of energy currently provides for a margin to Eneco because the revenues exceed the cost of production, procurement and transport. This is how we currently earn our money. But this business model will change.

Nr	Original quote	Translation
Q174	<p>O9 Eneco kiest voor duurzame energie en stelt in haar aangescherpte strategie de klant en zijn behoeften centraal. Duurzaam, decentraal en samen, dat is onze visie en onze verantwoordelijkheid. Wij bouwen aan een bedrijfsmodel waarin we samen met klanten energie besparen en duurzaam opwekken (2012)</p>	<p>O9 Eneco chooses for sustainable energy and focuses on the customer and his or her demand in the improved strategy. Sustainable, decentralized and together, this is our vision and our responsibility. We develop a business model by which we together with our customers save energy and generate sustainable energy. (2012)</p>
Q175	<p>O10 Sinds 2006 voorspellen wij de revolutie. Van fossiele naar duurzame energie, van centrale en grootschalige energieproductie naar decentrale opwekking, samen met de burger en klant. Nu bevinden we ons midden in die revolutie. We volgen niet, we zijn de aanjager. (2014)</p>	<p>O10 Since 2006 we have been projecting a revolution. From fossil to sustainable energy, from centralized, large scale energy generation towards decentralized generation, together with the citizen and customer. Now we are in the midst of this revolution. We do not follow, but we are the booster of this movement. (2014)</p>
Q176	<p>“Het hogere resultaat uit productie en levering komt volgens Eneco door de ingebruikname van enkele grote windparken, waaronder Luchterduinen, Delfzijl Noord en parken in België en Groot-Brittannië.” (Eneco spokesman Spruijt, Energiea August 5 2016)</p>	<p>“The improved results from production and supply are, according to Eneco, induced by the start of service of some large windfarms, including Luchterduinen, Delfzijl Noord as well as farms in Belgium and the UK.” (Eneco spokesman Spruijt, Energiea August 5 2016)</p>
Q177	<p>In die tijd zijn Ad van Wijk]CEO Econcern op dat moment] en Jeroen de Haas een keertje een biertje gaan drinken. Ad van Wijk heeft uitgelegd hoe de hele wereld sowieso straks geen grijze productie meer nodig zou hebben, maar duurzame productie. En toen heeft die ook uitgelegd dat je er prima subsidie voor kon krijgen en toen is Jeroen echt gewoon de switch gaan maken. Als wij productie gaan bouwen, dan wordt het duurzaam. (Interview 16)</p>	<p>In those times Ad van Wijk [then CEO Econcern] and Jeroen de Haas visited a bar together. Ad van Wijk explained how the whole world would demand sustainable, instead of grey energy in the future. He also explained how it is perfectly possible to acquire subsidies for these activities and from that moment Jeroen started making the switch: if we develop new capacity, then that will be sustainable capacity. (Interview 16)</p>

Nr	Original quote	Translation
Q178	Jeroen de Haas is toen aangetreden en die heeft gedacht de wereld gaat veranderen. Ik zie dit beeld ontstaan. Maar weet je, maar hij is wel -verketterd wil ik niet zeggen- maar wel uitgelachen van ja, dat kan nooit. (Interview 13)	Jeroen de Haas took office then and he saw that his world was changing. He saw a new future image emerging. But it is important to note that he - although I do not want to say reviled - was laughed at: "this is never possible." (Interview 13)
Q179	Toen kwamen de big four consultancybureaus zeggen: "Eneco, stop er nou maar mee. Verkoop de boel. Over een paar jaar zijn hier vier, vijf grote Europese spelers." (Interview 13)	Then we were visited by the big four consultancy firms: "Eneco, please quit. Sell the assets. In only a few years, only four or five large energy players will remain." (Interview 13)
Q180	De aandeelhouders hebben zoiets van: "hartstikke leuk dat duurzaam maar volgens mij moet jij nu grijze assets vinden." Dat is misschien wel de tegenwind die hij heeft gehad. En misschien de eerste twee jaar dat andere CEO's naar hem gekeken hebben van: "prima, maar wie het laatst lacht..." (Interview 16)	The shareholders stated: "Very nice this sustainability, but it seems that you should look for grey assets now." That is maybe the headwind he faced. And maybe also other CEO's who in the first two years looked at him thinking: "Excellent, but we will see who will laugh last..." (Interview 16)
Q181	Eneco is altijd een beetje daarachteraan gesukkeld zonder productie in een tijd dat je gewoon bizar rijk kon worden door het hebben van productie capaciteit. Want je moest echt verticaal geïntegreerd zijn. Toen wilden ze heel graag grijze assets hebben, maar visten ze altijd achter het net. (Interview 16)	Eneco always floundered a little bit in the rearguard without production assets, at a time when precisely these assets provided for bizarre returns. It was all about being vertically integrated [at that time]. They did like acquiring grey assets very much, but consistently came the day after the fact. (Interview 16)
Q182	Als je naar Eneco kijkt, die hadden natuurlijk eigenlijk behalve één gascentrale helemaal geen opwek. Zij hebben dat als een kans gezien omdat je die belast niet meesjouwt. (.) Dus soms is het ook een beetje uit nood geboren. (Interview 17)	If one looks at Eneco: they do not have any generation capacity, besides their one gas power plant. They saw this as an opportunity, because they had to carry less ballast. (.) But this is sometimes also born from necessity. (Interview 17)

Nr	Original quote	Translation
Q183	<p>2. Versterking van verticale integratie: Eneco Energy Trade vormt met de inkoop en verkoop van energie de spil tussen productie en levering aan klanten. De versterking van de verticale integratie komt tot uitdrukking in:</p> <ul style="list-style-type: none"> • De grotere afname van volume uit windparken, biomassacentrales en door Eneco aangestuurde gasgestookte centrales. In 2012 bestaat 70% van het leveringsportfolio uit eigen productie onder meer uit onze duurzame productie, uit Enecogen en afnamecontracten bij andere gascentrales. In 2009 kwam 47,5% van het leveringsportfolio uit eigen productie tegen 33,8% in 2008. • Het uitbouwen van de gaspositie, onder andere door de bouw van gasopslag en het sluiten van bilaterale inkoopcontracten. In 2012 verwacht Eneco 60% van het afgezette volume te verkopen via eigen shipping in plaats van via het agentmodel, in 2009 was dat 35%. (09O-C1, p. 31) 	<p>2. Strengthening vertical integration Eneco Energy Trade - with their procurement and sales activities - are pivotal in connecting production and supply to our customers. The strengthening of vertical integration will be implemented by:</p> <ul style="list-style-type: none"> * Procurement of larger volumes from wind farms, biomass power plants and gas power plants controlled by Eneco. In 2012 70% of our supply portfolio is covered by our sustainable production, from Enecogen as well as PPA's from other gas power plants. In 2009 this was 47,5% and in 2008 33,8%. * Improving our position in the gas market, amongst other things by development of gas storage capacity and the closure of bilateral gas procurement contracts. In 2012 Eneco expects to acquire 60% of its supply volume by owned shipping instead of an agent mode. In 2009 this was 35%. (09O-C1, p. 31)
Q184	<p>Oystein [Loseth, CEO Vattenfall] zelf zat ook weer in een moeilijke situatie, want we hadden een hele dominante chair man in de board. Hij was ook niet de innovator, hij was een soort technocraat, die op dat gebied van zeg maar het optimaliseren van de status quo kostenreductie heel goed was. Maar niet een shift durfde te maken. Vattenfall had natuurlijk bruinkolen in Duitsland op grote schaal en dat stond haaks op wat de aandeelhouders wilden hebben. Maar het was wel de bulk van cashflow van Vattenfall. (Interview 17)</p>	<p>Oystein [Loseth, CEO Vattenfall] himself was in a difficult situation, because the chair of the board was rather dominant. He was not an innovator either, he more resembled a technocrat with a strong capacity with regard to optimization of the status quo and cost reduction. But he lacked the guts to make a shift. Vattenfall owned lignite capacity in Germany at a large scale, in strong contrast to the preference of the shareholders. These assets, however, also represent the largest share of the cashflow of Vattenfall. (Interview 17)</p>

Nr	Original quote	Translation
Q185	<p>RWE is een heel ander bedrijf dan Essent. Dus als ik het nu even heb over RWE, dan is dat toch ook het tot op zekere hoogte tegen beter weten in verdedigen van de huidige positie. Natuurlijk ook in de wetenschap dat dit bedrijf gestoeld is op conventionele energieproductie en dat het de grootste energieproducent van Duitsland is. (.) De wens om een duurzaam product verder uitbouwen [bij Essent], daar in Duitsland niet enthousiast op werd gereageerd. Daarvan werd gezegd ja, daarmee kannibaliseren we eigenlijk onze productportfolio die toch voornamelijk conventioneel van aard is. (Interview 5)</p>	<p>RWE differs enormously from Essent. If we consider RWE for a moment, then it is important to note that they - to a certain degree against their better judgement - are defending their current position. This also in the context that their firm is greatly dependent on conventional energy generation and they are the largest energy producers in Germany. (.) The ambition to scale a sustainable product [within Essent] did not trigger an enthusiastic response in Germany. They replied that the product would cannibalize the product portfolio, which is largely based on conventionally generated energy. (Interview 5)</p>
Q186	<p>Je bent enorm schizofreen als het ware. Aan de ene kant wil je snelle groei. (.) Maar het is makkelijk om elk jaar als het even tegenvalt, om even je target naar beneden te halen. Om even te zeggen nou, doen we even iets minder TOON, we komen later wel met deze dienst. Dat is ook omdat je vooruitloopt in zoiets. Ik denk dat het gewoon een strijd is die in de hoofden van de raad van bestuur zich afspeelt. Eigenlijk is het niet ingewikkeld, je weet dat de stress van het behalen van de doelen van het jaar, dat altijd de stress gaat winnen. En de doelen zijn altijd financiële doelen (.) En hier gaat het erom van, gaan wij onze aandeelhouders hun dividend kunnen geven aan het eind van het jaar? (Interview 16)</p>	<p>Your situation can be compared to schizophrenia. On the one hand, you aspire to rapid growth. (.) But it is easy to every year reduce one's [innovation] targets quickly when the results disappoint. To say: "Let's reduce our ambition for TOON and introduce the service later." This is also because you are running in front. That is also the battle happening in the heads of the executive board members. Actually, it is rather simple: you know that the stress to achieve the [short term] targets for this year will always win. These targets are always financial targets. (.) The point of these targets is that they directly imply the ability to pay dividends to the shareholders at the end of the year. (Interview 16)</p>
Q187	<p>Interviewer: Als jij nou op Jeroen's positie had gezeten, wat waren nou de paar dingen die jij echt anders had gedaan zeg maar? Eneco medewerker: Ik had een paar mensen keihard vervangen. Mensen die niet de diepe, diepe overtuiging hebben dat de markt gaat veranderen. (Interview 16)</p>	<p>Interviewer: If you were in the position of Jeroen, what things would you have done totally differently? Eneco employee: I would have (harshly) replaced a few people. People who do not share the deep, deep conviction that the market is going to change. (Interview 16)</p>

Nr	Original quote	Translation
Q188	<p>We weten dat we daarheen gaan, maar we durven gewoon, we vinden de toekomst nog te eng, te onzeker waar die heengaat. Of die nou links, rechts gaat, waardoor we toch een incumbent zijn die risicomijdend is en toch afwacht. (Interview 13)</p>	<p>We know we are going in that direction. However, we do not have the guts, we still fear the future, because it is still rather uncertain where it is going (on a more concrete level). Whether the path will go left or right. In this regard, we remain an incumbent that is risk averse and waits. (Interview 13)</p>
Q189	<p>En ik had keuzes gemaakt. (.) Of het nou is dat wij moet investeren in de technologie of dat we moeten services of wat dan ook. Maar echt keuzes maken in plaats van alle ballen in de lucht houden. (Interview 16)</p>	<p>And I would have made (clear) choices. (.) Whether these would be to invest in technology or servicing or whatever. But the point is making choices, instead of keeping all the balls in the air. (Interview 16)</p>
Q190	<p>TOON levert nog niets op denk ik. Maar het heeft zo bizar veel potentie. Het is een beetje hetzelfde als LinkedIn. Levert LinkedIn al geld op? Je genereert gewoon onwijs veel data waar je heel veel mee zou kunnen doen, maar waar we nog te weinig mee doen. Op een gegeven moment denk je wanneer stop ik met investeren in de aantallen? Maar nu zijn wij gewoon heel erg aan het uitrollen om zoveel mogelijk TOONs te hebben. Wanneer heb je genoeg om echt wel gewoon voort te bouwen? En dat is echt gewoon wel de grootste spagaat waarin we ons bevinden. (Interview 16)</p>	<p>TOON does not return much [profits] yet. But the potential is huge. It is - to a certain extent - comparable to LinkedIn. Does LinkedIn already earn much profit? It generates enormous amounts of data, which provides for many opportunities which are only utilized to a rather limited extent at the moment. At a certain moment one thinks: when do I stop investing in growing the numbers? But at the moment we are still very much focused on increasing the number of TOON devices. When have you achieved sufficient numbers to continue to the next phase of development? This is really the biggest quandary we are in at the moment. (Interview 16)</p>
Q191	<p>Het grootste versnellingsmoment was de koop van van Econcern. Binnen Econcern waren er allemaal permits voor het ontwikkelen van windmolens en zonneparken en daar heeft Eneco profijt van gehad de afgelopen jaren. (Interview 16)</p>	<p>The most important moment of acceleration was the acquisition of Econcern. The Econcern inventory included all kinds of permits for the development of wind and solar farms, which provided many benefits for Eneco in the past years. (Interview 16)</p>

Nr	Original quote	Translation
Q192	Als je gelooft in abundance [van de beschikbaarheid van duurzame energiebronnen] en je gelooft in dat over een paar jaar al die problemen rondom te weinig energie of te dure energie worden oplost, dan is besparing ook gewoon nonsens. (Interview 16)	If one believes in abundance [of the availability of renewable energy sources] and one also believes that in a few years the problems of lack of energy as well as high prices will be solved, then energy saving simply does not make much sense. (Interview 16)
Q193	Ik heb toen wel gezegd: jongens, we moeten een geloofwaardige biomassaverhaal op tafel leggen, anders is het einde verhaal [voor kolencentrales]. (Interview 17)	At that time I did say: guys, we need to put a credible biomass story on the table, otherwise this will be the end of the story [for coal power plants]. (Interview 17)
Q194	Biomassa is uiteindelijk ook alleen maar een brugtechnologie. Want hij is gebonden aan commerciële centrales, die uiteindelijk door wind en zonnepanelen worden vervangen. (Interview 15)	Biomass is ultimately only a bridging technology. Because the technology is connected to commercial power plants, which eventually will be replaced by solar and wind. (Interview 15)
Q195	Je moet er best veel voor investeren [om biomassa bij te stoken]. Ik geloof 35 miljoen investeren en dan vervang je hele goedkope steenkool door relatief dure biomassa. Daar word je niet veel wijzer van, financieel gezien. Dus dan zeggen ze, je mag best 45 miljoen investeren, maar dan moet je zeker weten dat je vijf jaar of tien jaar die subsidie krijgt. (Interview 17)	You have to invest quite some money [to co-fire biomass]. I believe approximately €35 million investment was needed and this besides the consequence that you replace cheap coal by relatively expensive biomass. This is not very smart financially. So then they state: you are allowed to invest €45 million, but only if you are certain that you will still receive subsidy in 5 to 10 years from now. (Interview 17)
Q196	Toen werd iemand anders verantwoordelijk voor wind en die zei: ik ga alleen naar mijn Europese portfolio kijken. Ik trek ergens een lijn, onder die grote ga ik niks meer doen, of als het te lang duurt, ga ik ook niks doen. Dus die zei tegen mij: leuk dat onshore team, maar dat gaan we afbouwen, dat heeft geen zin want dit duurt te lang. (Interview 17)	Then another person was made responsible for the wind activities and he said: I will evaluate the portfolio from a European perspective. I will start drawing a line: below a certain magnitude I will not develop activities anymore, nor if the development takes too much time. He said to me: the onshore wind team will be dissolved, because their activities make no sense considering the required development time. (Interview 17)

Nr	Original quote	Translation
Q197	<p>Aan de offshore kant hadden we de afspraak met Jeroen de Haas dat wij de helft van dat Q10-park, wat nu Amalia is, zouden doen. Toen kwam wederom een Vattenfall executive langs en die zei: ik wil toch liever of de controle over het park of ergens anders het geld in steken. (Interview 17)</p>	<p>Regarding offshore, we had an agreement with Jeroen de Haas that we would participate for 50% in the Q10-farm, which is now the Amalia wind farm. Then again, another Vattenfall executive visited and he said: I prefer to have full control or otherwise to spend the money elsewhere. (Interview 17)</p>
Q198	<p>Ik praat misschien over 3 jaar geleden, misschien zelfs minder dat de elektriciteitsmarkt gedomineerd werd door een vier, vijftal bedrijven en dat waren oppermachtige bedrijven. Die bedrijven bevinden zich op nu de rand van de afgrond. Een aantal die is bezig met een splitsing om het vege lijf te redden. Maar dat is geen geringe opgave. Dat zijn bedrijven zijn jarenlang zich hebben ontwikkeld in een bepaalde manier. Dat zijn echt mammoettankers en die moeten opeens van koers veranderen. Dat is verdomd lastig. (Interview 14)</p>	<p>I am talking about maybe three or even fewer years ago, when the market was dominated by four or five firms and they were sovereign. Those firms are now at the edge of the abyss. Some of them are now trying to survive by unbundling their firms. However, their challenge should not be underestimated. This concerns firms which for a long time have developed in a certain direction. Those are supertankers which have to change course. That is terribly difficult. (Interview 14)</p>
Q199	<p>De gemiddelde tijd dat een onderneming nog bestaat is ongeveer 8 jaar geloof ik. Dus ja wie gaat er nou vanuit dat dat soort bedrijven er dan [in 2036] nog wel zijn. (..) Zullen ze nog in hun eigen vorm bestaan die tijd? Nee dat kan onmogelijk, daar geloof ik niks van. Dus er zullen nieuwe vormen ontstaan (..) en ze zullen spin-offs gaan organiseren. Dat zie ik nu al gebeuren kijk bijvoorbeeld naar Powerpeers. (Interview 11)</p>	<p>That average lifespan of a firm is, I suppose, about eight years at the moment. So who expects that this kind of firms will still exist [in 2036]? (..) Will they still exist in their current form at that moment? No: this is impossible and I do not believe it. New forms will emerge (..) and they will organize spin-offs. That is already happening, look for example at the case of Powerpeers. (Interview 11)</p>

APPENDIX C – BASIC CODE BOOK

Table C.1 - Basic code book used for descriptive coding of the data. See section 4.8 for a description the application of this code book.

Index	Code	Definition	Notes & indicators	References
	Landscape dynamics			
C1-0	Government	Influence of government, regulation and political processes on the transition towards renewable energy	Code any indication of governmental influence on the transition, specifically consider the measures mentioned as subcategory	Smith & Crotty, 2008 Hills et al., 2004 Blum-Kusterer & Hussain, 2001 Nameroff et al., 2004 ... many more references available
C1-1	Innovation policy	Influence of innovation policy such as the balance of market & R&D focus in policy, Innovation-friendly regulation, policy directed at innovation strategies of firms	Includes: tax breaks & deductions, subsidies & incentives, legal measures, enforceable property rights targeted specifically at innovation, R&D or specific aspects of innovation (e.g. product lifetime extension & recyclability)	Meek et al., 2010 Hillman & Sandén, 2008 Binz et al., 2012

Index	Code	Definition	Notes & indicators	References
C1-2	Policy uncertainty	Influence of policy uncertainty on the transition	Uncertainty can emerge about current policy (e.g. uncertainty about the interpretation or effect of policy, or uncertainty due to a lack of regulation) or about future changes in policy (e.g. incentives, permits, etc.). Uncertainty about governmental behavior (reliability of the government) is also an important cause for political uncertainty.	Meijer et al., 2007 Markusson et al., 2012
C1-3	Public procurement	Influence of integration of sustainability criteria in the procurement of government organizations		Hills et al., 2004
C1-4	Tax policy	Influence of tax policies and incentives on both the current system as well as stimulating new forms of energy	Includes both energy tax measures for industry & consumers, tax measures targeted at the energy sector as well as innovation tax reductions	Fisher & Newell, 2008 Hills et al., 2004 Safarzyńska & vd Berg, 2010 Suurs & Hekkert, 2009 Oltra & Saint Jean, 2009 Inoue & Miyazaki, 2008
C1-5	Other government influence	Influence of other government or political action on the transition (other than G1-G4)		

Index	Code	Definition	Notes & indicators	References
C2-0	Stakeholder pressure	Influence of pressure of stakeholder to change the current system on the transition towards renewable energy	Stakeholder in this context defined as secondary stakeholders, market, competitor and technology supplier influences are noted in other categories	See below
C2-1	Issue awareness	Influence of (changes in) issue awareness & urgency in the minds of the citizens and consumers in general	Includes both indications of increasing or decreasing awareness as well as the influence on the transition & innovation process	Stafford et al., 2000 Conceicao et al., 2006 Schwarz & Ernst, 2009
C2-2	Media attention	Influence of media attention for the transition, problems with the current system, potential solutions as well as specific corporate actions	Both general attention as well as attention for specific companies. Both positive (e.g. solution potential) as well as negative coverage is relevant. Media analysis as such already indicates amount of media attention, quotes mentioning influence of media attention on issue life cycle and corporate behavior are specifically relevant	Bansal, 2005 Jun., 2012

Index	Code	Definition	Notes & indicators	References
C2-3	Stakeholder actions	Influence of actions by NGOs, citizens and other stakeholders to influence the issue dynamic	Both actions directed at issue awareness in general and actions targeted at specific companies. Examples: media offensives, court cases, protest, black mail actions and requests for customer boycotts/action	Miles et al., 2002 Elzen et al., 2011 Henriques & Sadorsky, 2007 Blum-Kusterer & Hussain, 2001 Haanaes et al., 2011 ... and more available
C2-4	Other stakeholder pressure influence	Influence of other stakeholder pressure effects on the transition (other than S1-S3)		
C3-0	Technological & solution context	Influence of the availability and relative advantage of potential solutions in the transition towards renewable energy	Code general quotes mentioning lack or availability of solutions, their characteristics and their potential attractiveness as barrier or driver of the transition - solutions can be both technologies as well as new business models - relevant to capture are the relative characteristics of the solutions (e.g. cost, quality, risks, etc.), specific events (e.g. development, pilot, market introduction) and their relationship to the transition	See below
C3-1	Solution availability & characteristics	Influence of individual solutions and their relative characteristics on the transition		Avadikyan & Llerena, 2010 Farla et al., 2010 Hekkert & Negro, 2009

Index	Code	Definition	Notes & indicators	References
C3-2	Complementarities	Influence of complementarities & interdependencies between different technologies as well as between technologies and infrastructure	Includes complementarities between infrastructure & energy sources (e.g. gas vs. network), technologies (solar power & batteries), development path dependencies (e.g. biogas > hydrogen) as well as technologies and business models (e.g. solar power vs. decentralized generation)	Avadikyan & Llerena, 2010 Farla et al., 2010 Hillman & Sandén, 2008
C3-3	IP	Influence of Intellectual property as barrier of enabler of the transition, patenting activity and proprietary technology	Positive potential: availability of IP, protection of IP driving innovation Negative: lock-in due to protected IP, lack of protection limiting innovation	Wagner, 2007 Parayil, 2003 Christmann, 2000
C3-4	Lock-in	Influence of lock-in in the current system, defined as the relative advantage of current or intermediate solutions block the transition towards a final solution	Especially focus on indications of high sunk cost, high profit margins of current solutions, lack of attractiveness of radical solutions, as well as hesitant behavior by incumbents	Avadikyan & Llerena, 2010 Farla et al., 2010 Safarzynska et al., 2012
C3-5	Uncertainty	(Negative) Influence of technological uncertainty on the transition	Quotes stressing negative impact of diversity of pathways, uncertain speed of development, uncertain public acceptance, etc. on technology/solution development	Markusson et al., 2012 Meijer et al., 2007 Alkemade & Suurs, 2012

Index	Code	Definition	Notes & indicators	References
C3-6	Co-evolution & solution competitiveness	Influence of the co-evolution (or lack of) between solutions and the market	Indicators of lack of co-evolution: lack of demand, prices too high for competitiveness, mismatch with customer values or practices Indicators of co-evolution: fast increasing demand, customer practice change, increasing competitiveness	Merito & Bonaccorsi, 2007 Safarzyńska & vd Berg, 2010 Oltra & Saint Jean, 2009 Inoue & Miyazaki, 2008
C3-7	Other technology & solution influence	Influence of solutions and their interaction on the transition (other than T1-T6)		
C4-0	Market context	Influence of market structure, business customers and consumers on the transition towards renewable energy	Interaction between market & technology is included under the technology category (co-evolution)	See below
C4-1	Values & norms	Consumers value strength & alignment with issue as well as novelty seeking behavior	Examples of values mentioned in literature environmental & social consciousness, novelty seeking (as trait of early movers), personal independence (as trait of early movers)	Tran et al., 2012 Jansson, 2011
C4-2	Market demand & Solution framing	Influence market demand for and the framing of specific solutions or products in the mind of customers or consumers as solution towards the issue	Relevant are both influences of market demand for specific solutions, framing them as solution for the issue, as well as (lack of) demand for sustainable solutions in general	Walsch, 2012 Horbach, 2008 De Marchi & Grandinetti, 2013

Index	Code	Definition	Notes & indicators	References
C4-3	Consumer interaction	Influence of interactions between customers and consumers such as bandwagon and network effects and leader-follower dynamics	Explicit mentioning of early mover behavior or consumer interaction Bandwagon effect: the relative attractiveness to join a network or buy a product increases when others have already joined	Windrum et al., 2009 Oltra & Saint Jean, 2009 Tran et al., 2012 Jansson, 2011
C4-4	Market transparency	Influence of the transparency of the market concerning the impact of different solutions and products on the transition	Indicators: (introduction of) a labelling or trade mark scheme related to sustainability, (online) database tools or apps increasing sustainability, lack of transparency quoted as barrier to change	Dean & McMullen, 2007 Dangelico & Pujari, 2010 Jansson, 2011 Husted & Allen, 2007
C4-5	Niche segment	Influence of the presence (or lack of) of niche segments in which new solutions can develop to a more mature stage	Niche segment is defined as (relatively) small segment of market sheltered from the competitive pressure of the core market due to unique demands, special regulatory regime etc. Evidence is either mentioning of specific niche segments with preference for more sustainable solutions as well as mentioning of lack of niche segments	Dean & McMullen, 2007 Oltra & Saint Jean, 2009
C4-6	Other influence	Influence of other market effects on the transition (other than M1-M5)		
C5-0	Business context	Influence of competition and financing climate on the transition towards renewable energy		See below

Index	Code	Definition	Notes & indicators	References
C5-1	Competitive context	Influence of the competitive pressure and dynamism in the sector on the ability of firms to progress in the transition	Relevant is the level of competitive pressure as both a driver (high competitiveness is fast reaction to market) or barrier (low margin/slack due to high pressure) of change	Pinkse & Kolk, 2010 Rothenberg & Zygliopoulos, 2007
C5-2	Finance	Influence of the financing climate on the transition including pressure from mainstream investors and impact investors	Indicators are: news regarding increasing or decreasing investment, investors positioning investment in sustainable solutions as (un)attractive and/or risky	Hekkert & Negro, 2009 Raven & Geels, 2010 Moore & Wüstenhagen, 2004
C5-3	Other business context influence	Influence of other business context aspects on the transition (other than B1-B2)		
	Regime level dynamics	Influence of institutional arrangements and processes at regime level (meso level) targeted at leveraging the transition towards renewable energy		
C6-0	Networks, partnerships & coalitions formation	Influence of networks, (cross sector) partnerships and coalitions between actors on the transition.		See below

Index	Code	Definition	Notes & indicators	References
C6-1	Networks, partnerships & coalitions formation	Influence of networks, (cross sector) partnerships and coalitions between actors on the transition.	<ul style="list-style-type: none"> - code every form of external (interfirm/organisation) cooperation (as far as it is influencing the regime level dynamics) - the functional nature of the cooperation as such can be diverse and reflect the content of other labels - front runner coalitions are specifically relevant 	<p>Pavlovich & Akoorie, 2010</p> <p>Ozcağlat-Toulouse, 2009</p> <p>Hekkert & Negro, 2009</p> <p>Romin & Caniels, 2011</p>
C7-0	Context behavior creating	Influence of specific behavior by actors to stimulate or oppose the transition	<ul style="list-style-type: none"> - all behavior of either individual actors or coalitions targeted not directly at their own operation - for description of possible activities see below 	See below
C7-1	Vision alignment processes	Influence of processes develop a shared vision among the different actors in the field	<ul style="list-style-type: none"> - examples: meetings, platforms & networks focused at developing future visions, publishing vision documents - examples: lobbying, providing information and presenting research in favor of solutions, presenting alternative solutions & visions to broader public or politics, raising support with trusted organization or NGOs, grass root mobilization, linking to public interest 	<p>Kerkhof & Wiczorek, 2005</p>
C7-2	Cooperative legitimacy building & lobbying	Influence of cooperation to build legitimacy of a coalition and/or solution direction and lobbying to change regulation & incentives in favor of the solutions proposed		<p>Pacheco et al., 2010</p> <p>Hekkert & Negro, 2009</p> <p>Smink et al., 2013</p>

Index	Code	Definition	Notes & indicators	References
C7-3	Knowledge developing & experimenting	Influence of co-developing & sharing knowledge and information as well as cooperating with experiments, pilots & other early stage activities	- can be in the form of organized platforms & conferences, as well as structural interfirm partnerships	Pavlovich & Akoorie, 2010 Raven & Geels, 2010 Monaghan, 2009 Hekkert & Negro, 2009 Senge et al., 2007
C7-4	Co-developing assets & implementation	Influence of cooperating in the implementation and upscaling of solutions. Is likely to take form of co-development, investment or ownership of assets and other risk sharing constructions	- distinguished from knowledge developing & experimenting based on the stage of innovation process (invention vs. Implementation. Indicators of implementation phase are: scale of activity (e.g. capacity, investment), focus group (mainstream/larger segments), objectives (realizing commercially viable proposition vs. proving concept, gaining knowledge)	NR, emerged from pilot case study
C7-5	Learning & reflexive activities	Influence of explicit learning and reflective activities	- examples: evaluation reports, reflective dialogues/ conferences, explicit mentioning of goal to evaluate progress and draw learnings	Schot & Geels, 2008 Loorbach & Wijsman, 2013

Index	Code	Definition	Notes & indicators	References
C7-6	Developing standards & certification	Influence of developing standards & certification on the transition at regime level	Standards and certification could have different degrees of formalization, even informal agreements could have an effect Specific attention is the likely effect on the transition in the sense of lowering or increasing the improvement pressure on firms. Relevant are remarks on the relative ambition in the standard, the standard compared to the current position of incumbents as well as motivations for developing the standard	Smink et al., 2013
C7-7	Other context creating behavior	Influence of other context creating behavior on the transition (other than CB1-CB6)		
Firm level enablers				
C8-0	Mindset & strategy	Influence of the mindset, leadership as well as explicit vision and plans regarding the transition on the firm's behavior	Note specific behavior of leaders, indications of underlying mindset (both from leaders as well as shared on firm level) as well as explicit goals and strategies	See below
C8-1	Mindset: motives	The Influence of the motives for addressing societal issues as firm (as part of the shared mindset) on the pro-activeness of the firm's approach	Relevant are motives expressed by individual leaders of the firm as well as motives expressed in official documents. Core motives mentioned by literature: legitimacy and responding to stakeholder demands, creating value and improving financial outcomes, leading societal transformations and taking societal responsibility	Groza et al., 2011 Bansal & Roth, 2000 van Tulder et al., 2014

Index	Code	Definition	Notes & indicators	References
C8-2	Mindset: firm role	The influence of the perspective of the firm's role in addressing societal issues (as part of the shared mindset) on the pro-activeness of the firm's approach	Relevant are: role of the firm itself (as being leader/follower, mainly changing own operation (internal focus) or cooperating/co-creating (external focus)) as well as the role of business vs. other societal actors (such as government, NGOs, science, etc.)	Limited discussion in literature, van Tulder & Zwart, 2006 van Tulder et al., 2014
C8-3	Mindset: vision transition	The influence of the perspective regarding the transition (as part of the shared mindset) on the pro-activeness of the firm's approach	Relevant are: visions for the end state and potential pathways, ideas about the likely speed, potential disruptiveness (e.g. threat to firm survival and potential new entrants and challengers) expressed both by leaders as well as in official documents	Limited discussion in literature from firm perspective, disruptiveness is mentioned in Nidumolu et al., 2010, Christensen et al., 2006, general perspectives in transition literature e.g. Farla et al., 2010 & Hillman & Sandén, 2008

Index	Code	Definition	Notes & indicators	References
C8-4	Individual leadership: Entrepreneurial behavior	The influence of entrepreneurial behavior by leaders within the firm to leverage (un)sustainable innovations	Relevant: leaders showing vision for value creation, market imperfections as well as appetite to make bold moves in business development and (radical) innovation driven by entrepreneurial motives (creating value, developing new products and markets, using market imperfections)	De Marchi & Grandinetti, 2013 Cohen & Winn, 2007 Dean & McMullen, 2007
C8-5	Individual leadership: Values & norms	The influence of personal values of the leaders on their behavior in the transition	Relevant: leaders showing strong values regarding social/ societal responsibility as well as links to strong personal values regarding social responsibility. Several authors note that strong values regarding family dependence also influence strong social values	Kuckertz & Wagner, 2010 Meek et al., 2010 Ozcaglar-Toulouse, 2009 et Uhlaner et al., 2011
C8-6	Goals set	The influence of the firm having explicit goals regarding sustainability (innovation) or the transition as indicator of the pro-activeness of the firm's approach	Code explicit goals stated and/or changed including their temporal dimension. Goal changes/announcement might reflect changes in pro-activeness/mindset. Especially the temporal dimension can indicate the firm's commitment and its perspective on the transition nature	van Tulder & Zwart, 2006 van Tulder et al., 2014 Arnold & Hockerts, 2011 mention targets as key in process

Index	Code	Definition	Notes & indicators	References
C8-7	Strategy (change)	The influence of the firm having an explicit strategy regarding sustainability (innovation) or the transition as indicator of the pro-activeness of the firm's approach	Code both strategy changes as well as summaries/descriptions of the firm's strategy and priorities as far as they refer to sustainability, energy transition and/or C(S)R. A strategy change might reflect a change of mindset/pro-activeness and strategy in general could be analyzed regarding its pro-activeness	van Tulder & Zwart, 2006 van Tulder et al., 2014 Arnold & Hockerts, 2011 mention strategy as key in process
C8-8	Other mindset & strategy influence	Influence of other mindset & strategy aspects on the firm's behavior in the transition (other than MS1-MS7)		
C9-0	Firm's position	Influence of the firm's current position on their future potential in the transition, including path dependency aspects	In general, note most important firm characteristics (size, export, ownership, financial slack) as well as specific focus on the asset base and investment pipeline	See below
C9-1	Size	Influence of the firm's scale and size on their ability to position themselves in the transition	Indicators of scale including: revenue, profit, market valuation, # of employees, market share and total energy production/sales Also relevant is people referring to differences between large companies/MNC's and small companies/SME's	Chen, 2008 Pavelin, 2008 Conceicao et al., 2006
C9-2	Export experience	Influence of foreign experience as indicator of relevant experience which is likely to positively influence their position in the transition	Indicators are: foreign presence, exporting, export share of revenues or profit	Pavelin, 2008 Conceicao et al., 2006

Index	Code	Definition	Notes & indicators	References
C9-3	Resource availability	The influence of the availability of resources available to invest in sustainability innovation	Indicators: high profitability, capital available, high investment, mentioning of lack of resources to invest Also relevant: people referring to (lack of) resources as driver/barrier of sustainability innovation	Pavelin, 2008
C9-4	Ownership structure	Influence of ownership structure on the firms position in the transition	Indicators: different ownership structures as well as changes in ownership: including family firms, public listing, venture capital, government ownership/participation	Wagner, 2010
C9-5	Complementarities	Influence of complementarities between current assets and infrastructure and potential sustainability innovations	This includes complementarities between generation technologies as well as with infrastructures Known relevant: gas + renewables, coal + CCS, coal + co-firing biomass, grid capacity vs. transferring renewables surplus, storage capacity vs. storing renewables surplus	Pinkse & Kolk, 2010
C9-6	Current business model, assets & Lock-in	Influence of lock-in effects of current assets or business model on potential sustainability innovations	Code information about current production & supply mix, asset base, business model and investment pipeline as well as people directly stating potential lock-in risk Potential indicators: high invested capital in older power plants and/or fossil-fuel technologies (coal etc.), close alignment of investment pipeline with current assets, high margins in current business model and market segments which are not interested in sustainable solutions	Pinkse & Kolk, 2010 (firm) System level: Avadikyan & Llerena, 2010 Farla et al., 2010 Hillman & Sandén, 2008

Index	Code	Definition	Notes & indicators	References
C9-7	Other influence position	Influence of other position aspects on the firm's behavior in the transition (other than MS1-MS7)		
C10-0	General innovation capabilities	Influence of the firm's innovation capabilities on their influence in the transition.	Influence of firm's leadership, culture and structure on innovation as well as specific capacities regarding (specific subtypes of) innovation	See below
C10-1	Innovation record track	Past experience and success with innovation as indicator of innovation capability driving potential sustainability innovation	Potential indicators: high number of innovations, breakthrough innovations, high R&D expenditure, number of patents, innovator reputation	Rothenberg & Zyglidopoulos, 2007 Horbach, 2008 Conceicao et al., 2006
C10-2	Learning culture	Influence of a learning organization culture driving potential sustainability innovation	Indicators of culture: focus on drawing lessons, failure tolerance, participatory leadership style structure:	Siebenhüner & Arnold, 2007 Senge et al., 2007

Index	Code	Definition	Notes & indicators	References
C10-3	Organizational (structural) flexibility	Influence of organizational flexibility to absorb concurrent exploration and exploitation (referred to as ambidexterity)	Code both indicators of ambidexterity and influence of (lack of) ambidexterity on innovation (e.g. tight structure killing innovation initiatives) Indicators of ambidexterity: separation of exploration from core in organization structure (either in separate units or taskforces/project teams) & budgets, differential degrees of freedom for core and exploration activities regarding budgets, success criteria and procedural freedom (ambidexterity also has a culture and leadership component which overlaps largely with learning organization culture) Also code structures targeted at learning and knowledge exchange: idea marketplaces & competitions, intracompany networks targeted at knowledge exchange, experimentation programs & budgets	Ambidexterity: Könnölä & Unruh, 2007 Conceicao et al., 2006 More structural discussion of indicators in O'Reilly III & Tushman, 2004 Learning & knowledge exchange: Siebenhuner & Arnold, 2007
C10-4	Cross functional cooperation	Influence of the capability to cooperate cross functionally and setup cross functional problem solving teams	Indicators are cooperation between different functions (such as marketing & R&D or marketing & operations) and/or cross functional project teams & taskforces	Berchicci & Bodeves, 2005 Pujari, 2006 Hall & Wagner, 2012
C10-5	Product innovation capabilities	Influence of capabilities enabling product innovation on the firms influence in the transition	Includes both advantages from superior customer relation as well as superior products driving potential innovation	See below

Index	Code	Definition	Notes & indicators	References
C10-6	Co-creation	Ability to co-create products with potential users and customers	Code when companies are showing co-creating in practice and/or have installed specific programs to facilitate cocreation. Openness, two-way communication and actual involvement in multiple stages are indicators of depth of interaction	De Marchi, 2012 Hoffmann, 2007
C10-7	Customer satisfaction	Influence of a positive customer satisfaction	Indicators are: above sector average scores in customer satisfaction surveys, high customer retention & winning awards	Luo & Bhattacharya, 2006
C10-8	Market focus	Influence of market focus and active consideration of customer requirements	Code both indicators of actual market focus as well as indications that this is influencing sustainability innovation. Indicators of actual market focus are: explicit upfront market assessment & customer involvement in development	Pujari, 2006
C10-9	Differentiation	Influence of a differentiated position in the market	Indicators of differentiation are: high advertising spend, much branding & marketing spend. Low differentiation can be referred to as commodity product.	Luo & Bhattacharya, 2009 Hull & Rothenberg, 2008

Index	Code	Definition	Notes & indicators	References
C10-10	Relative advantage	Relative advantage of the firm's products compared to competitors as well as potential alternatives to customer	Relevant aspects & indicators: pricing, match with customers' needs, risk for the customer, quality, trade-offs, compatibility with other products/systems and behavior of the customer. Lack of relative advantage could be indicated by limited customer demand and/or only niche segment market demand Relevant are both quotes referring to specific products or the firm's products in general	Jansson, 2011 Dangelico & Pujari, 2010 Luo & Bhattacharya, 2006
C10-11	Process innovation capabilities	Ability to find and implement process innovations to develop more sustainable processes	Includes general focus on efficiencies and cost savings. Often cost savings and eco-efficiencies are aligned	Holliday, 2001 Frondel et al., 2007 Chen et al., 2006
C10-12	TQM	Implementation of total quality management systems & culture as driver of finding process innovations	Indicators are ISO 9001, Lean and Six sigma	Holliday, 2001 Henriques & Sadorsky, 2007

Index	Code	Definition	Notes & indicators	References
C10-13	R&D capabilities	Ability to do research & development regarding sustainable technologies and products	Indicators of capacity are: R&D expenditure, # of scientists, engineers or developers appointed. Earlier or newly developed knowledge (e.g. patents) or innovative products could be considered an indicator of this capacity In the context of the energy sector we consider the process of developing (constructing) new assets (such as power plants) as R&D (development)	Luo & Bhattacharya, 2006 Horbach, 2008 Pujari, 2006 Hull & Rothenberg, 2008
C10-14	LCA/impact analysis	Ability to and/or availability of life cycle analyses (or comparable product impact data analysis) of the firm's products and solutions	Indicators are mentioning of LCA as such or comparable extensive product impact data analysis	Pujari, 2006 Taplin et al., 2006
C10-15	Supplier involvement	Ability to involve suppliers in sustainability innovation processes	Includes involvement of suppliers in developing new technologies and products	De Marchi, 2012 Lee & Kim, 2011
C10-16	Business model capabilities	Ability to perceive and implement radical changes in the business model	Business model changes include circular business models, pricing and financing innovations, product as a service and behavior change models. Business model innovation refers to radical changes in one or more dimensions of the current dominant business model. Indicators are firm's ventures or participation in ventures with radical business model changes.	Christensen et al., 2006 Yunus et al., 2010 Hall & Wagner, 2012

Index	Code	Definition	Notes & indicators	References
C10-17	Other innovation capabilities influence	Influence of other innovation capability aspects on the firm's behavior in the transition (other than IC1-IC16)		
C11-0	CR capabilities	Influence of the firms' CR capabilities on their influence in the transition	Note indicators the firm's capacity for managing both internal C(S)R processes as well as stakeholder engagement and participations	See below
C11-1	Integrated strategy	Influence of the integration of the CR strategy to the core business and business strategy	Indicators: integrated reporting (financial/general reporting with CR reporting), involving of core business players, integration in firm's overall strategy	Arnold & Hockerts, 2011 Husted & Allen, 2007 Wagner, 2009
C11-2	Organize in business	Influence of organizing the responsibility for CR and sustainability within the business reporting line (compared to a position as staff function)	Indicators: CEO or line director responsible, targets for line managers, involvement of line managers in planning & evaluation	Arnold & Hockerts, 2011

Index	Code	Definition	Notes & indicators	References
C11-3	Stakeholder engagement	Influence of stakeholder management & dialogue capabilities on the firm's influence in the sustainability transition	Indicators: stakeholder dialogues & consultation, reporting on outcomes	De Marchi, 2012 Frondel et al., 2007 See van Tulder et al., 2014 for integral discussion of approaches See also Torugsa et al., 2013 & Sharma & Vredenburg, 1998 for measuring
C11-4	EMS	Influence of the implementation of environmental/corporate responsibility management systems (such as ISO14001 as well as non-certified target setting and measurement systems)	Indicators: certification (ISO 14001, 26000, ...), explicit target setting & monitoring integrated & explicit planning cycle	Frondel et al., 2007 Arnold & Hockerts, 2011 Horbach, 2008

Index	Code	Definition	Notes & indicators	References
C11-5	Partnership capabilities	Influence of the ability to form and develop partnerships with other firms in the context of sustainability innovation (including context creating & advocacy) on the firm's influence in the sustainability transition	Includes cooperation with diverse actions, such as other competitors, suppliers, customers, NGOs, science and governmental agencies. Indicators are both past success in forming partnerships, broad networks, as well as firms showing explicit focus and vision for cooperating with these stakeholders	Senge et al., 2007 Nidumolu et al., 2009 Blum-Kusterer & Hussain, 2001 De Marchi, 2012
C11-6	Other CR capability influence	Influence of other CR capability aspects on the firm's behavior in the transition (other than CC1-CC5)		
	Firm level behavior			
C12-0	Sustainability innovation behavior	New knowledge, assets, business models, products and processes which are substantial changes to the current situation and result in a significant improvement of the acceptability for all relevant stakeholders of the balance between economic, social and environmental outcomes of the business system and the firm's contribution from a long-term perspective	To be included are all (significant) changes in offerings to customers (product or business model innovations) as well as the firm's primary process, as well as knowledge development (R&D) targeted at developing new products and context influencing actions in relation to developing new products (both advocacy & partnerships) As a rule of thumb all changes in supportive processes (such as governance) and organization structure which do not result in changes in the impact of the primary process should be considered enablers/drivers	See below

Index	Code	Definition	Notes & indicators	References
C12-1	R&D	Research and development targeted at developing new knowledge & technologies and solutions with improved sustainability	Indicators of output are either new knowledge, technologies (patent as proxy). Implementing the knowledge in a product or process is considered a product or process innovation.	Luo & Bhattacharya, 2006 Horbach, 2008 Pujari, 2006 Hull & Rothenberg, 2008
C12-2	Process optimization	Developing new processes (and production facilities) which improve the sustainability of the firm's primary process footprint (in social and environmental sense)	Includes all efficiency savings in primary process. Often cost savings and eco-efficiencies are aligned. In the energy sector this could refer both the optimizing firing efficiencies of power plant as well as grid efficiencies. Energy reduction at the end user as far as energy supplier is involved is considered either a service or a business model innovation In the context of the energy sector we consider the process of developing (constructing) new assets (such as power plants) a process innovation	Holliday, 2001 Frondel et al., 2007 Chen et al., 2006
C12-3	Product innovation	Developing new products (or services) which include technologies and solutions with improved sustainability	Includes all energy services to customer, including enabling energy usage reduction, providing transparency (smart gauges). When radical changes to current business the innovations are considered business model innovations	Dangelico & Pujari, 2010 Wagner, 2009 Berchicci & Bodewes, 2005

Index	Code	Definition	Notes & indicators	References
C12-4	Business model innovation	Developing new business models which represent a radical change to the value proposition, profit formula or organizational model which result in (enabling) improved sustainability	Business model changes include circular business models, pricing and financing innovations, product as a service and behavior change models. Business model innovation refers to radical changes in one or more dimensions of the current dominant business model. Indicators are firm's ventures or participation in ventures with radical business model changes.	Christensen et al., 2006 Yunus et al., 2010 Hall & Wagner, 2012 ... see also below
C12-5	- Behavior change business model	Ability to develop new business models targeted at behavioral change of the customer	Includes business models targeted at customer energy use reduction as well as shifting behavior over time in line with energy availability (smart grids)	Nykvist & Whitmarsh, 2008
C12-6	- Pricing & finance innovations in business models	Ability to develop new business models by developing innovative finance & payment arrangements	Includes new financing arrangements (such as leasing and crowd funding) and aligning payment with value creation (such as discounting in relation to average wind strength for wind power and paying for actual energy use reduction)	Anttonen, 2010 Nakata & Weidner, 2012 (BoP as parallel)
C12-7	- Circular business models	Focus at entire lifecycle of product as well as developing circular economy business models	Includes focusing on recyclability of assets (such as solar panels), using new waste streams (excess heat, biomass etc.) as energy sources	Dijkema et al., 2006
C12-8	Other innovations	Other sustainability innovations with relevance to the transition (other than I1-I7)		
C13-0	Firm level context creating behavior	See regime level context creating behavior codes (C6&C7)		

Index	Code	Definition	Notes & indicators	References
C13-1	Partnerships	Forming partnerships with other firms or stakeholders to leverage sustainability innovation.	Refers to C6-1 for further information	
C13-2	Context creating behavior	Engaging different stakeholders to create the context for specific sustainability innovations	Refers to C7-1 - C7-7 for further information	
Outcomes				
C14-0 Direct outcomes				
C14-1	Revenue growth	Revenue (growth) as a result of sustainability innovations	NB to code only when there is an explicit or implicit relationship to sustainability innovations Indicators: revenue/turnover, product sales figures, volume sold, market share Explicitly stated effect on intermediate variables affecting commercial performance, such as increased differentiation, new customers, new markets and competitive advantage, in relation to sustainability innovation, can also be coded; but should be judged more careful in the interpretation upon their actual effect	Examples of revenue effect studies: Pujari, 2006 Husted & Allen, 2007 Wagner, 2009
C14-2	Cost reduction	Cost savings/effects as a result of sustainability innovations	NB to code only when there is an explicit or implicit relationship to sustainability innovations Indicators: cost reduction, profitability improvement, efficiency gain	Examples of cost effect studies: Chen et al., 2006 Christmann, 2000

Index	Code	Definition	Notes & indicators	References
C14-3	GHG (CO ₂)	GHG (CO ₂) reduction as a result of sustainability innovations	NB to code only when there is an explicit or implicit relationship to sustainability innovations Relevant GHG's are: CO ₂ SF ₆ CH ₄ N ₂ O HFCs PFCs (GHG protocol)	Scope source: GHG protocol, WBCSD & WRI, 2004 Impact studies focusing on emissions: Carrion-Flores & Ines, 2010 Sarkis & Cordeiro, 2009
C14-4	Energy saving	Energy saving as a result of sustainability innovations	NB to code only when there is an explicit or implicit relationship to sustainability innovations	Own sector specific interpretation of environmental impact

Index	Code	Definition	Notes & indicators	References
C14-5	(Renewable) capacity in pipeline	(Renewable) generation capacity in the development pipeline as an indicator of sustainability innovations in process	<p>To be able to compare the share renewables in the total mix all information regarding specific assets in development is to be coded</p> <p>Pipeline: every project reported from planning a specific asset (including applying for permits, acquiring investments, designing and constructing the facility) until start of operation</p> <p>When available code information on planned capacity (MW etc.), share of ownership, investment, stage of development (e.g. plan, awaiting permit, awaiting financial closure, in construction, etc.) as well as planned contracts (Long term (>5 year) contracts for procuring a substantial (>20%) share of the capacity of a specific asset from a third party are also to be coded</p>	Own sector specific interpretation of environmental impact

Index	Code	Definition	Notes & indicators	References
C14-6	(Renewable) capacity installed	(Renewable) generation capacity installed as a result of sustainability innovations	To be able to compare the share renewables in the total mix all information regarding specific assets in operation is to be coded Installed capacity refers to all assets in operation until the final closure (assets in temporary close-down due to maintenance or lack of demand are considered installed) Long term (>5 year) contracts for procuring a substantial (>20%) share of the capacity of a specific asset from a third party are also to be coded	Own sector specific interpretation of environmental impact
C14-7	Other direct outcomes	Other direct outcomes with relevance to the transition (other than DO1-DO7)		
C15-0	Indirect outcomes			
C15-1	Example setting	Firm's inventions and practices spread to other actors and as such could be considered to have a broader indirect impact	Indicators of practice spread are: clear temporal difference (firm was clearly first), broad media coverage of the firm's practices followed by broader adoption, actors referring to firm as inventor/leader in respect to this practice	Christensen et al., 2006 as inspiration

Index	Code	Definition	Notes & indicators	References
C15-2	Context creation by firm	Firm has a clear stake in context creating & influencing actions which resulted in a significant improvement (or reduction) in the supportiveness of the context for sustainability innovations	Indicators: coalition formation, shared vision creation, government support, public opinion change are indicators of context change Context changes targeted at stimulation current regime (with potential negative impact on the transition) are also to be coded	Hekkert & Negro, 2009 Smink et al., 2013
C15-3	Other outcomes indirect	Other indirect outcomes with relevance to the transition (other than IO1-IO2)		

APPENDIX D – PRAGMATIC COALITIONS PER DEBATE

EA Need

Table D.1 - Discourse coalitions identified in the EA Need debate. See section 6.2.2 for further discussion.

	Consistent policy need	Delta plan & EA positive	Delta plan & EA negative
Central belief	The Dutch energy policy lacks stability and this should be improved	A multi-stakeholder agreement is needed to create a stable policy context	The EA (and earlier plans) should be evaluated negatively
Key positions	Often no specific solutions or promoting a specific measure (e.g. supplier obligation)	<ul style="list-style-type: none"> * positive in general, underlining need for stable climate * minor disagrees or notes: e.g. biomass & ETS (DGZ), needs enforcement (IEA), prosumer flexibility needed (Essent) * other proposal: Plan 2030 (Netbeheer) & Masterplan per province (BCG) * job growth documented in practice 	<ul style="list-style-type: none"> * no radical shift (including abandon ETS) * creates bureaucracy * decentralized actors not involved * creates high (financial) burden * lack of capital in practice
Key actors	RWE, Env Experts, Eneco, EON, PvdA ++	PvdA, Eneco, SN&M, VVD, VNO-NCW ++	Rotmans - EUR, (NewNRG, VEH, NLE, Groene Rekenkamer)

Goals & ambitions

Core beliefs and secondary beliefs are identical, see table 6.5 for summary

Support mechanism

Table D.2 - Discourse coalitions identified in the Support mechanism debate. See section 6.2.2 for further discussion.

	Renewable support		Optimizers		Free market		Energy saving support		Consistent policy	
Central belief	Achieve goals & develop "real" renewables	Achieve goals with least cost	Leaving to market with support for innovation	Reduce energy use or increase efficiency	Consistent policy is crucial for successful transition					
Meta frames	Fiscal greening External cost inclusion	Efficiency of measure Alignment with goals	Limit market interference Cost control	Energy saving as most effective	Energy saving as most effective					
Support focus	Scaling	Scaling	R&D	Scaling	NR					
Concrete measures	Energy tax adaptation, carbon tax, coal tax Feed-in (SDE) (Supplier obligation)	SDE+ Supplier obligation/ biomass obligation Greendeals	Innovation subsidies Budget saving/limitations Greendeals	Support for energy saving, CHPs, industrial solutions	Differs largely per actor					
Aligned stakes	Wind/ solar	Biomass support (Clean) conventional PPs	Industrial energy cost (Consumer cost) (Budget saving)	CHP (gas), heating nets, industry, construction/ installation sector	Depends					

	Renewable support	Optimizers	Free market	Energy saving support	Consistent policy
Key actors	Groenlinks, Eneco, CE Delft, PvdA, Env Experts, D66, Greenchoice, Koomstra, DGZ, SN&M, Volkskrant, Christenunie, SP, Ecofys, Rotmans, Eemflow Energy, ASN, Triodos, I&M ++	Energie-NL, VVD, PvdA, Essent, CDA, ECN, EL&I, PWC, D66, AER, EON, Nuon, SP, PBL, Groenlinks ++	EL&I, VVD, VEMW, VNO, Topsector Energie, KIVI, min Finance, pricewise.nl ++	(Delfzijl/Eemshaven cluster, SN&M, citizen), see also energy saving cluster	(EL&I, Topsector, Rabo, Eneco, Essent, Wijffels, FD)

Conventional generation & CCS

Table D.3 - Discourse coalitions identified in the Conventional generation & CCS debate. See section 6.2.2 for further discussion.

	Coal resisters	Gas focus	Clean fossil
Central belief	Coal is a highly polluting technology which should be phased-out	Gas as carbon less conventional is the back-up solution in the transition phase and provides economic opportunities for NL	In combination with CCS, biomass and other optimization coal should still play a role for several decades
Key positions	<ul style="list-style-type: none"> * against new coal PPs * underlines lack of support and lock-in risk of CCS * anger about gas PP idling, attributed to coal (over)capacity * proposes closure or transformation of coal PPs * support coal tax 	<ul style="list-style-type: none"> * gas as transition fuel * economic gain for NL & fit with gas history * anger about gas PP idling 	<ul style="list-style-type: none"> * coal PPs as needed and relatively "clean" in combination with add-ons * new coal PPs as needed to balance mix and provide for low energy cost * resisting closure or demanding compensation * promoting CCS as key solution with economic potential * linking gas PP idling to DE solar take-off * oppose coal tax or propose to link to efficiency
Key actors	Greenpeace, PvdA, Delta, Eneco, SN&M, 54 profs, EL&I (anti-CCS Rutte I)	Gasunie, Eneco, Greenpeace, (Essent, GDF, Nuon, PvdA)	Essent/RWE, EL&I, IEA, VNO, Nuon, Energie-NL, ECN Rotterdam (CCS), Shell (CCS)

Wind power

Table D.4 - Discourse coalitions identified in the Wind power debate. See section 6.2.2 for further discussion.

	Onshore Proponents	Onshore Resisters	Offshore Proponents	Offshore Resisters
Central belief	Support onshore wind as key solution	Resist the growth of onshore wind	Support offshore wind as key solution with large economic potential	Resist offshore wind as desirable solution
Key messages	<ul style="list-style-type: none"> * underline competitiveness and large potential of onshore * support regional alignment * propose optimization such as landscape blending and local participation * criticize local resisters as selfish 	<ul style="list-style-type: none"> * underline negative local impact (horizon, health, house values, community tensions) * point at lack of space * point at lack of local support and involvement in process 	<ul style="list-style-type: none"> * crucial to reach environmental goals * industry potential * positive case including external cost * optimization proposals: exclude grid cost, speed up procedures, nearshore * call for new support (pre 2013) and retaining permits 	<ul style="list-style-type: none"> * cost are excessively high * benefits are limited due to fluctuating output and ETS leakage * risk for crucial nature * has negative impact on local coastal economies
Key actors	Provinces (Utrecht, Friesland, Drente), ECN, PvdA, Eneco, NWEA, EL&I, Ecofys, CE Delft, BCG, Bosch & Rijn, Platform Duurzaam Fryslân, St Doarpsmûne in Reduzum	Nationaal Kritisch Platform Windenergie, municipality Emmen, (all kinds of municipalities, provinces and local committees)	SN&M (including Zeekracht), PBL/ECN, PWC, Eneco, Groenlinks, NWEA, Greenpeace, EL&I, Persson (VK), NM federaties, Nuon, Taskforce WoZ, St NL Krijgt Nieuwe Energie, FLOW, PvdA, RWE, DE Koepel, ING, KEMA, Lagerweij, BCG	Sommer (VK), CPB, VVD, group of academics, St Vrije Horizon, coastal communities

Solar & Bottom-up

Table D.5 - Discourse coalitions identified in the Solar & Bottom-up debate. See section 6.2.2 for further discussion.

	Bottom-up supporters	Solar supporters	Limited potential
Central belief	* underline the revolutionary potential of decentralized energy generation rooted in a social empowerment movement	* hail the large potential of solar as technology	* underline the limited potential of solar & decentralized energy generation
Key messages	* plea for local netting and/or feed-in * discredit incumbents and government as unable to adapt or resisting change	* underline the future potential * plea for R&D and industry building support	* underline the marginal nature of solar and/or limited effectiveness within the current energy system
Key actors	NewNRG, several academics (Rotmans, van Wijk, Jonker), Eneco, Urgenda, SN&M, (Essent)	ECN, Holland Solar, Solar industrial cluster, (Shell), (Urgenda), (Eneco)	ECN, VNO, Nuon, Essent, (EON), (Telegraaf)

Bio-based solutions

Table D.6 - Discourse coalitions identified in the Bio-based solutions debate. See section 6.2.2 for further discussion.

	Biomass support	Bio-based support	Biomass resisters & Bio-based issues
Central belief	Biomass as optimal renewable	Bio-based economy provides many (green) growth opportunities	Especially Biomass has many sustainability issues and should not receive comparable support as renewables
Key positions	<ul style="list-style-type: none"> * Cheap renewable * Crucial to reach goals * New subsidies or obligation required 	<ul style="list-style-type: none"> * Should be industry policy priority * Support for biogas & green gas * Explore cascading & new co-firing methods (torrefraction etc.) 	<ul style="list-style-type: none"> * Against biomass support * Strict biomass standards * Underlines limited resources, resource competition and low value application
Key actors	ECN, EAE (Faaij), Essent, Energie-NL, VNO, EL&I, (EnergyValley, Innovatieplatform)	Essent, EL&I, Electrabel, PBL, (EON, Eneco, Delta, LTO, Gasunie)	ENGOS in general, Rathenau, (Greenchoice, Urgenda, PBL, DGZ, DNGOs)

Emission trading system (ETS)

Table D.7 - Discourse coalitions identified in the Emission trading system debate. See section 6.2.2 for further discussion.

	Adapt - environment focus	Adapt - economy focus
Central belief	ETS should be adapted with primary focus on environmental goals	ETS should be adapted with primary focus on economic goals
Key positions	<ul style="list-style-type: none"> * When needed on national level * Hard ceiling, fixed caps, fixed minimum prices * Reduce surpluses of rights 	<ul style="list-style-type: none"> * Use to stimulate efficiency innovation * Improve stability and predictability * Prevent offshoring of industry * Shift to ETS only approach (single system)
Key actors	Eneco, IEA, (DGZ, SN&M, D66, Eurelectric, Delta, GDF, Essent, Gasunie, PBL++)	CPB, (VEMW, VNCI, VNO, VNPI, FME-CWN, ACM, I&M, NEA, Tata, Eurelectric, EON, Delta, GDF, four incumbents)

Energy saving

Table D.8 - Discourse coalitions identified in the Energy saving debate. See section 6.2.2 for further discussion.

	Energy saving general	Higher ambitions	Lagging behind	Build environment
Central belief	Energy saving is the most effective and efficient option in the energy transition	The savings goals should be increased	Progress lags behind the targets (EU/EA)	Is a key opportunity economic & in terms of transition
Key positions	Not always clear, depends on solution focus	Specific goals		* Obligatory labels * Fund * Fiscal support
Key actors	van Wijk, (diverse set including Eneco, AER, several academics EL&I etc)	(Urgenda/DGZ /MGMC, Env experts, Harmsen & Hekkert - UU, CE Delft)	ECN/PBL, (CE Delft, SN&M, Rathenau)	DGZ, EPG Netwerk, Koornstra, InnovatiePlatform, Greenpeace, ActivInvestor, (several others including Eneco, SN&M, Urgenda, EL&I etc)

Energy saving (continued)

Table D.8 - Discourse coalitions identified in the Energy saving debate. See section 6.2.2 for further discussion.

	Residual heat	Efficiency industry	Heat pump	Heat pump - against
Central belief	Is a key opportunity	Focus on remaining efficiency leader	Is a key opportunity	Economically unattractive and potentially damaging to soil/water supply
Key positions	* Exempt/support local sharing & netting	* Sustain voluntary approach (VNO)	* Support	* Regulate/limit
Key actors	Rotterdam/RCI, (Eneco, Essent, EnergyValley, Nijmegen)	van Soest, (VNO, TNO, Hekkert/Harmsen - UU, Cefin)	I&M, (WUR, Deltares, Amsterdam, ING)	(Alliander, water companies)

APPENDIX E – ENERGY AGREEMENT ANALYSIS VS CORE BELIEFS/ADVOCACY COALITIONS

Table E.1 - Mapping of the key agreement of the EA vs. the core and secondary beliefs of the advocacy coalitions.

Chapter	Pro-decentralized	Pro-environment	Green growth	Clean fossil	Pro-economy
2. Ambition		+ environmental goals clearly embraced as central	+ focus on renewables goals (vs. CO ₂) + job creation central		+ job creation central + phasing of ambition (16% to optimize offshore cost reduction)
3. Energy saving - buildings		+ more enforcement + considerable added energy saving	+ embracing building environment opportunity + fund (vs. earlier Greendeal) + support for new propositions	+ continued focus on facilitating & informing + no accountability for incumbents	
3. Energy saving - industry & agro		+/? Added savings, but only partly concrete and mandatory	+ support for geothermal solutions & heating nets		+ industry competitiveness embraced as principle + no obligatory agreements - no support for CHPs + no consequences of CHP idling

Chapter	Pro-decentralized	Pro-environment	Green growth	Clean fossil	Pro-economy
4. Renewables support - Offshore wind		+ clear goal	+ new support + embraces earlier FLOW/Greendel initiatives for cost innovation + grid connection clarity		+ targets cost savings - requires substantial investments
4. Renewables support - Onshore wind		+ large potential targeted	+ larger scale locations will be available + participations efforts formalized		
4. Renewables support - Biomass		+/- cap on biomass (but substantial growth still) + sharpened criteria	+/? Bio-based agenda emphasized (but not very concrete)	+ new biomass co-firing support & substantial growth space ?/- sharpened criteria	

Chapter	Pro-decentralized	Pro-environment	Green growth	Clean fossil	Pro-economy
5. Decentralized generation support	+ local netting - spatial limitations to local netting ? Rating & legislation experiments		? Rating & legislation experiments	+ suppliers are protected from covering costs	+ spatial boundaries to local netting limit fiscal erosion
7. ETS		- no national level measures - sustained free right allocation	- no national level measures		+ embrace competitiveness as key principle + EU level approach + free right allocation
8. Conventional PPs		+ closing coal PPs - cancelling coal tax		+ underlines need for conventionals & CCS - closing coal PPs + cancelling coal tax (+ newer coal PPs not affected)	

APPENDIX F – DETAILED CODING SCHEME RADICALNESS INNOVATIONS IN ELECTRICITY SECTOR

Table F.1 - Detailed coding scheme radicalness innovations in Electricity sector.

	Low			Medium	High
Radicalness – general definition	Optimization/improvement to asset which is conventional in sector Marketing which is largely complementary with current positioning	Developing/implementing new technology to sector which are (partly) complementary with system and infrastructure Value added services which are (partly) complementary and/or involve limited risk taking	Implementing largely different business models and/or system adaptations Upscaling at new to sector scale levels R&D with high risk taking by incumbents and/or into technologies with limited complementarity		
<i>(definition applied to innovations in the Electricity sector)</i>					
R&D		<ul style="list-style-type: none"> * New biomass & bio-coal * CCS * Large scale storage * Smart meter (w/o new business models) 	<ul style="list-style-type: none"> * Smart grids * Biorefining (beyond energy application) * Distributed/prosumer storage * Early stage technologies: Jatropha, blue energy 		
Conventional generation	<ul style="list-style-type: none"> * Developing new assets (more efficient) * Improving efficiency * Closing/idling lossmaking PPs * Contracting gas PPs 	<ul style="list-style-type: none"> * Closure of older, yet profitable PPs * Participating in LNG infrastructure dev 	<ul style="list-style-type: none"> * Closure of new (>2000s) PPs 		

	Low	Medium	High
Renewable generation	<ul style="list-style-type: none"> * Onshore wind contracting (PPA) * Offshore wind efficiency improvement * Biomass co-firing $\leq 35\%$ 	<ul style="list-style-type: none"> * Onshore wind asset development * Solar: single location (proprietary) generation and/or supplier/installation role only projects * Biogas asset dev (CHIP) * Offshore wind asset development * Hydro asset development & optimization * Standalone biomass PPs * Biomass co-firing $> 35\%$ (beyond current practice) * Applying crowd funding 	<ul style="list-style-type: none"> * Solar: distributed generation & local power sharing projects * Biogas grid injection projects/hub infrastructure * Geothermal asset development (high tech risk)
Supply chain	<ul style="list-style-type: none"> * Biomass certification (w/o clear shift in sourcing) * Coal: transparency and audit schemes (w/o clear shift in sourcing or added cost) 	<ul style="list-style-type: none"> * Biomass: actively developing new sources 	
Sales & Marketing	<ul style="list-style-type: none"> * Equal price green products and/or compensation * New marketing channels in which also the conventional products are sold 	<ul style="list-style-type: none"> * Customer deals involving supply from specific (NL) renewables sources * (large scale) Marketing campaigns including sustainability aspects * Premium price green products * Customer/marketing events focused on sustainability * Market development partnerships with NGOs 	<ul style="list-style-type: none"> * (large scale) Marketing campaigns with central focus on new business models (prosumer)

	Low	Medium	High
Value added services		<ul style="list-style-type: none"> * Building solutions in which incumbent is mainly supplier and/or adviser * EVs: public & private charging solutions * Other: shore power, program management, city support 	<ul style="list-style-type: none"> * Building solutions shifting risk to incumbent (e.g. ESCO) and/or incumbent has evident leading role in conceiving and developing the project * EVs: fast charging solutions (tech risk & behavior change) * Agro: facilitating decentralized generation (e.g. with trading platforms) & actively supporting farmer asset development
Energy saving		<ul style="list-style-type: none"> * Reselling/distributing energy saving products * Advise services 	<ul style="list-style-type: none"> * Risk taking solutions (ESCOs) * Propositions including financing (loan/lease)
Smart home & prosumer		<ul style="list-style-type: none"> * Smart meter & thermostat (w/o new business models) 	<ul style="list-style-type: none"> * Smart thermostat actively positioned as platform for apps and new business models * New business models facilitating prosumers (e.g. financing, risk taking, facilitating local sharing)
Heating nets		<ul style="list-style-type: none"> * Developing new infrastructure (heat/cold), CHP units and/or heat buffers 	

	Low	Medium	High
Other	<ul style="list-style-type: none"> * Own footprint reduction by internal energy saving with a business case (e.g. building optimization, driving efficiency) * Other emission reduction measures (w/o mentioning substantial investments) 	<ul style="list-style-type: none"> * Consultancy * Integral sustainable procurement schemes * CO₂ grids * New nuclear assets * New market model supplier <> DSO * Gas data services * Employability partnerships 	<ul style="list-style-type: none"> * Start-up venture capital funding * Cradle2Cradle in energy dialogue

APPENDIX G – METHOD NOTES OUTCOME DATA

Generation data

Basic source & triangulation: the basic source of data is the annual/integrated/CSR reporting of the firm. In most cases, firms report with structured overviews on capacity and production differentiated per asset or power source. Project level reporting in the text or other sources is used to triangulate the data or to determine specifics such as ownership and geographical location. Triangulation is also done over the years, by considering whether changes in capacity and production can be explained by reported changes in asset and contract base.

Geographical scope = NL: to make a fair comparison between the firms – and to analyze their contribution to the Dutch electricity system – included assets are scoped on the Netherlands (except for comparison of group level data in figure G1 the rightmost column & figure G2a&b).

Capacity data = owned capacity incl. majority shares: for capacity data, the owned capacity data was chosen as indicator, because this best indicates the effort of the company to develop capacity. Participations are included pro rata when the company has a majority share. Not in all cases do companies report explicitly on the share they own as well as whether capacity is reported pro rata. In these cases, it is assumed that the company has 100% ownership or reports pro rata, because this is most likely, considering general accounting principles.

- *Eneco specifics:* because of Eneco's supply-focused history they report the least structurally on generation capacity & production. In contrast to the other two incumbents, they have not always included systematic overviews (tables) in their reporting. Furthermore, Eneco often reports including PPAs. Third, Eneco has more activities outside NL (especially wind) included in their reported data (for the other incumbents the activities outside NL are often reported as part of other group companies/units). To be able to verify the data and to scope geographically a detailed overview of specific wind assets was developed, based on the combination of Eneco's annual report, two systematic benchmarks of asset capacity by applied research firm CE Delft (CE Delft 2014, TEC, CE Delft 2014) as well as project reporting on Eneco NL, UK & BE website (checked August 8th 2016). Except for 20 MW of pre-2010 developed capacity (7% of 2010 renewable capacity, 3% of 2014 capacity) the reported numbers could be matched with specific assets. Biomass capacity could be verified based on the combination of annual report data and the CE Delft benchmark. For 4-8 MW of solar capacity developed pre 2010 the location (NL or BE) could not be verified (max. 3%). Added up, these triangulation

efforts give sufficient certainty that the numbers are comparable with a limited margin of error (<10% in 2010, declining to <4% in 2014).

- *Nuon specifics*: Nuon reports renewables capacity pro rata and on the NL scope for the period 2010-2012. For 2013 & 2014 only total numbers are provided without a clear specification of location and share. The mutation in capacity could, however, be related to specific projects, which makes it possible to compose these numbers from the combination of earlier reporting and project level data and triangulate these with the total numbers.
- *Essent specifics*: for the period 2010-2012 Essent provides detailed annual capacity & emission overviews, which distinguish location and ownership. For 2013 & 2014 RWE reporting is used. RWE, however, reports the renewables activities (except hydro power & biomass co-firing) in the Innogy business unit and not per country. Therefore, this data was combined with project level reports as well as the Innogy factbook (14R-C3, April 2015), which also provides asset-specific overviews of wind capacity. Biomass co-firing & hydro specification can be derived from the total renewable capacity for the Essent business unit (thus excluding Innogy's wind/solar activities, 13R-F1, p. 59-60, 14R-F1, pp. 45-46) combined with project level reports.

Production data = including PPAs: in contrast to the capacity data the total production including PPAs (contracted) capacity is used as indicator. This recognizes that in terms of production, incumbents also contribute in terms of contracting capacity. For the production growth (G1 rightmost) and transition at firm level (G2a&b) group level data is used to account for the fact that investment decisions are made at group level and firms can choose to allocate fewer resources than average to the Netherlands in their asset portfolio.

- *Eneco specifics*: for production, Eneco reports even less as capacity, due to their supply focused tradition. Therefore, Eneco's production data are estimated based on a single report of total renewable production in 2011 (2,1 TWh, 11O-C1, p. 26). Based on another source, this could be scoped to the Netherlands (13E-C4, pp. 6). This is an analysis by Essent of how the renewables production of firms compares and quotes these numbers from Eneco's website as source. In terms of triangulation: this report mentions the same total production as Eneco's annual report. To estimate production for the other years, the 2011 figure has been multiplied with the capacity including PPA growth, which Eneco does report: Renewable production year X = Renewable production 2011 * (Capacity including PPA Year X/Capacity including PPA 2011).
- *Nuon specifics*: From 2010-2012, Nuon reports include contracted capacity for the Netherlands only. In 2013 (& 2014) the firm changed reporting to include capacity

abroad. Based on a comparison of the production in 2012 (reported in both the 2012 & 2013 report) it can be inferred that 98% of the production is in NL. Therefore the 2013 is multiplied with this percentage to compensate for capacity abroad. Note that this assumes that relative share of production abroad stays stable, because there is no data available to deduce how the share has potentially changed.

- *Essent specifics:* for Essent, the detailed production & emission overviews include usable data for the period 2010-2013. For 2014, only the RWE annual report is used (14R-F1, p. 44) as far as it reports on Essent as a business unit (this only includes biomass co-firing and hydro power). For the wind production in 2014 it is assumed that this stays stable while the capacity data shows stable capacity and there is no indication that something has changed in the contracted capacity.
- *RWE specifics:* renewable production, total production and total supply numbers are reported transparently in RWE's annual report. While reporting is at group level there are no geographical scope issues. The external benchmark by the scientific institute ESMT is used to arrive at a split between hydro power and other renewables (Burger, Pandit & Weinmann 2015). On the level of total renewables these numbers have been triangulated with the annual reports of RWE.
- *Vattenfall specifics:* renewable production, total production, and total supply numbers are reported transparently in RWE's annual report. While reporting is at group level, there are no geographical scope issues. No indication was found within Vattenfall's reporting whether the reported numbers are including or excluding PPAs. There is thus a chance that Vattenfall's performance (both with regard to renewables as share of total, as well as compared to its competitors) is underestimated due to the exclusion of PPAs. As with RWE the ESMT benchmark is used to triangulate and complement the data from Vattenfall's report (Burger, Pandit & Weinmann 2015).

G1 - Renewable generation growth - Change 2014 vs. 2010

This table compares the growth of renewable generation. The content of the columns represents the following:

- NL owned renewables capacity: renewables capacity in NL owned by Eneco, Nuon and Essent, excluding PPAs, pro rata.
- NL owned wind capacity: wind capacity (onshore & offshore) in NL owned by Eneco, Nuon and Essent, excluding PPAs, pro rata.
- NL renewables production: production of renewable electricity in NL by Eneco, Nuon and Essent, including PPAs, pro rata. NB: due to inconsistent and incomplete data, a substantial share of the data is estimated, see previous notes.

- Group renewables production: production of renewable electricity as group by Eneco, Vattenfall & RWE, including PPAs, pro rata. NB: for Vattenfall's data it is not certain whether PPAs are included.

G2a&b - Renewables contribution to incumbent product & sales – excluding and including hydro power

This table compares to what degree incumbents' production and sales are backed with renewable production. Considering that renewable investment decisions are made on group level and geographical spread might under- & over-allocate certain countries, this comparison is made on group level. A comparison is made without (G2a) and including hydro power (G2b), considering that Vattenfall has a large historical advantage in this respect and there is not much development happening in this segment. The content of the columns represents the following:

- 2010 Production: total renewable production (including PPA, pro rata)/total electricity production
- 2014 Sales: total renewable production (including PPA, pro rata)/total electricity sales
- 2010 Production: total renewable production (including PPA, pro rata)/total electricity production
- 2014 Sales: total renewable production (including PPA, pro rata)/total electricity sales

G3 - Incumbent contribution to total NL renewable production

This table compares the contribution of the three NL incumbents to the total Dutch renewables installed base and production. As comparison base the data of the Dutch Statistics Agency (CBS) is used (Statline, <http://statline.cbs.nl/>, table "Hernieuwbare elektriciteit; productie en vermogen," retrieved latest version November 23rd 2016). Because the statistics agency does not list co-firing capacity as separate capacity (but includes it as a thermal/coal asset), the owned capacity is compared excluding biomass co-firing. The content of the columns represents the following:

- 2010 – Own cap: Capacity of incumbent (owned, pro rata, excluding PPA)/Total Dutch renewable asset capacity (both excluding biomass co-firing)
- 2010 – Production: Production of incumbent (including PPA, pro rata)/Total Dutch renewable production (both including biomass co-firing)
- 2014 – Own cap: Capacity of incumbent (owned, pro rata, excluding PPA)/Total Dutch renewable asset capacity (both excluding biomass co-firing)

- 2014 – Production: Production of incumbent (including PPA, pro rata)/Total Dutch renewable production (both including biomass co-firing)

Supply data

Data originates from the regulated power labels: comparison of supply mix and CO₂ data is more straightforward because electricity suppliers are obligated to report on these numbers in regulated manner on their “power labels.” On these labels, they report on the fuel mix and CO₂ (per kWh) and on some occasions split these numbers in retail and business segments of the market.

Comparability of the scope of the labels has one issue: each of the three incumbents has a business unit in Belgium (Nuon divested this unit mid-2011) and Eneco also has limited supply activities in other EU countries. There is one comparability issue with regard to scope of the data. Firms report on several segmentations, but the scope is not always clear. A segmentation for the total of the Dutch market is not included on many occasions. Therefore, the data was compared on the total of the “group.” The influence of supplied energy outside the Netherlands was verified to remain at <15%, so this influence remained limited. For Eneco a revenue split per country was included in the annual reports and the share outside NL remained at <6% of the total revenue in the studied period. For Essent and Nuon the share could be derived from reported numbers of customers per country and this was respectively 13% (2014) for Essent and 14% for Nuon (2010/2011). Furthermore, for other segmentations included on the power labels, the scope was unclear and they were not included consistently, so comparison was not possible. As such, conclusions could be influenced by developments outside the Netherlands, but this influence can be considered limited.

S1 Fuel source of supplied energy – 2014

This graph displays the fuel mix of the supplied electricity in 2014. Fuel sources as reported on the label are clustered. Clustered in “Gas & other” are next to gas-based power, nuclear power & “other fossil” based power. Clustered in “Other renewable” are wind, solar, biomass and “other renewables” as they are reported on the labels. This clustering was developed to highlight especially the coal & hydro power as part of the total mix and compare the development in this respect to (other) renewables. The included percentage represents the share of “other renewables” as part of the mix.

S2 Change in share of fuel source in supply mix - 2014 vs. 2010

This graph displays the change in fuel mix between 2014 and 2010. A change of +10% means the share is 10% higher (e.g. 10% in 2010 and 20% in 2014) and does not represent

the “percentage growth of the share.” The clustering of the fuel sources is the same as for S1 (see previous notes before).

S3a Reported CO₂ emission of supplied electricity (g/kWh)

This graph shows the development of the CO₂ emissions (per kWh). These numbers are directly reported on the power labels.

S3b Reported CO₂ emission of supplied electricity (g/kWh), compensated for hydro power

This graph is meant to show how the CO₂ emissions develop, when the effect of imported hydro power is neutralized. Considering the broadly contested effect of this certificate trade (see chapters 5 & 7), it is relevant to understand this effect. A simple formula is used to compensate for the effect of the hydro power: CO₂ original (see S3a) + (share hydro * 375 g/kWh). The 375 g/kWh is based on the CO₂ emissions of a gas generation, while this is the marginal capacity in the Dutch and neighboring markets (and as such the generated power is likely to have approx. that emission level). It is noted that this calculation also includes the hydro power generated in the Netherlands, however from the generation data it is known that this has only minor impact (approximately 0,1% of the total generated electricity between in 2010 & 2014, source (ECN et al. 2015), so considering the incumbents supply >10% of their electricity based on hydro power (certificates) the 0,1% generated in the Netherlands is only marginal).

Customer impact & knowledge creation data

Energy saving

To evaluate the contribution of electricity sector incumbents towards energy saving by their customers, a systematic evaluation of reported activities and outcomes in the firm’s report is supplemented with a targeted review of key policy documents and evaluations.

- The firm reporting data set has been systematically reviewed with regard to the reported energy saving activities and their outcomes. As mentioned in the discussion on outcome level this gives only a fragmented and incomplete picture.
- As a supplementary analysis, the professional energy news source Energieia was searched in the category energy saving (“energie besparing & efficiëntie”) for articles that mentioned the focus incumbents. This resulted in a few relevant items referring to policy documents and evaluations.
- Based on the aforementioned Energieia search, as well as a further snowball search of references to other documents, a set of key policy documents and evaluation was retrieved. These documents were applied to text search with help of NVivo to find

references or remarks on the electricity sector (incumbents) (key words: “Eneco,” “Nuon,” “Essent,” “energieleverancier,” “energiebedrijf”). The reviewed documents are:

- December 2007, Ministerie WW&I, Kamerbrief: “Energiebesparingsplannen gebouwde omgeving, onder andere particuliere woningvoorraad” (Ministerie WW&I 2007).
- January 2008, Ministerie VROM & Ministerie EZ & Bouwend Nederland & UNETO-VNI & EnergieNed & VME, Convenant Energiebesparing bestaande gebouwen (“Meer met Minder”) (Ministerie VROM et al. 2008).
- June 2012, Ministerie BZ&K & AEDES & Bouwend Nederland & Energie-NL & NVB & NEPROM & UNETO-VNI & Vastgoed Belang & Woonbond, “KOEPELCONVENANT ENERGIEBESPARING GEBOUWDE OMGEVING” (Ministerie BZ&K et al. 2012).
- November 2013, Ministerie BZ&K, Kamerbrief: “Energiebesparing gebouwde omgeving en het Energieakkoord voor duurzame groei” (Ministerie BZ&K 2013).
- June 2014, Ministerie BZ&K, Kamerbrief: “Voortgang aantal rijksacties Energieakkoord voor energiebesparing woningen” (Ministerie BZ&K 2014b).
- 2014, PBL, Energie besparen gaat niet vanzelf: Evaluatie energiebesparingsbeleid voor de gebouwde omgeving (PBL 2014).
- June 2014, RVO, BLOK VOOR BLOK: DE BEVINDINGEN Grootschalige energiebesparing in de bestaande woningbouw (RVO 2014).
- November 2014, SIRA Consulting, “Evaluatie Bouwbesluit 2012: Een ex post onderzoek naar de doeltreffendheid en doelmatigheid van het Bouwbesluit 2012” (SIRA Consulting 2014).
- November 2014, prof. A. van Hal, Reaction on PBL evaluation (Hal 2014).
- November 2014, prof. W. Derksen, Reaction on SIRA evaluation (Derksen 2014).
- December 2014, Ministerie BZ&K, Kamerbrief: “Beleidsdoorlichting Energie en Bouwqualiteit” (Ministerie BZ&K 2014a).

Solar power generation

In a similar vein as for energy saving, firm reporting is supplemented with a targeted search of relevant information.

- The firm reporting data set has been systematically reviewed with regard to the reported solar activities and their outcomes.
- As a supplementary analysis, the professional energy news source *Energieia* was searched in the category energy saving (“energie besparing & efficiëntie”) for articles that mentioned the focus incumbents. This resulted in several relevant news items which were reviewed on reporting incumbent activities and their outcomes.
 - One of the news items referred to a relevant report of Roland Berger discussing the role of incumbents in solar power developments (June 2015, “SOLAR PV: could be similar to the shale gas disruption for the utilities industry”). In the news item discussing the report, Ward van den Berg, an energy expert of Roland Berger, refers to leading position of Eneco (June 22nd 2015, *Energieia*, “Aandeel energiebedrijven in zon-PV-markt marginaal”)
- In the discussion, an estimated share of 5-10% in the solar panel sales for Eneco was mentioned. This was based on the following observations:
 - The “Zon zoekt dak” program of SN&M used Eneco as supplier except for the first round (in 2015 the sixth round was completed). This program reports having sold 50.000 panels by-end 2015 (Natuur en Milieu 2016).
 - Eneco acquired Zon-IQ which reported having sold >100.000 panels by February 2016 (Savelkoul 2016).
 - It is estimated that the total number of sold panels in the Dutch market is in the range of 1,7-2,8 million (ISO-C1, p. 17 mentions 280.000 households with panels until 2015, estimate based on 6 to 10 panels per household on average).
 - The lower figure of 150.000 panels sold through the Zon Zoekt Dak and Zon-IQ channels (and there might be other channels through which Eneco has sold solar panels) resulted in a rough estimate of a share of 5-10% of the solar panels sold which could be attributed to Eneco’s influence.

Knowledge creation

The activities of the incumbents are evaluated based on firm reporting, supplemented with a targeted search of relevant information.

- The firm reporting data set has been systematically reviewed with regard to the reported R&D activities, pilots and participation in research programs as well as their outcomes.
- Two policy evaluations were reviewed in more detail:

- December 2014, CE Delft, “Review Topsector Energie: Deelonderzoek I” (CE Delft 2014).
- December 2014, CE Delft & TEC & Triple-E consult, “Review Topsector Energie: Deelonderzoek II: Thema’s en Governancestructuur TSE” (TEC, CE Delft 2014).
- Furthermore, all available background documents on the website of the Topsector (<http://topsectorenergie.nl/documenten/>) were retrieved (12-8-2016). This resulted in 64 documents dating from 2012 to 2016. These documents were subjected to a text search with NVivo with respect to mentioning the incumbents (keywords “Essent,” “Nuon,” “Eneco”). Besides content review of the relevant text fragments, counting the times an incumbent was mentioned was also used to support the analysis.

List of Abbreviations

Abbreviation	Meaning
2B	(selling products/services) to business (customers)
2C	(selling products/services) to consumers
ABN	Bank
ACF	Advocacy Coalition Framework
ACM	Consumer & Markets authority
ADA	Analytical Discourse Analysis
ANOVA	Analysis of Variance
AKZO (NOBEL)	Chemicals company
AMJ	Academy of Management Journal
ANWB	Union of Dutch Road Users
ASN	Bank
avg	average
BCG	Boston Consultancy Group, strategy consultancy firm
BE	Belgium
b	billion
CATO	Carbon Capture & Storage research program
CCS	Carbon Capture & Storage
CE Delft	Applied research firm focused on energy
CFP	Corporate Financial Performance
CH ₄	Carbon Hydrogen compound, methane
CHP	Combined heat & power generation
Climate-KIC	EU Climate change research program
CNV	Labor Union
CPB	Centraal Planbureau: Central (Economic) Planning Agency
CR	Corporate Responsibility
CSP	Corporate Social Performance
CSR	Corporate Social Responsibility
ct	cent
D66	Political Party
DE	Germany
DGZ	Employer union of sustainability frontrunners
DK	Denmark

Abbreviation	Meaning
DONG	Danish Energy firm
DSO	Distribution System (Network) Operators
EA	Energy Agreement
EBIT	Earnings before interest & tax, profit measure
ECN	Applied energy research firm
EIA	Energy investment tax deduction scheme
EL&I	Ministry of Economic Affairs, Agriculture & Innovation
EMS	Environmental Management System
ENGO	Environmental NGO
EON	(German) Energy firm
EPZ	(Dutch) Energy firm
ESCO	Energy Saving Company, new business model to finance investments to improve energy efficiency
(EU)-ETS	EU Emissions Trading Scheme
EV	Electric Vehicle
EVO	Association of Shippers (issuers of transport orders)
EU	European Union
EZ	Ministry of Economic Affairs
FLOW	Offshore Wind research program
FME-CWN	Industry Association of Metal Industries
FNV	Labor Union
FR	France
GDF (Suez)	(French) Energy firm
GHG	Greenhouse Gases
GRI	Global Reporting Initiative
HIER	Climate Change mobilization campaign of NGOs
HR boilers	High efficiency boilers
HRM	Human Resources Management
HVC	(Dutch) Energy firm
I&M	Ministry of Infrastructure & Environment
ICT	Information & Communication Technology
IEA	International Energy Agency
IPO	Interprovincial Association
ISO	International Organization for Standardization

Abbreviation	Meaning
k	1.000
KEMA Institute	Global energy consultancy firm
KLD	KLD dataset on CSR behavior, http://www.whartonwrds.com/datasets/kld/
KPI	Key Performance Indicator
KPN	Telecommunication firm
LCA	Life Cycle Analysis
LEAN	LEAN management, an efficiency improvement method
LNG	Liquefied Natural Gas
LT	Long term
LTO	Agribusiness Association
MEE	Energy Saving covenants between government and business targeted on firms included in EU-ETS
MEP	Renewable Energy subsidy program of Dutch Government
MHP	Labor Union
Min	Ministry
Ministerie BZ&K	Ministerie van Binnenlandse Zaken en Koninkrijksrelaties (Ministry of the Interior and Kingdom Relations)
Ministerie EZ	Ministerie van Economische Zaken (Ministry of Economic Affairs)
Ministerie VROM	Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu (Ministry of Public Housing, Spatial Policy and Environment)
Ministerie WW&I	Ministerie van Wonen, Wijken en Integratie (Ministry of Housing, Neighborhoods and Integration)
MJA	Energy Saving covenants between government and business
MKB-NL	General employer Union representing small & medium size enterprises
m	million
MLP	Multi-Level Paradigm
MNC	Multinational corporation (firm)
MP	Member of Parliament (local/provincial/national/EU)
NDP	Association of the “news” sector
NEST	Smart thermostat developed by Google and marketed in NL by Essent
NEV	Nationale Energie Verkenning, National Energy Planning study
NGO	Non-Governmental Organization
NL	the Netherlands
NLE	Nederlandse Energie Maatschappij, (Dutch) Energy firm

Abbreviation	Meaning
NMA	Consumer & Markets authority, currently named ACM
NO ₂	Nitrogen Dioxide (Chemical Compound)
NS	Nederlandse Spoorwegen (Dutch Railways)
NVB	Banking Association
NVDE	Dutch Association of Renewable Energy, advocacy association of producers and equipment manufacturers in the renewable energy sector
NVivo	Content analysis software package
NWEA	NL Wind Energy Association
OPAC	Research program focused on energy storage
OV-MEP	Transition regime between MEP & SDE subsidy schemes for renewable energy of the Dutch government
PAC	Research program focused on energy storage
PBL	Planbureau voor de Leefomgeving, Environmental Planning Agency
PJ	Petajoule, energy unit equal to one quadrillion (10 ¹⁵) joules
PP	Power Plant
PPA	Power Purchasing Agreement
Prov	Province/s
PV	Photo-Voltaic
PvdA	Political Party (Labor party)
PWC	Price Waterhouse Coopers, accountancy & consulting firm
R&D	Research & Development
RAI	Automotive Industry Association
RBV	Resource Based View, research school in business science
ROI	Return On Investment
RUG	Rijksuniversiteit Groningen, university
RVO	Entrepreneurial Support Agency of Dutch Government
RWE	A large German energy firm
SCM	Supply Chain Management
SDE, SDE+	(Two consecutive) Renewable Energy Subsidy schemes of Dutch Government
SEP	Power plant capacity planning agency existing before the privatization of the electricity sector
SER	Social Economic Council, an important policy advisory council consisting of representatives of employers and labor unions as well as independent members officially appointed by the king

Abbreviation	Meaning
Six sigma	Methodology that reduces process variability to eliminate defects
SME	Small and Medium Sized Enterprises
SN&M	Stichting Natuur & Milieu (an ENGO)
SNM	Strategic Niche Management
TBI	Construction firm
TMT	Top Management Team
TOON	Smart thermostat marketed by Eneco
TQM	Total Quality Management
TUD	Technical University Delft
UK	United Kingdom
UNETO-VNI	Association of Installation & Technical retail sectors
UU	University of Utrecht
VEH	Home Owners Association
VEMW	Association of Large Users of Energy & Water
VME	Energy sector organization, founded as alternative to EnergieNed
VNCI	Association of Chemical Industry
VNG	Association of Municipalities
VNO-NCW	General employer Union representing the larger firms
VNPI	Association of Petroleum Industry
VVD	Political Party
WISE	NGO focused on renewable energy
WWF	World Wildlife Fund, nature & environment NGO

References

- Abbott, W.F. & Monsen, R.J. 1979, "On the Measurement of Corporate Social Responsibility: self-reported disclosures as a method of measuring corporate social involvement," *Academy of management journal*, vol. 22, no. 3, pp. 501-515.
- Abernathy, W.J. & Clark, K.B. 1985, "Innovation: Mapping the winds of creative destruction," *Research policy*, vol. 14, no. 1, pp. 3-22.
- ACM 2016, *Tendrapportage Marktwerking en Consumentenvertrouwen in de energiemarkt - Tweede halfjaar 2015 (Trendreport Market functioning & Consumer trust in the energy market - second half year 2015)*, Available from: <https://www.acm.nl/nl/publicaties/publicatie/15762/> [Accessed: April 27th 2017].
- ACM 2015, *Tendrapportage Marktwerking en Consumentenvertrouwen in de energiemarkt - Tweede halfjaar 2014 (Trendreport Market functioning and Consumer trust in the energy market - Second half year 2014)*,), Available from: <https://www.acm.nl/nl/publicaties/publicatie/14218/> [Accessed: April 27th 2017].
- ACM 2014, *Tendrapportage Marktwerking en Consumentenvertrouwen in de energiemarkt - Tweede halfjaar 2013 (Trendreport Markt functioning and Consumer trust in the energymarket - 2nd half year 2013)*, <https://www.acm.nl/nl/publicaties/publicatie/12904/> [Accessed: April 27th 2017].
- Aguinis, H. & Glavas, A. 2012, "What We Know and Don't Know About Corporate Social Responsibility: A Review and Research Agenda," *Journal of Management*, vol. 38, no. 4, pp. 932-968.
- Aharonson, B.S. & Bort, S. 2015, "Institutional pressure and an organization's strategic response in Corporate Social Action engagement: The role of ownership and media attention," *Strategic Organization*, vol. 13, no. 4, pp. 307-339.
- Alkemade, F. & Suurs, R.A.A. 2012, "Patterns of expectations for emerging sustainable technologies," *Technological Forecasting and Social Change*, vol. 79, no. 3, pp. 448-456.
- Alt, E., Díez-de-Castro, E.P. & Lloréns-Montes, F.J. 2015, "Linking Employee Stakeholders to Environmental Performance: The Role of Proactive Environmental Strategies and Shared Vision," *Journal of Business Ethics*, vol. 128, no.1 pp. 167-181.
- Ambrosini, V. & Bowman, C. 2009, "What are dynamic capabilities and are they a useful construct in strategic management?" *International journal of management reviews*, vol. 11, no. 1, pp. 29-49.

- Anttonen, M. 2010, "Greening from the Front to the Back Door? A Typology of Chemical and Resource Management Services," *Business Strategy and the Environment*, vol. 19, no. 3, pp. 199-215.
- Aragón-Correa, J.A. 1998, "Strategic Proactivity and Firm Approach to the Natural Environment," *Academy of Management Journal*, vol. 41, no. 5, pp. 556-567.
- Aragón-Correa, J.A. & A. Rubio-López, E. 2007, "Proactive Corporate Environmental Strategies: Myths and Misunderstandings," *Long range planning*, vol. 40, no. 3, pp. 357-381.
- Aragón-Correa, J.A., Hurtado-Torres, N., Sharma, S. & García-Morales, V.J. 2008, "Environmental strategy and performance in small firms: A resource-based perspective," *Journal of environmental management*, vol. 86, no. 1, pp. 88-103.
- Aragón-Correa, J.A., Martín-Tapia, I. & Hurtado-Torres, N.E. 2013, "Proactive Environmental Strategies and Employee Inclusion: The Positive Effects of Information Sharing and Promoting Collaboration and the Influence of Uncertainty," *Organization and Environment*, vol. 26, no. 2, pp. 139-161.
- Aragón-Correa, J.A. & Sharma, S. 2003, "A Contingent Resource-Based View of Proactive Corporate Environmental Strategy," *Academy of Management Review*, vol. 28, no. 1, pp. 71-88.
- Arnold, M.G. & Hockerts, K. 2011, "The Greening Dutchman: Philips' Process of Green Flagging to Drive Sustainable Innovations," *Business Strategy and the Environment*, vol. 20, no.6, pp. 394-407.
- Asgary, N. & Li, G. 2016, "Corporate Social Responsibility: Its Economic Impact and Link to the Bullwhip Effect," *Journal of Business Ethics*, vol. 135, no. 4, pp. 665-681.
- Auerswald, P.E. & Branscomb, L.M. 2003, "Valleys of death and Darwinian seas: Financing the Invention to Innovation Transition in the United States," *The Journal of Technology Transfer*, vol. 28, no. 3-4, pp. 227-239.
- Austin, J.E. & Seitanidi, M.M. 2014, *Creating Value in Nonprofit-Business Collaborations: New Thinking and Practice*. San Francisco, CA, Jossey-Bass.
- Avadikyan, A. & Llerena, P. 2010, "A real options reasoning approach to hybrid vehicle investments," *Technological Forecasting and Social Change*, vol. 77, no. 4, pp. 649-661.
- Azzone, G. & Bertele, U. 1994, "Exploiting Green Strategies for Competitive Advantage," *Long Range Planning*, vol. 27, no. 6, pp. 69-81.

- Baden, D., Harwood, I.A. & Woodward, D.G. 2011, "The effects of procurement policies on 'downstream' corporate social responsibility activity Content-analytic insights into the views and actions of SME owner-managers," *International Small Business Journal*, vol. 29, no. 3, pp. 259-277.
- Bain & Company 2016, *Achieving Breakthrough Results in Sustainability*, Available from: <http://www.bain.com/publications/articles/achieving-breakthrough-results-in-sustainability.aspx> [Accessed: April 27th 2017].
- Banerjee, S.B. 2008, "Corporate social responsibility: The Good, the Bad and the Ugly," *Critical Sociology*, vol. 34, no. 1, pp. 51-79.
- Bansal, P. 2005, "Evolving sustainably: a longitudinal study of corporate sustainable development," *Strategic Management Journal*, vol. 26, no. 3, pp. 197-218.
- Bansal, P. & Roth, K. 2000, "Why Companies Go Green: A Model of Ecological Responsiveness," *Academy of Management Journal*, vo. 43, no. 4, pp. 717-736.
- Barr, S.H., Baker, T., Markham, S.K. & Kingon, A.I. 2009, "Bridging the Valley of Death: Lessons Learned from 14 Years of Commercialization of Technology Education," *Academy of Management Learning & Education*, vol. 8, no. 3, pp. 370-388.
- Battilana, J., Leca, B. & Boxenbaum, E. 2009, "How Actors Change Institutions: Towards A Theory of Institutional Entrepreneurship," *The Academy of Management Annals*, vol. 3, no. 1, pp. 65-107.
- Beckman, K. 2013, *Exclusive: RWE sheds old business model, embraces transition*, Available from: <http://www.energypost.eu/exclusive-rwe-sheds-old-business-model-embraces-energy-transition/> [Accessed: April 27th 2017].
- Benner, M.J. & Tripsas, M. 2012, "The influence of prior industry affiliation on framing in nascent industries: the evolution of digital cameras," *Strategic Management Journal*, vol. 33, no. 3, pp. 277-302.
- Berchicci, L. & Bodewes, W. 2005, "Bridging Environmental Issues with New Product Development," *Business Strategy and the Environment*, vol. 14, no. 5, pp. 272-285.
- Berry, M.A. & Rondinelli, D.A. 1998, "Proactive corporate environmental management: A new industrial revolution," *The Academy of Management Executive*, vol. 12, no. 2, pp. 38-50.
- Binz, C., Truffer, B., Li, L., Shi, Y. & Lu, Y. 2012, "Conceptualizing leapfrogging with spatially coupled innovation systems: The case of onsite wastewater treatment in China," *Technological Forecasting and Social Change*, vol. 79, no. 1, pp. 155-171.

- BlackRock 2015, *The price of climate change - Global warming's impact on portfolios*, Available from: <https://www.blackrock.com/corporate/en-cn/literature/whitepaper/bii-pricing-climate-risk-international.pdf> [Accessed: April 27th 2017].
- Blanchi, R. & Noci, G. 1998, "'Greening" SMEs' Competitiveness," *Small Business Economics*, vol. 11, no. 3, pp. 269-281.
- Blum-Kusterer, M. & Hussain, S.S. 2001, "Innovation and corporate sustainability: An investigation into the process of change in the pharmaceuticals industry," *Business Strategy and the Environment*, vol. 10, no. 5, pp. 300-316.
- Bocken, N.M.P., Short, S.W., Rana, P. & Evans, S. 2014, "A literature and practice review to develop sustainable business model archetypes," *Journal of Cleaner Production*, vol. 65, pp. 42-56.
- Bohnsack, R. 2013, "Car firms and low-emission vehicles: The evolution of incumbents' strategies in relation to policy developments," Available from: https://pure.uva.nl/ws/files/2033309/128425_thesis.pdf [Accessed: April 27th 2017].
- Boiral, O. 2006, "Global Warming: Should Companies Adopt a Proactive Strategy?" *Long Range Planning*, vol. 39, no. 3, pp. 315-330.
- Borri, F. & Boccaletti, G. 1995, "From total quality management to total quality environmental management," *The TQM Magazine*, vol. 7, no. 5, pp. 38-42.
- Bosman, R., Loorbach, D., Frantzeskaki, N. & Pistorius, T. 2014, "Discursive regime dynamics in the Dutch energy transition," *Environmental Innovation and Societal Transitions*, vol. 13, pp. 45-59.
- BP 2015, *BP Statistical Review of World Energy - June 2015*, Available from: <http://biomasspower.gov.in/document/Reports/BP%20statistical%20review-2015.pdf> [Accessed: April 27th 2017].
- Brown, J.P., Lambert, D.M. & Florax, R.J. 2013, "The birth, death, and persistence of firms: Creative destruction and the spatial distribution of US manufacturing establishments, 2000–2006," *Economic Geography*, vol. 89, no. 3, pp. 203-226.
- Burger, B. 2016, *Photovoltaics report, June 2016*, Fraunhofer Institute for Solar Energy Systems, Available from: <https://www.scribd.com/document/327210577/2016-06-06-Photovoltaics-Report> [Accessed: April 27th 2017].
- Burger, C., Pandit, S. & Weinmann, J. 2015, *ESMT innovation index 2014 – electricity supply industry: The “big beyond.”*, ESMT Berlin, Available from: <https://www.esmt>

- .org/esmt-innovation-index-2014-electricity-supply-industry-big-beyond [Accessed: April 27th 2017].
- Burke, L. & Logsdon, J.M. 1996, "How Corporate Social Responsibility Pays Off," *Long Range Planning*, vol. 29, no. 4, pp. 495-502.
- Buysse, K. & Verbeke, A. 2003, "Proactive environmental strategies: A stakeholder management perspective," *Strategic Management Journal*, vol. 24, no. 5, pp. 453-470.
- Cambra-Fierro, J., Wilson, A., Polo-Redondo, Y., Fuster-Mur, A. & Lopez-Perez, M.E. 2013, "When do firms implement corporate social responsibility? A study of the Spanish construction and real-estate sector," *Journal of Management and Organization*, vol. 19, no. 2, pp. 150-166.
- Carballo-Penela, A. & Castromán-Diz, J.L. 2014, "Environmental policies for sustainable development: An analysis of the drivers of proactive environmental strategies in the service sector," *Business Strategy and the Environment*, vol. 24, no. 8, pp. 802-818.
- Carrión-Flores, C.E. & Innes, R. 2010, "Environmental innovation and environmental performance," *Journal of Environmental Economics and Management*, vol. 59, no. 1, pp. 27-42.
- Carroll, A.B. 1979, "A three-dimensional conceptual model of corporate performance," *Academy of Management Review*, vol. 4, no. 4, pp. 497-505.
- CE Delft 2017, Wordt de 25% emissiereductie van broeikasgassen in 2020 gehaald? (Will the 25% emissionreduction for GHGs in 2020 be achieved?), Available from: http://www.ce.nl/publicatie/wordt_de_25%25_emissiereductie_van_broeikasgassen_in_2020_gehaald/1983 [Accessed: August 11th 2017].
- CE Delft 2016, *Recht doen aan klimaatbeleid (Doing justice to climate policy)*, Available from: http://www.ce.nl/publicatie/recht_doen_aan_klimaatbeleid/1836 [Accessed: April 27th 2017].
- CE Delft 2015, *Elektriciteitsleveranciers in kaart - Update 2015 (Electricity suppliers mapped - Updated 2015)*, Available from: http://www.ce.nl/publicatie/elektriciteitsleveranciers_in_kaart_update_2015/1678 [Accessed: April 27th 2017].
- CE Delft 2014, *Review Topsector Energie - Deel I (Review "Topsector" Energy, Part I)*, Available from: http://www.ce.nl/publicatie/review_topsector_energie/1586 [Accessed: April 27th 2017].
- Chandler, A.D. 1990, "Scale and scope: The dynamics of industrial competition," Cambridge, MA, *Harvard University Press*.

- Chandy, R.K. & Tellis, G.J. 2000, "The incumbent's curse? Incumbency, size, and radical product innovation," *Journal of Marketing*, vol. 64, no. 3, pp. 1-17.
- Chandy, R.K. & Tellis, G.J. 1998, "Organizing for radical product innovation: The overlooked role of willingness to cannibalize," *Journal of Marketing Research*, , vol. 35, no. 4, pp. 474-487.
- Chang, C.-. 2015, "Proactive and reactive corporate social responsibility: Antecedent and consequence," *Management Decision*, vol. 53, no. 2, pp. 451-468.
- Chen, S. & Bouvain, P. 2009, "Is corporate responsibility converging? a comparison of corporate responsibility reporting in the USA, UK, Australia, and Germany," *Journal of Business Ethics*, vol. 87, no. SUPPL. 1, pp. 299-317.
- Chen, Y.-. 2008, "The driver of green innovation and green image - Green core competence," *Journal of Business Ethics*, vol. 81, no. 3, pp. 531-543.
- Chen, Y.-., Chang, C.-. & Wu, F.-. 2012, "Origins of green innovations: The differences between proactive and reactive green innovations," *Management Decision*, vol. 50, no. 3, pp. 368-398.
- Chen, Y.-., Lai, S.-. & Wen, C.-. 2006, "The influence of green innovation performance on corporate advantage in Taiwan," *Journal of Business Ethics*, vol. 67, no. 4, pp. 331-339.
- Chesbrough, H.W. 2012, "GE's ecomagination Challenge: An experiment in open innovation," *California Management Review*, vol. 54, no. 3, pp. 140-154.
- Chesbrough, H.W. 2003, "Environmental influences upon firm entry into new sub-markets: Evidence from the worldwide hard disk drive industry conditionally," *Research Policy*, vol. 32, no. 4, pp. 659-678.
- Chesbrough, H.W. 2001, "Assembling the elephant: a review of empirical studies on the impact of technical change upon competing firms," *Comparative Studies of Technological Evolution*, vol. 7, pp. 1-36.
- Christensen, C.M. 1997, *The innovator's dilemma: When new technologies cause great firms to fail*, Boston, MA, Harvard Business School Print.
- Christensen, C.M. 1993, "The rigid disk drive industry: a history of commercial and technological turbulence," *Business History Review*, vol. 67, no. 04, pp. 531-588.
- Christensen, C.M. & Bower, J.L. 1996, "Customer power, strategic investment, and the failure of leading firms," *Strategic Management Journal*, vol. 17, no. 3, pp. 197-218.

- Christensen, C.M., Baumann, H., Ruggles, R. & Sadtler, T.M. 2006, "Disruptive innovation for social change," *Harvard Business Review*, vol. 84, no. 12, pp. 94-101+163.
- Christmann, P. 2000, "Effects of 'best practices' of environmental management on cost advantage: The role of complementary assets," *Academy of Management Journal*, vol. 43, no. 4, pp. 663-680.
- Clarkson, P.M., Fang, X., Li, Y. & Richardson, G. 2013, "The relevance of environmental disclosures: Are such disclosures incrementally informative?" *Journal of Accounting and Public Policy*, vol. 32, no. 5, pp. 410-431.
- Claver-Cortés, E., Molina-Azorín, J.F., Pereira-Moliner, J. & López-Gamero, M.D. 2007, "Environmental strategies and their impact on hotel performance," *Journal of Sustainable Tourism*, vol. 15, no. 6, pp. 663-679.
- Cohen, B. & Winn, M.I. 2007, "Market imperfections, opportunity and sustainable entrepreneurship," *Journal of Business Venturing*, vol. 22, no. 1, pp. 29-49.
- Conceição, P., Heitor, M.V. & Vieira, P.S. 2006, "Are environmental concerns drivers of innovation? Interpreting Portuguese innovation data to foster environmental foresight," *Technological Forecasting and Social Change*, vol. 73, no. 3, pp. 266-276.
- Cooper, A.C. & Schendel, D. 1976, "Strategic responses to technological threats," *Business Horizons*, vol. 19, no. 1, pp. 61-69.
- Corley, K. 2011, "The coming of age for qualitative research: Embracing the diversity of qualitative methods," *Academy of Management Journal*, vol. 54, no. 2, pp. 233-237.
- Cowper-Smith, A. & de Grosbois, D. 2011, "The adoption of corporate social responsibility practices in the airline industry," *Journal of Sustainable Tourism*, vol. 19, no. 1, pp. 59-77.
- Crane, A. & Seitanidi, M.M. 2014, "Social Partnerships and responsible business: what, why and how?" In: Seitanidi, M.M., Crane, A. (eds.) *Social Partnerships and Responsible Business.*, Oxon, Routledge, pp. 1-12.
- Dangelico, R.M. & Pujari, D. 2010, "Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability," *Journal of Business Ethics*, vol. 95, no. 3, pp. 471-486.
- Danneels, E. 2004, "Disruptive technology reconsidered: A critique and research agenda," *Journal of Product Innovation Management*, vol. 21, no. 4, pp. 246-258.

- Dasgupta, M., Gupta, R. & Sahay, A. 2011, "Linking Technological Innovation, Technology Strategy and Organizational Factors A Review," *Global Business Review*, vol. 12, no. 2, pp. 257-277.
- David, P.A. & Steinmueller, W.E. 1994, "Economics of compatibility standards and competition in telecommunication networks," *Information Economics and Policy*, vol. 6, no. 3, pp. 217-241.
- de Bakker, F.G.A., Groenewegen, P. & Den Hond, F. 2005, "A bibliometric analysis of 30 years of research and theory on corporate social responsibility and corporate social performance," *Business and Society*, vol. 44, no. 3, pp. 283-317.
- de Burgos-Jiménez, J., Vázquez-Brust, D., Plaza-Úbeda, J.A. & Dijkshoorn, J. 2013, "Environmental protection and financial performance: An empirical analysis in Wales," *International Journal of Operations and Production Management*, vol. 33, no. 8, pp. 981-1018.
- de Haan, J.H. & Rotmans, J. 2011, "Patterns in transitions: Understanding complex chains of change," *Technological Forecasting and Social Change*, vol. 78, no. 1, pp. 90-102.
- de Marchi, V. 2012, "Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms," *Research Policy*, vol. 41, no. 3, pp. 614-623.
- de Marchi, V. & Grandinetti, R. 2013, "Knowledge strategies for environmental innovations: The case of Italian manufacturing firms," *Journal of Knowledge Management*, vol. 17, no. 4, pp. 569-582.
- de Vreese, C.H. & Boomgaarden, H.G. 2006, "Media effects on public opinion about the enlargement of the European union," *Journal of Common Market Studies*, vol. 44, no. 2, pp. 419-436.
- Dean, T.J. & McMullen, J.S. 2007, "Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action," *Journal of Business Venturing*, vol. 22, no. 1, pp. 50-76.
- Deegan, C. & Rankin, M. 1996, "Do Australian companies report environmental news objectively?: An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority," *Accounting, Auditing & Accountability Journal*, vol. 9, no. 2, pp. 50-67.
- Delmas, M.A., Nairn-Birch, N. & Lim, J. 2015, "Dynamics of Environmental and Financial Performance: The Case of Greenhouse Gas Emissions," *Organization and Environment*, vol. 28, no. 4, pp. 374-393.

- den Besten, J.W., Arts, B. & Verkooijen, P. 2014, "The evolution of REDD : An analysis of discursive-institutional dynamics," *Environmental Science & Policy*, vol. 35, pp. 40-48.
- Dentoni, D., Bitzer, V. & Pascucci, S. 2016, "Cross-Sector Partnerships and the Co-creation of Dynamic Capabilities for Stakeholder Orientation," *Journal of Business Ethics*, vol. 135, no. 1, pp. 35-53.
- Derksen, W. 2014, *Oordeel over SIRA evaluatie (Reaction on SIRA evaluation)*, Available from: <https://www.rijksoverheid.nl/documenten/brieven/2014/11/23/oordeel-over-evaluatie-sira> [Accessed: April 27th 2017].
- Dijkema, G.P.J., Ferrão, P., Herder, P.M. & Heitor, M. 2006, "Trends and opportunities framing innovation for sustainability in the learning society," *Technological Forecasting and Social Change*, vol. 73, no. 3, pp. 215-227.
- Dillard, J. 2009, "Buddhist economics: A path from an amoral accounting toward a moral one. " In: Lehman, C.R. (ed.) *Extending Schumacher's Concept of Total Accounting and Accountability into the 21st Century (Advances in Public Interest Accounting, vol. 14)*, Bingley, Emerald Group Publishing Ltd., pp. 25-53.
- Dillard, J. & Layzell, D. 2014, "An ongoing journey of corporate social responsibility," *Accounting Forum*, vol. 38, no. 3, pp. 212-226.
- DiSegni, D.M., Huly, M. & Akron, S. 2015, "Corporate social responsibility, environmental leadership and financial performance," *Social Responsibility Journal*, vol. 11, no. 1, pp. 131-148.
- Dittrich, K. & Duysters, G. 2007, "Networking as a means to strategy change: the case of open innovation in mobile telephony," *Journal of Product Innovation Management*, vol. 24, no. 6, pp. 510-521.
- Dittrich, K., Duysters, G. & de Man, A. 2007, "Strategic repositioning by means of alliance networks: The case of IBM," *Research Policy*, vol. 36, no. 10, pp. 1496-1511.
- Dixon-Fowler, H.R., Slater, D.J., Johnson, J.L., Ellstrand, A.E. & Romi, A.M. 2013, "Beyond "Does it Pay to be Green?" A Meta-Analysis of Moderators of the CEP-CFP Relationship," *Journal of Business Ethics*, vol. 112, no. 2, pp. 353-366.
- Dosi, G. 1982, "Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change," *Research Policy*, vol. 11, no. 3, pp. 147-162.

- Dul, J. & Hak, T. 2012, *Case study methodology in business research*, Routledge, New York, NY.
- ECN, PBL, CBS & RVO 2016, *Nationale Energie Verkenning 2016 (National Energy Foresight Report 2016)*, Available from: <https://www.cbs.nl/nl-nl/publicatie/2016/41/nationale-energieverkenning-2016> [Accessed: April 27th 2017].
- ECN, PBL, CBS & RVO 2015, *Nationale Energie Verkenning 2015 (National Energy Foresight Report 2015)*, Available from: <https://www.cbs.nl/nl-nl/publicatie/2015/41/nationale-energie-verkenning-2015> [Accessed: April 27th 2017].
- Economy, E. & Lieberthal, K. 2007, "Scorched earth will environmental risks in China overwhelm its opportunities?" *Harvard Business Review*, vol. 85, no. 6, pp. 88-96+141.
- Egyedi, T.M. 1999, "Examining the relevance of paradigms to base OSI standardisation," *Computer Standards & Interfaces*, vol. 20, no. 4, pp. 355-374.
- Eisenhardt, K.M. 1989, "Building theories from case study research," *Academy of Management Review*, vo. 14, no. 4, pp. 532-550.
- Eisenhardt, K.M. & Graebner, M.E. 2007, "Theory building from cases: opportunities and challenges," *Academy of Management Journal*, vol. 50, no. 1, pp. 25-32.
- El Baz, J., Laguir, I., Marais, M. & Staglianò, R. 2016, "Influence of National Institutions on the Corporate Social Responsibility Practices of Small- and Medium-sized Enterprises in the Food-processing Industry: Differences Between France and Morocco," *Journal of Business Ethics*, vol. 134, no. 1, pp. 117-133.
- Elkington, J. 1997, *Cannibals with forks: The triple bottom line of 21st-century business*, Gabriola Island, BC, New Society Publishers.
- Ellen MacArthur Foundation 2014, *Towards the circular economy vol. 3 - Accelerating the scale-up across global supply chains*, Available from: <https://www.ellenmacarthurfoundation.org/publications/towards-the-circular-economy-vol-3-accelerating-the-scale-up-across-global-supply-chains> [Accessed: April 27th 2017].
- Elzen, B., Geels, F.W., Leeuwis, C. & van Mierlo, B. 2011, "Normative contestation in transitions 'in the making': Animal welfare concerns and system innovation in pig husbandry," *Research Policy*, vol. 40, no. 2, pp. 263-275.
- Endrikat, J., Guenther, E. & Hoppe, H. 2014, "Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environmental

and financial performance,” *European Management Journal*, vol. 32, no. 5, pp. 735-751.

Energieia 2017, Bijstook biomassa in kolencentrales komt traag op gang (Co-firing of biomass in coal power plants is starting slowly), Available from: <http://energieia.nl/nieuws/170818-1704/bijstook-biomassa-in-kolencentrales-komt-traag-op-gang> [Accessed: August 11th 2017].

Energieia 2016, Nederlands bedrijfsleven wil Klimaatwet (Dutch business community desires a climate law), Available from: <http://energieia.nl/nieuws/906006-1610/nederlands-bedrijfsleven-wil-klimaatwet> [Accessed: August 11th 2017].

Eriksson, P. & Kovalainen, A. 2008, *Qualitative methods in business research*, London, Sage Publications Ltd.

Farla, J., Alkemade, F. & Suurs, R.A.A. 2010, "Analysis of barriers in the transition toward sustainable mobility in the Netherlands,” *Technological Forecasting and Social Change*, vol. 77, no. 8, pp. 1260-1269.

Farla, J., Markard, J., Raven, R. & Coenen, L. 2012, "Sustainability transitions in the making: A closer look at actors, strategies and resources,” *Technological Forecasting and Social Change*, vol. 79, no. 6, pp. 991-998.

Fassin, Y., van Rossem, A. & Buelens, M. 2011, "Small-business owner-managers' perceptions of business ethics and CSR-related concepts,” *Journal of Business Ethics*, vol. 98, no. 3, pp. 425-453.

Fischer, C. & Newell, R.G. 2008, "Environmental and technology policies for climate mitigation,” *Journal of Environmental Economics and Management*, vol. 55, no. 2, pp. 142-162.

Flaim, T., Neenan, B. & Robinson, J. 2013, "Pilot Paralysis: Why Dynamic Pricing Remains Over-Hyped and Underachieved,” *The Electricity Journal*, vol. 26, no. 4, pp. 8-21.

Font, X., Walmsley, A., Cogotti, S., McCombes, L. & Häusler, N. 2012, "Corporate social responsibility: The disclosure-performance gap,” *Tourism Management*, vol. 33, no. 6, pp. 1544-1553.

Fraj-Andrés, E., López-Pérez, M.E., Melero-Polo, I. & Vázquez-Carrasco, R. 2012, "Company image and corporate social responsibility: Reflecting with SMEs' managers,” *Marketing Intelligence and Planning*, vol. 30, no. 2, pp. 266-280.

Frankental, P. 2001, "Corporate social responsibility-a PR invention?” *Corporate Communications: An International Journal*, vol. 6, no. 1, pp. 18-23.

- Friedman, M. 2007, *The social responsibility of business is to increase its profits*, Springer.
- Frondel, M., Horbach, J. & Rennings, K. 2007, "End-of-pipe or cleaner production? An empirical comparison of environmental innovation decisions across OECD countries," *Business Strategy and the Environment*, vol. 16, no. 8, pp. 571-584.
- Garcés-Ayerbe, C., Rivera-Torres, P. & Murillo-Luna, J.L. 2012, "Stakeholder pressure and environmental proactivity: Moderating effect of competitive advantage expectations," *Management Decision*, vol. 50, no. 2, pp. 189-206.
- Garcia, R. & Calantone, R. 2002, "A critical look at technological innovation typology and innovativeness terminology: a literature review," *Journal of Product Innovation Management*, vol. 19, no. 2, pp. 110-132.
- Garriga, E. & Melé, D. 2004, "Corporate social responsibility theories: mapping the territory," *Journal of Business Ethics*, vol. 53, no. 1, pp. 51-71.
- Garud, R., Hardy, C. & Maguire, S. 2007, "Institutional entrepreneurship as embedded agency: An introduction to the special issue," *Organization Studies*, vol. 28, no. 7, pp. 957-969.
- Gavel, Y. & Iselid, L. 2008, "Web of Science and Scopus: a journal title overlap study," *Online Information Review*, vol. 32, no. 1, pp. 8-21.
- Geels, F.W. 2011, "The multi-level perspective on sustainability transitions: Responses to seven criticisms," *Environmental Innovation and Societal Transitions*, vol. 1, no. 1, pp. 24-40.
- Geels, F.W. 2007a, "Analysing the breakthrough of rock 'n' roll (1930-1970) Multi-regime interaction and reconfiguration in the multi-level perspective," *Technological Forecasting and Social Change*, vol. 74, no. 8, pp. 1411-1431.
- Geels, F.W. 2007b, "Transformations of large technical systems: A multilevel analysis of the Dutch highway system (1950-2000)," *Science Technology and Human Values*, vol. 32, no. 2, pp. 123-149.
- Geels, F.W. 2005, "Processes and patterns in transitions and system innovations: Refining the co-evolutionary multi-level perspective," *Technological Forecasting and Social Change*, vol. 72, no. 6 SPEC. ISS., pp. 681-696.
- Geels, F.W. 2004, "From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory," *Research Policy*, vol. 33, no. 6-7, pp. 897-920.

- Geels, F.W. 2002, "Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study," *Research Policy*, vol. 31, no. 8-9, pp. 1257-1274.
- Geels, F.W. & Schot, J. 2010, "The dynamics of socio-technical transitions: a sociotechnical perspective in grin'," In: Rotmans, J. & Schot, J. (eds.), *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change*, London, Routledge.
- Geels, F.W. & Schot, J. 2007, "Typology of sociotechnical transition pathways," *Research Policy*, vol. 36, no. 3, pp. 399-417.
- Gerstner, L.V. 2002, *Who Says Elephants Can't Dance? Inside IBM's Historic Turnaround*, London, Harper Collins Publishers.
- Ghobadian, A., Viney, H., Liu, J. & James, P. 1998, "Extending linear approaches to mapping corporate environmental behaviour," *Business Strategy and the Environment*, vol. 7, no. 1, pp. 13-23.
- Gibbert, M. & Ruigrok, W. 2010, "The "what" and "how" of case study rigor: Three strategies based on published work," *Organizational Research Methods*, vol. 13, no. 4, pp. 710-737.
- Gibbert, M., Ruigrok, W. & Wicki, B. 2008, "What passes as a rigorous case study?" *Strategic Management Journal*, vol. 29, no. 13, pp. 1465-1474.
- Gilbert, C.G. 2005, "Unbundling the structure of inertia: Resource versus routine rigidity," *Academy of Management Journal*, vol. 48, no. 5, pp. 741-763.
- González-Benito, J. & González-Benito, Ó. 2006, "A review of determinant factors of environmental proactivity," *Business Strategy and the Environment*, vol. 15, no. 2, pp. 87-102.
- González-Benito, J. & González-Benito, Ó. 2005, "Environmental proactivity and business performance: An empirical analysis," *Omega*, vol. 33, no. 1, pp. 1-15.
- Gottschalk, P. 2013, "Limits to corporate social responsibility: The case of gjensidige insurance company and hells angels motorcycle club," *Corporate Reputation Review*, vol. 16, no. 3, pp. 177-186.
- Graebner, M.E. 2009, "Caveat venditor: Trust asymmetries in acquisitions of entrepreneurial firms," *Academy of Management Journal*, vol. 52, no. 3, pp. 435-472.

- Greenwood, R. & Suddaby, R. 2006, "Institutional entrepreneurship in mature fields: The big five accounting firms," *Academy of Management Journal*, vol. 49, no. 1, pp. 27-48.
- Grob, S. & McGregor, I. 2005, "Sustainable organisational procurement: a progressive approach towards sustainable development," *International Journal of Environment, Workplace and Employment*, vol. 1, no. 3-4, pp. 280-295.
- Grosvold, J., Hoejmosse, S.U. & Roehrich, J.K. 2014, "Squaring the circle: Management, measurement and performance of sustainability in supply chains," *Supply Chain Management*, vol. 19, no. 3, pp. 292-305.
- Groza, M.D., Pronschinske, M.R. & Walker, M. 2011, "Perceived Organizational Motives and Consumer Responses to Proactive and Reactive CSR," *Journal of Business Ethics*, vol. 102, no. 4, pp. 639-652.
- Guthrie, J. & Abeysekera, I. 2006, "Content analysis of social, environmental reporting: what is new?" *Journal of Human Resource Costing & Accounting*, vol. 10, no. 2, pp. 114-126.
- Haanaes, K., Balagopal, B., Arthur, D., Kong, M., Velken, I., Kruschwitz, N. & Hopkins, M.S. 2011a, "First look: The second annual sustainability & innovation survey," *MIT Sloan Management Review*, vol. 52, no. 2, pp. 77-83.
- Haanaes, K., Balagopal, B., Teck Kong, M., Velken, I., Arthur, D., Hopkins, M.S. & Kruschwitz, N. 2011b, "New sustainability study: The 'embracers' seize advantage," *MIT Sloan Management Review*, vol. 52, no. 3, pp. 23-35.
- Hajer, M.A. 2006, "Doing discourse analysis: coalitions, practices, meaning," *Nederlandse Geografische Studies*, no. 344, pp. 65-74.
- Hajer, M.A. 1995, *The politics of environmental discourse: ecological modernization and the policy process*, Oxford, Clarendon Press.
- Hajer, M. & Versteeg, W. 2005, "A decade of discourse analysis of environmental politics: achievements, challenges, perspectives," *Journal of Environmental Policy & Planning*, vol. 7, no. 3, pp. 175-184.
- van Hal, A. 2014, Oordeel over evaluatie PBL (Reaction on PBL evaluation), Available from: <https://www.rijksoverheid.nl/documenten/brieven/2014/11/11/oordeel-over-evaluatie-pbl> [Accessed: April 27th 2017].

- Hall, J. & Kerr, R. 2003, "Innovation dynamics and environmental technologies: the emergence of fuel cell technology," *Journal of Cleaner Production*, vol. 11, no. 4, pp. 459-471.
- Hall, J. & Wagner, M. 2012, "Integrating sustainability into firms' processes: Performance effects and the moderating role of business models and innovation," *Business Strategy and the Environment*, vol. 21, no. 3, pp. 183-196.
- Halme, M. & Laurila, J. 2009, "Philanthropy, integration or innovation? Exploring the financial and societal outcomes of different types of corporate responsibility," *Journal of Business Ethics*, vol. 84, no. 3, pp. 325-339.
- de Haan, J. & Rotmans, J. 2011, "Patterns in transitions: Understanding complex chains of change," *Technological Forecasting and Social Change*, vol. 78, no. 1, pp. 90-102.
- Hamel, G. 2000, "Waking up IBM: How a gang of unlikely rebels transformed big blue," *Harvard Business Review*, vol. 78, no. 4, pp. 137.
- Hansen, O.E., Sondergard, B. & Meredith, S. 2002, "Environmental innovations in small and medium sized enterprises," *Technology Analysis and Strategic Management*, vol. 14, no. 1, pp. 37-56.
- Harris, H. 2001, "Content analysis of secondary data: A study of courage in managerial decision making," *Journal of Business Ethics*, vol. 34, no. 3-4, pp. 191-208.
- Hart, S.L. 2010, *Capitalism at the crossroads: Next generation business strategies for a post-crisis world*, Upper Saddle River, NJ, Wharton School Publishing.
- Hart, S.L. 1997, "Beyond greening: strategies for a sustainable world," *Harvard Business Review*, vol. 75, no. 1, pp. 66-77.
- Hart, S.L. 1995a, "A natural-resource-based view of the firm," *Academy of Management Review*, vol. 37, no. 5, pp. 986-1014.
- Hart, S.L. & Dowell, G. 2011, "Invited Editorial: A Natural-Resource-Based View of the Firm Fifteen Years After," *Journal of Management*, vol. 37, no. 5, pp. 1464-1479.
- Hass, J.L. 1996, "Environmental ('green') management typologies: An evaluation, operationalization and empirical development," *Business Strategy and the Environment*, vol. 5, no. 2, pp. 59-68.
- Hauser, J., Tellis, G.J. & Griffin, A. 2006, "Research on innovation: A review and agenda for marketing science," *Marketing Science*, vol. 25, no. 6, pp. 687-717.

- Hawkins, R. 1999, "The rise of consortia in the information and communication technology industries: emerging implications for policy," *Telecommunications Policy*, vol. 23, no. 2, pp. 159-173.
- Heikkurinen, P. 2011, "Environmental strategy and sustainability," In: Idowu, S.O., Louche, C. (eds.) *Theory and Practice of Corporate Social Responsibility*, Berlin Heidelberg, Springer, pp. 123-140.
- Hekkert, M.P. & Negro, S.O. 2009, "Functions of innovation systems as a framework to understand sustainable technological change: Empirical evidence for earlier claims," *Technological Forecasting and Social Change*, vol. 76, no. 4, pp. 584-594.
- Henderson, R. 1993, "Underinvestment and incompetence as responses to radical innovation: Evidence from the photolithographic alignment equipment industry," *The RAND Journal of Economics*, vol. 24, no. 2, pp. 248-270.
- Henderson, R.M. & Clark, K.B. 1990, "Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms," *Administrative Science Quarterly*, vol. 35, no.1, pp. 9-30.
- Henriques, I. & Sadorsky, P. 2007, "Environmental technical and administrative innovations in the Canadian manufacturing industry," *Business Strategy and the Environment*, vol. 16, no. 2, pp. 119-132.
- Henriques, I. & Sadorsky, P. 1996, "The Determinants of an Environmentally Responsive Firm: An Empirical Approach," *Journal of Environmental Economics and Management*, vol. 30, no. 3, pp. 381-395.
- Heracleous, L. & Barrett, M. 2001, "Organizational change as discourse: Communicative actions and deep structures in the context of information technology implementation," *Academy of Management Journal*, vol. 44, no. 4, pp. 755-778.
- Hermwille, L. 2016, "The role of narratives in socio-technical transitions—Fukushima and the energy regimes of Japan, Germany, and the United Kingdom," *Energy Research & Social Science*, vol. 11, pp. 237-246.
- Hill, C.W. & Rothaermel, F.T. 2003, "The performance of incumbent firms in the face of radical technological innovation," *Academy of Management Review*, vol. 28, no. 2, pp. 257-274.
- Hillman, A.J., Keim, G.D. & Schuler, D. 2004, "Corporate political activity: A review and research agenda," *Journal of Management*, vol. 30, no. 6, pp. 837-857.

- Hillman, K.M. & Sandén, B.A. 2008, "Exploring technology paths: The development of alternative transport fuels in Sweden 2007-2020," *Technological Forecasting and Social Change*, vol. 75, no. 8, pp. 1279-1302.
- Hills, P., Lam, J. & Welford, R. 2004, "Business, environmental reform and technological innovation in Hong Kong," *Business Strategy and the Environment*, vol. 13, no. 4, pp. 223-234.
- Hincha-Ownby, M. 2011, "12 Tech Companies Who Are Proactive About Being Green," Available from: <https://authoritylabs.com/blog/green-tech-companies/> [Accessed: July 21st 2017].
- Hisschemöller, M. & Bode, R. 2011, "Institutionalized knowledge conflict in assessing the possible contributions of H 2 to a sustainable energy system for the Netherlands," *International Journal of Hydrogen Energy*, vol. 36, no. 1, pp. 14-24.
- Hockerts, K. 2010, "Greening Goliaths versus emerging Davids - Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship," *Journal of Business Venturing*, vol. 25, no. 5, pp. 481-492.
- Hoffmann, E. 2007, "Consumer integration in sustainable product development," *Business Strategy and the Environment*, vol. 16, no. 5, pp. 322-338.
- Hofman, P.S. 2005, *Innovation and institutional change: the transition to a sustainable electricity system*, Available from: <http://doc.utwente.nl/55830/> [Accessed: April 27th 2017].
- Holburn, G.L. & Bergh, R.G.V. 2008, "Making friends in hostile environments: Political strategy in regulated industries," *Academy of Management Review*, vol. 33, no. 2, pp. 521-540.
- Holcomb, J.L., Upchurch, R.S. & Okumus, F. 2007, "Corporate social responsibility: What are top hotel companies reporting?" *International Journal of Contemporary Hospitality Management*, vol. 19, no. 6, pp. 461-475.
- Holliday, C. 2001, "Sustainable growth, the DuPont way," *Harvard Business Review*, vol. 79, no. 8, pp. 129-134, 162.
- Horbach, J. 2008, "Determinants of environmental innovation--New evidence from German panel data sources," *Research Policy*, vol. 37, no. 1, pp. 163-173.
- Hull, C.E. & Rothenberg, S. 2008, "Firm performance: The interactions of corporate social performance with innovation and industry differentiation," *Strategic Management Journal*, vol. 29, no. 7, pp. 781-789.

- Humphreys, A. 2010, "Megamarketing: the creation of markets as a social process," *Journal of Marketing*, vol. 74, no. 2, pp. 1-19.
- Hunt, C.B. & Auster, E.R. 1990, "Proactive Environmental-Management-Avoiding the Toxic Trap," *Sloan Management Review*, vol. 31, no. 2, pp. 7-18.
- Husted, B.W. & Allen, D.B. 2009, "Strategic corporate social responsibility and value creation: A study of multinational enterprises in Mexico," *Management International Review*, vol. 49, no. 6, pp. 781-799.
- Husted, B.W. & Allen, D.B. 2007, "Strategic Corporate Social Responsibility and Value Creation among Large Firms. Lessons from the Spanish Experience," *Long Range Planning*, vol. 40, no. 6, pp. 594-610.
- Idowu, S.O. & Towler, B.A. 2004, "A comparative study of the contents of corporate social responsibility reports of UK companies," *Management of Environmental Quality*, vol. 15, no. 4, pp. 420-437.
- IEA 2015a, *Energy and Climate Change - World Energy Outlook Special Report*, Available from: <https://www.iea.org/publications/freepublications/publication/WEO2015SpecialReportonEnergyandClimateChange.pdf> [Accessed: April 27th 2017].
- IEA 2015b, *Tracking Clean Energy Progress 2015*, Available from: http://www.iea.org/publications/freepublications/publication/Tracking_Clean_Energy_Progress_2015.pdf [Accessed: April 27th 2017].
- Immink, V.M., Reinders, M.J., van Tulder, R.J.M. & van Trijp, J.C.M. 2013, "The livestock sector and its stakeholders in the search to meet the animal welfare requirements of society," *Journal on Chain and Network Science*, vol. 13, no. 2, pp. 151-160.
- Ingold, K. & Varone, F. 2011, "Treating policy brokers seriously: evidence from the climate policy," *Journal of Public Administration Research and Theory*, vol. 22, no. 2, pp. 319-346.
- Inoue, Y. & Miyazaki, K. 2008, "Technological innovation and diffusion of wind power in Japan," *Technological Forecasting and Social Change*, vol. 75, no. 8, pp. 1303-1323.
- Jabbour, C.J.C. 2010, "Non-linear pathways of corporate environmental management: A survey of ISO 14001-certified companies in Brazil," *Journal of Cleaner Production*, vol. 18, no. 12, pp. 1222-1225.
- Jabbour, C.J.C., Santos, F.C.A. & Nagano, M.S. 2010, "Contributions of HRM throughout the stages of environmental management: Methodological triangulation applied to

- companies in Brazil," *International Journal of Human Resource Management*, vol. 21, no. 7, pp. 1049-1089.
- Jahangirian, M., Naseer, A., Stergioulas, L., Young, T., Eldabi, T., Brailsford, S., Patel, B. & Harper, P. 2012, "Simulation in health-care: Lessons from other sectors," *Operational Research*, vol. 12, no. 1, pp. 45-55.
- Jansson, J. 2011, "Consumer eco-innovation adoption: Assessing attitudinal factors and perceived product characteristics," *Business Strategy and the Environment*, vol. 20, no. 3, pp. 192-210.
- Jeswani, H.K., Wehrmeyer, W. & Mulugetta, Y. 2008, "How warm is the corporate response to climate change? Evidence from Pakistan and the UK," *Business Strategy and the Environment*, vol. 17, no. 1, pp. 46-60.
- Jiang, F., Zalan, T., Tse, H.H.M. & Shen, J. 2015, "Mapping the Relationship Among Political Ideology, CSR Mindset, and CSR Strategy: A Contingency Perspective Applied to Chinese Managers," *Journal of Business Ethics*, published online, pp. 1-26.
- Jones, P., Comfort, D. & Hillier, D. 2007, "What's in store? Retail marketing and corporate social responsibility," *Marketing Intelligence and Planning*, vol. 25, no. 1, pp. 17-30.
- Jun, S.-. 2012, "A comparative study of hype cycles among actors within the socio-technical system: With a focus on the case study of hybrid cars," *Technological Forecasting and Social Change*, vol. 79, no. 8, pp. 1413-1430.
- Karltorp, K. & Sandén, B.A. 2012, "Explaining regime destabilisation in the pulp and paper industry," *Environmental Innovation and Societal Transitions*, vol. 2, pp. 66-81.
- Kelly, M. 2004, "Musings: Holy Grail Found: Absolute, Definitive Proof CSR Pays Off," *Business Ethics: The Magazine of Corporate Responsibility*, vol. 18, no. 4, pp. 4-5.
- Kemp, R. 1994, "Technology and the transition to environmental sustainability: the problem of technological regime shifts," *Futures*, vol. 26, no. 10, pp. 1023-1046.
- Kemp, R., Schot, J. & Hoogma, R. 1998, "Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management," *Technology Analysis and Strategic Management*, vol. 10, no. 2, pp. 175-195.
- Kesidou, E. & Demirel, P. 2012, "On the drivers of eco-innovations: Empirical evidence from the UK," *Research Policy*, vol. 41, no. 5, pp. 862-870.

- Ketchen, D.J., Snow, C.C. & Hoover, V.L. 2004, "Research on competitive dynamics: Recent accomplishments and future challenges," *Journal of Management*, vol. 30, no. 6, pp. 779-804.
- Kim, S.K. & Min, S. 2015, "Business Model Innovation Performance: When does Adding a New Business Model Benefit an Incumbent?" *Strategic Entrepreneurship Journal*, vol. 9, no. 1, pp. 34-57.
- Kim, K. & Lim, H. 2015, "How does environmental performance matter across heterogeneously performing groups?" *Journal of Applied Business Research*, vol. 31, no. 1, pp. 147-162.
- Klepper, S. 2002, "The capabilities of new firms and the evolution of the US automobile industry," *Industrial and Corporate Change*, vol. 11, no. 4, pp. 645-666.
- Klewitz, J. & Hansen, E.G. 2014, "Sustainability-oriented innovation of SMEs: A systematic review," *Journal of Cleaner Production*, vol. 65, pp. 57-75.
- Klingebiel, R. & Rammer, C. 2014, "Resource allocation strategy for innovation portfolio management," *Strategic Management Journal*, vol. 35, no. 2, pp. 246-268.
- Kolk, A. & Mauser, A. 2002, "The evolution of environmental management: from stage models to performance evaluation," *Business Strategy and the Environment*, vol. 11, no. 1, pp. 14-31.
- Kolk, A. & Pinkse, J. 2010, "The integration of corporate governance in corporate social responsibility disclosures," *Corporate Social Responsibility and Environmental Management*, vol. 17, no. 1, pp. 15-26.
- Könnölä, T. & Unruh, G.C. 2007, "Really changing the course: The limitations of environmental management systems for innovation," *Business Strategy and the Environment*, vol. 16, no. 8, pp. 525-537.
- Krippendorff, K. 2012, *Content analysis: An introduction to its methodology*, London, Sage Publications Ltd.
- Kuckertz, A. 2010, "The influence of sustainability orientation on entrepreneurial intentions - Investigating the role of business experience," *Journal of business venturing*, vol. 25, no. 5, pp. 524-539.
- Kunz, V.D. & Warren, L. 2011, "From innovation to market entry: A strategic management model for new technologies," *Technology Analysis and Strategic Management*, vol. 23, no. 4, pp. 345-366.

- Lacy, P., Hayward, R., Lee, J., Keebie, J., McNamara, R., Hall, C., Cruse, S. 2013, *The UN Global Compact-Accenture CEO Study on Sustainability 2013: Architects of a Better World*, New York, NY, UN Global Compact, Available from: https://www.unglobalcompact.org/docs/news_events/8.1/UNGC_Accenture_CEO_Study_2013.pdf [Accessed: April 27th 2017].
- Lawrence, T.B. & Suddaby, R. 2006, "Institutions and institutional work." In: Clegg, S.R., Hardy, C., Lawrence, T., Nord, W.R. (eds.) *The SAGE Handbook of Organization Studies*, Thousand Oaks, CA, Sage Publications, pp. 215-254.
- Lawrence, T.B., Suddaby, R. & Leca, B. 2009, *Institutional work: Actors and agency in institutional studies of organizations*, Cambridge, Cambridge University Press.
- Lee, M.-P. 2011, "Configuration of External Influences: The Combined Effects of Institutions and Stakeholders on Corporate Social Responsibility Strategies," *Journal of Business Ethics*, vol. 102, no. 2, pp. 281-298.
- Lee, K.-. & Kim, J.-. 2011, "Integrating Suppliers into Green Product Innovation Development: An Empirical Case Study in the Semiconductor Industry," *Business Strategy and the Environment*, vol. 20, no. 8, pp. 527-538.
- Lee, S.Y. & Rhee, S. 2007, "The change in corporate environmental strategies: a longitudinal empirical study," *Management Decision*, vol. 45, no. 2, pp. 196-216.
- Leonard-Barton, D. 1992, "Core capabilities and core rigidities: A paradox in managing new product development," *Strategic Management Journal*, vol. 13, no. S1, pp. 111-125.
- Li, S., Jayaraman, V., Paulraj, A. & Shang, K.-. 2016, "Proactive environmental strategies and performance: Role of green supply chain processes and green product design in the Chinese high-tech industry," *International Journal of Production Research*, vol. 54, no. 7, pp. 2136-2151.
- Lieberman, M.B. & Montgomery, D.B. 1998, "First-mover (dis) advantages: Retrospective and link with the resource-based view," *Strategic Management Journal*, vo. 19, no. 12, pp. 1111-1125.
- Lieberman, M.B. & Montgomery, D.B. 1988, "First-mover advantages," *Strategic Management Journal*, vol. 9, no. S1, pp. 41-58.
- Lin, H. 2012, "Cross-sector Alliances for Corporate Social Responsibility Partner Heterogeneity Moderates Environmental Strategy Outcomes," *Journal of Business Ethics*, vol. 110, no. 2, pp. 219-229.

- Lin, L.-. & Ho, Y.-. 2016, "Institutional Pressures and Environmental Performance in the Global Automotive Industry: The Mediating Role of Organizational Ambidexterity," *Long Range Planning*, vol. 49, no. 6, pp. 764-775.
- Linton, J.D. 2009, "De-babelizing the language of innovation," *Technovation*, vol. 29, no. 11, pp. 729-737.
- Liston-Heyes, C. & Vazquez Brust, D.A. 2014, "Environmental Protection in Environmentally Reactive Firms: Lessons from Corporate Argentina," *Journal of Business Ethics*, vol. 135, no. 2, pp. 361-379.
- Liu, B.F. 2010, "Distinguishing how elite newspapers and A-list blogs cover crises: Insights for managing crises online," *Public Relations Review*, vol. 36, no. 1, pp. 28-34.
- Loorbach, D. & Rotmans, J. 2010, "The practice of transition management: Examples and lessons from four distinct cases," *Futures*, vol. 42, no. 3, pp. 237-246.
- Loorbach, D. & Wijsman, K. 2013, "Business transition management: exploring a new role for business in sustainability transitions," *Journal of Cleaner Production*, vol. 45, pp. 20-28.
- Lovell, H. 2004, "Framing sustainable housing as a solution to climate change," *Journal of Environmental Policy & Planning*, vol. 6, no. 1, pp. 35-55.
- Lumpkin, G.T., Moss, T.W., Gras, D.M., Kato, S. & Amezcua, A.S. 2013, "Entrepreneurial processes in social contexts: How are they different, if at all?" *Small Business Economics*, vol. 40, no. 3, pp. 761-783.
- Luo, X. & Bhattacharya, C.B. 2009, "The debate over doing good: Corporate social performance, strategic marketing levers, and firm-Idiosyncratic risk," *Journal of Marketing*, vol. 73, no. 6, pp. 198-213.
- Luo, X. & Bhattacharya, C.B. 2006, "Corporate social responsibility, customer satisfaction, and market value," *Journal of Marketing*, vol. 70, no. 4, pp. 1-18.
- Maguire, S., Hardy, C. & Lawrence, T.B. 2004, "Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada," *Academy of Management Journal*, vol. 47, no. 5, pp. 657-679.
- Maon, F., Lindgreen, A. & Swaen, V. 2010, "Organizational stages and cultural phases: a critical review and a consolidative model of corporate social responsibility development," *International Journal of Management Reviews*, vol. 12, no. 1, pp. 20-38.

- Marín, L., Rubio, A. & de Maya, S.R. 2012, "Competitiveness as a Strategic Outcome of Corporate Social Responsibility," *Corporate Social Responsibility and Environmental Management*, vol. 19, no. 6, pp. 364-376.
- Markard, J., Suter, M. & Ingold, K. 2016, "Socio-technical transitions and policy change—Advocacy coalitions in Swiss energy policy," *Environmental Innovation and Societal Transitions*, vol. 18, pp. 215-237.
- Markard, J. & Truffer, B. 2008, "Actor-oriented analysis of innovation systems: exploring micro–meso level linkages in the case of stationary fuel cells," *Technology Analysis and Strategic Management*, vol. 20, no. 4, pp. 443-464.
- Markard, J., Raven, R. & Truffer, B. 2012, "Sustainability transitions: An emerging field of research and its prospects," *Research Policy*, vol. 41, no. 6, pp. 955-967.
- Markham, S.K., Ward, S.J., Aiman-Smith, L. & Kingon, A.I. 2010, "The valley of death as context for role theory in product innovation," *Journal of Product Innovation Management*, vol. 27, no. 3, pp. 402-417.
- Markusson, N., Kern, F., Watson, J., Arapostathis, S., Chalmers, H., Ghaleigh, N., Heptonstall, P., Pearson, P., Rossati, D. & Russell, S. 2012, "A socio-technical framework for assessing the viability of carbon capture and storage technology," *Technological Forecasting and Social Change*, vol. 79, no. 5, pp. 903-918.
- Mathur, I. & Singh, M. 2011, "Corporate political strategies," *Accounting & Finance*, vol. 51, no. 1, pp. 252-277.
- Mazza, C. & Alvarez, J.L. 2000, "Haute couture and prêt-à-porter: The popular press and the diffusion of management practices," *Organization Studies*, vol. 21, no. 3, pp. 567-588.
- Meek, W.R. 2010, "The impact of social norms on entrepreneurial action: Evidence from the environmental entrepreneurship context," *Journal of business venturing*, vol. 25, no. 5, pp. 493-509.
- Meijer, I.S.M., Hekkert, M.P. & Koppenjan, J.F.M. 2007, "How perceived uncertainties influence transitions; the case of micro-CHP in the Netherlands," *Technological Forecasting and Social Change*, vol. 74, no. 4, pp. 519-537.
- Merito, M. & Bonaccorsi, A. 2007, "Co-evolution of physical and social technologies in clinical practice: The case of HIV treatments," *Research Policy*, vol. 36, no. 7, pp. 1070-1087.

- Miles, M.B., Huberman, A.M. & Saldaña, J. 2014, *Qualitative data analysis: A methods sourcebook*, 3rd edition, Thousand Oaks, CA, SAGE Publications.
- Miles, M.P., Munilla, L.S. & Covin, J.G. 2002, "The constant gardener revisited: The effect of social blackmail on the marketing concept, innovation, and entrepreneurship," *Journal of Business Ethics*, vol. 41, no. 3, pp. 287-295.
- Miles, R.E., Snow, C.C., Meyer, A.D. & Coleman, H.J. 1978, "Organizational strategy, structure, and process," *Academy of management review*, vol. 3, no. 3, pp. 546-562.
- Ministerie BZ&K 2014a, *Kamerbrief: "Beleidsdoorlichting Energie en Bouwkwaliiteit"* (*Letter to Parliament: "Policy evaluation Energy & Building quality"*), Available from: <https://www.rijksoverheid.nl/documenten/kamerstukken/2014/12/19/aanbiedingsbrief-bij-beleidsdoorlichting-energie-en-bouwkwaliiteit> [Accessed: April 27th 2017].
- Ministerie BZ&K 2014b, *Kamerbrief: "Voortgang aantal rijksacties Energieakkoord voor energiebesparing woningen"* (*Letter to Parliament: "Progress on governmental actions Energy Agreement for energy saving in residential buildings"*), Available from: <https://www.rijksoverheid.nl/documenten/kamerstukken/2014/06/23/kamerbrief-voortgang-rijksacties-energieakkoord-voor-energiebesparing-woningen> [Accessed: April 27th 2017].
- Ministerie BZ&K 2013, *Kamerbrief: "Energiebesparing gebouwde omgeving en het Energieakkoord voor duurzame groei"* (*Letter to Parliament: "Energy saving built environment and the Energy Agreement for sustainable growth"*), Available from: <https://www.rijksoverheid.nl/documenten/kamerstukken/2013/11/15/kamerbrief-over-energiebesparing-in-de-gebouwde-omgeving-en-het-energieakkoord-voor-duurzame-groei> [Accessed: April 27th 2017].
- Ministerie BZ&K, AEDES, Bouwend Nederland, Energie-Nederland, NVB, NEPROM, UNETO-VNI, Vastgoed Belang & Woonbond 2012, *Koepelconvenant energiebesparing gebouwde omgeving (Umbrella covenant energy saving built environment)*, Available from: <https://www.rijksoverheid.nl/documenten/convenanten/2012/06/28/koepelconvenant-energiebesparing-gebouwde-omgeving> [Accessed: April 27th 2017].
- Ministerie van Financien 2016, *Rapport IBO kostenefficiëntie CO₂-reductiemaatregelen (Report Integral Policy Evaluation on cost efficient CO₂ reduction measures)*, Available from: <https://www.rijksoverheid.nl/documenten/rapporten/2016/04/09/rapport-ibo-kostenefficiëntie-co2-reductiemaatregelen> [Accessed: April 27th 2017].
- Ministerie VROM, Ministerie EZ, Bouwend Nederland, UNETO-VNI, EnergieNed & VME 2008, *Convenant Energiebesparing bestaande gebouwen ("Meer met Minder") (Covenant Energysaving existing buildings ("More with Less"))*, Available from:

<https://www.rijksoverheid.nl/documenten/kamerstukken/2008/02/29/energiebesparingsplannen-convenant> [Accessed: April 27th 2017].

- Ministerie WW&I 2007, *Kamerbrief: Energiebesparingsplannen gebouwde omgeving, onder andere particuliere woningvoorraad (Letter to Parliament: Energysavingplans built environment, among others private house inventory)*, Available from: <https://www.rijksoverheid.nl/documenten/kamerstukken/2008/02/29/energiebesparingsplannen-kamerbrief> [Accessed: April 27th 2017].
- Mintzberg, H., Ahlstrand, B., Lampel, J. 1998, *Strategy Safari: A Guided Tour Through The Wilds of Strategic Management*, New York, NY, The Free Press.
- Mirvis, P. & Googins, B. 2006, "Stages of corporate citizenship: A developmental framework," *California Management Review*, vol. 48, no. 2, pp. 104-126.
- Mitchell, W. 1991, "Dual clocks: Entry order influences on incumbent and newcomer market share and survival when specialized assets retain their value," *Strategic Management Journal*, vol. 12, no. 2, pp. 85-100.
- Mitchell, W. & Singh, K. 1993, "Death of the lethargic: Effects of expansion into new technical subfields on performance in a firm's base business," *Organization Science*, vol. 4, no. 2, pp. 152-180.
- Molina-Azorín, J.F., Claver-Cortés, E., Pereira-Moliner, J. & Tarí, J.J. 2009, "Environmental practices and firm performance: an empirical analysis in the Spanish hotel industry," *Journal of Cleaner Production*, vol. 17, no. 5, pp. 516-524.
- Monaghan, A. 2009, "Conceptual niche management of grassroots innovation for sustainability: The case of body disposal practices in the UK," *Technological Forecasting and Social Change*, vol. 76, no. 8, pp. 1026-1043.
- Mondéjar-Jiménez, J., Segarra-Oña, M., Peiró-Signes, Á., Payá-Martínez, A.M. & Sáez-Martínez, F.J. 2015, "Segmentation of the Spanish automotive industry with respect to the environmental orientation of firms: Towards an ad-hoc vertical policy to promote eco-innovation," *Journal of Cleaner Production*, vol. 86, pp. 238-244.
- Moore, B. & Wüstenhagen, R. 2004, "Innovative and sustainable energy technologies: The role of venture capital," *Business Strategy and the Environment*, vol. 13, no. 4, pp. 235-245.
- Morgan, R.E. & Strong, C.A. 2003, "Business performance and dimensions of strategic orientation," *Journal of Business Research*, vol. 56, no. 3, pp. 163-176.

- Munoz, L.H., Huijben, J., Verhees, B. & Verbong, G. 2014, "The power of grid parity: A discursive approach," *Technological Forecasting and Social Change*, vol. 87, pp. 179-190.
- Murillo-Luna, J.L., Garcés-Ayerbe, C. & Rivera-Torres, P. 2011, "Barriers to the adoption of proactive environmental strategies," *Journal of Cleaner Production*, vol. 19, no. 13, pp. 1417-1425.
- Murillo-Luna, J.L., Garcés-Ayerbe, C. & Rivera-Torres, P. 2008, "Why do patterns of environmental response differ? A stakeholders' pressure approach," *Strategic Management Journal*, vol. 29, no. 11, pp. 1225-1240.
- Nagji, B. & Tuff, G. 2012, "Managing your innovation portfolio," *Harvard Business Review*, vol. 90, no. 5, pp. 66-74.
- Nagtegaal, B. 2016, *Luchtvaartsector akkoord met 'ongekende' CO₂-compensatie (Aviation sector agrees on unprecedented CO₂-compensation)*, NRC Handelsblad, Available from: <https://www.nrc.nl/nieuws/2016/10/06/luchtvaartsector-akkoord-met-ongekend-co2-compensatieplan-a1525246> [Accessed: April 27th 2017].
- Nakata, C. & Weidner, K. 2012, "Enhancing new product adoption at the base of the pyramid: A contextualized model," *Journal of Product Innovation Management*, vol. 29, no. 1, pp. 21-32.
- Nameroff, T.J., Garant, R.J. & Albert, M.B. 2004, "Adoption of green chemistry: An analysis based on US patents," *Research Policy*, vol. 33, no. 6-7, pp. 959-974.
- Natuur en Milieu 2016, *Jaarverslag 2015 (Annual Report 2015)*, Available from: <https://www.natuurenmilieu.nl/over-ons/jaarverslag/> [Accessed: April 27th 2017].
- Nelson, R.R. & Winter, S.G. 1982, *An Evolutionary Theory of Economic Change*. Cambridge, MA, The Belknap Press of Harvard University Press.
- Nidumolu, R., Prahalad, C.K. & Rangaswami, M.R. 2009, "Why sustainability is now the key driver of innovation," *Harvard Business Review*, vol. 87, no. 9, pp. 56-64.
- Nil, J. & Kemp, R. 2009, "Evolutionary approaches for sustainable innovation policies: From niche to paradigm?" *Research Policy*, vol. 38, no. 4, pp. 668-680.
- NMA 2011, *Tendrapportage Marktwerking en Consumentenvertrouwen in de energiemarkt 2e half jaar 2011 (Trendreport Market functioning and consumertrust in the energy market (2nd half year 2011))*, Available from: <https://www.acm.nl/nl/download/bijlage/?id=9009> [Accessed: April 27th 2017].

- Noci, G. & Verganti, R. 1999, "Managing 'green' product innovation in small firms," *R&D Management*, vol. 29, no. 1, pp. 3-15.
- Nykqvist, B. & Whitmarsh, L. 2008, "A multi-level analysis of sustainable mobility transitions: Niche development in the UK and Sweden," *Technological Forecasting and Social Change*, vol. 75, no. 9, pp. 1373-1387.
- O'Donohue, W. & Torugsa, N.A. 2016, "The moderating effect of 'Green' HRM on the association between proactive environmental management and financial performance in small firms," *International Journal of Human Resource Management*, vol. 27, no. 2, pp. 239-261.
- Oliver, C. & Holzinger, I. 2008, "The effectiveness of strategic political management: A dynamic capabilities framework," *Academy of Management Review*, vol. 33, no. 2, pp. 496-520.
- Oltra, V. & Saint Jean, M. 2009, "Sectoral systems of environmental innovation: An application to the French automotive industry," *Technological Forecasting and Social Change*, vol. 76, no. 4, pp. 567-583.
- O'Reilly III, C.A. & Tushman, M.L. 2004, "The Ambidextrous Organization," *Harvard Business Review*, vol. 82, no. 4, pp. 74-81+140.
- Orlitzky, M. 2011, "Institutional logics in the study of organizations: The social construction of the relationship between corporate social and financial performance," *Business Ethics Quarterly*, vol. 21, no. 03, pp. 409-444.
- Özçağlar-Toulouse, N., Béji-Bécheur, A. & Murphy, P.E. 2009, "Fair Trade in France: From Individual Innovators to Contemporary Networks," *Journal of Business Ethics*, vol. 90, no. SUPPL. 4, pp. 589-606.
- Pacheco, D.F., Dean, T.J. & Payne, D.S. 2010, "Escaping the green prison: Entrepreneurship and the creation of opportunities for sustainable development," *Journal of Business Venturing*, vol. 25, no. 5, pp. 464-480.
- Parayil, G. 2003, "Mapping technological trajectories of the Green Revolution and the Gene Revolution from modernization to globalization," *Research Policy*, vol. 32, no. 6, pp. 971-990.
- Patton, E. & Johns, G. 2007, "Women's absenteeism in the popular press: Evidence for a gender-specific absence culture," *Human Relations*, vol. 60, no. 11, pp. 1579-1612.
- Pavelin, S. & Porter, L.A. 2008, "The corporate social performance content of innovation in the U.K.," *Journal of Business Ethics*, vol. 80, no. 4, pp. 711-725.

- Pavlovich, K. & Akoorie, M. 2010, "Innovation, sustainability and regional development: The Nelson/Marlborough seafood cluster, New Zealand," *Business Strategy and the Environment*, vol. 19, no. 6, pp. 377-386.
- PBL 2014, *Energie besparen gaat niet vanzelf - Evaluatie energiebesparingsbeleid voor de gebouwde omgeving (Energy saving does not come naturally - Evaluation energy saving policy for the built environment)*, Available from: <http://www.pbl.nl/publicaties/energie-besparen-gaat-niet-vanzelf-evaluatie-energiebesparingsbeleid-voor-de-gebouwde-omgeving> [Accessed: April 27th 2017].
- PBL & ECN 2013, *Het Energieakkoord: wat gaat het betekenen? - Inschatting van de gemaakte afspraken (The Energy Agreement: what does it mean? - Estimation of (the impact) of the agreements)*, Available from: <http://www.pbl.nl/publicaties/het-energieakkoord-wat-gaat-het-betekenen> [Accessed: April 27th 2017].
- Pereira-Moliner, J., Font, X., Molina-Azorin, J.F., José Tari, J., Lopez-Gamero, M.D. & Pertusa-Ortega, E.M. 2015, "The holy grail: Environmental management, competitive advantage and business performance in the Spanish hotel industry," *International Journal of Contemporary Hospitality Management*, vol. 27, no. 5, pp. 714-738.
- Pettigrew, A.M. 1990, "Longitudinal field research on change: theory and practice," *Organization Science*, vol. 1, no. 3, pp. 267-292.
- Phillips, N., Lawrence, T.B. & Hardy, C. 2004, "Discourse and institutions," *Academy of Management Review*, vol. 29, no. 4, pp. 635-652.
- Pinkse, J. & Kolk, A. 2010, "Challenges and trade-offs in corporate innovation for climate change," *Business Strategy and the Environment*, vol. 19, no. 4, pp. 261-272.
- Plowman, D.A., Baker, L.T., Beck, T.E., Kulkarni, M., Solansky, S.T. & Travis, D.V. 2007, "Radical change accidentally: The emergence and amplification of small change," *Academy of Management Journal*, vol. 50, no. 3, pp. 515-543.
- Plumer, B. 2013, *Europe's cap-and-trade program is in trouble. Can it be fixed?*, The Washington Post, Available from: https://www.washingtonpost.com/news/wonk/wp/2013/04/20/europes-cap-and-trade-program-is-in-trouble-can-it-be-fixed/?utm_term=.7bb9a1e523a2 [Accessed: April 27th 2017].
- Pollard, D., Almond, R., Duncan, E., Grooten, M., Hadeed, L. & Jeffries, B. 2010, *Living planet report 2010*, Gland, World Wildlife Foundation, Available from: http://www.wwf.org.pe/en/keep_updated/publications/?uNewsID=195675 [Accessed: April 27th 2017].

- Popp, D., Hafner, T. & Johnstone, N. 2011, "Environmental policy vs. public pressure: Innovation and diffusion of alternative bleaching technologies in the pulp industry," *Research Policy*, vol. 40, no. 9, pp. 1253-1268.
- Porter, M.E., van der Linde, C. 1995, "Green and competitive: Ending the stalemate," *Harvard Business Review*, vol. 73, no. 5, pp. 120-134.
- Porter, M.E. & Kramer, M.R. 2011, "Creating shared value," *Harvard Business Review*, vol. 89, no. 1/2, pp. 62-77.
- Porter, M.E. & Kramer, M.R. 2006, "Strategy & society: The link between competitive advantage and corporate social responsibility," *Harvard Business Review*, vol. 84, no. 12, pp. 78-92.
- Postma, R. 2016, *Vervuilend of duurzaam, dat is de vraag*, NRC Handelsblad, Available from: <https://www.nrc.nl/nieuws/2016/06/16/vervuilend-of-duurzaam-dat-is-de-vraag-2746847-a1505697> [Accessed: April 27th 2017].
- Pratt, M.G. 2009, "From the editors: For the lack of a boilerplate: Tips on writing up (and reviewing) qualitative research," *Academy of Management Journal*, vol. 52, no. 5, pp. 856-862.
- Prieto-Carrón, M., Lund-Thomsen, P., Chan, A., Muro, A. & Bhushan, C. 2006, "Critical perspectives on CSR and development: what we know, what we don't know, and what we need to know," *International Affairs*, vol. 82, no. 5, pp. 977-987.
- Primc, K. & Cater, T. 2015, "Environmental proactivity and firm performance: a fuzzy-set analysis," *Management Decision*, vol. 53, no. 3, pp. 648-667.
- Pujari, D. 2006, "Eco-innovation and new product development: Understanding the influences on market performance," *Technovation*, vol. 26, no. 1, pp. 76-85.
- Raisch, S. & Birkinshaw, J. 2008, "Organizational ambidexterity: Antecedents, outcomes, and moderators," *Journal of Management*, vol. 34, no. 3, pp. 375-409.
- Raven, R.P.J.M. 2005, *Strategic niche management for biomass: a comparative study on the experimental introduction of bioenergy technologies in the Netherlands and Denmark*, Technische Universiteit Eindhoven, Available from: <http://repository.tue.nl/642178> [Accessed: April 27th 2017].
- Raven, R.P.J.M. & Geels, F.W. 2010, "Socio-cognitive evolution in niche development: Comparative analysis of biogas development in Denmark and the Netherlands (1973-2004)," *Technovation*, vol. 30, no. 2, pp. 87-99.

- Reber, B.H. & Berger, B.K. 2005, "Framing analysis of activist rhetoric: How the Sierra Club succeeds or fails at creating salient messages," *Public Relations Review*, vol. 31, no. 2, pp. 185-195.
- Reidenbach, R.E. & Robin, D.P. 1991, "A conceptual model of corporate moral development," *Journal of Business Ethics*, vol. 10, no. 4, pp. 273-284.
- Reverte, C., Gómez-Melero, E. & Cegarra-Navarro, J.G. 2016, "The influence of corporate social responsibility practices on organizational performance: Evidence from Eco-Responsible Spanish firms," *Journal of Cleaner Production*, vol. 112, pp. 2870-2884.
- Richter, M. 2013, "Business model innovation for sustainable energy: German utilities and renewable energy," *Energy Policy*, vol. 62, pp. 1226-1237.
- Richter, M. 2012, "Utilities' business models for renewable energy: A review," *Renewable and Sustainable Energy Reviews*, vol. 16, no. 5, pp. 2483-2493.
- Rip, A. & Kemp, R. 1998, "Technological change," In: Rayner, S. & Malone, E.L. (eds.), *Human choice and climate change. vol. 2, Resources and technology*, Columbus, OH, Battelle Press, pp. 327-399.
- Ritala, P. & Sainio, L. 2014, "Coopetition for radical innovation: technology, market and business-model perspectives," *Technology Analysis and Strategic Management*, vol. 26, no. 2, pp. 155-169.
- Rivera-Torres, P., Garcés-Ayerbe, C., Scarpellini, S. & Valero-Gil, J. 2015, "Pro-Environmental Change and Short- to Mid-Term Economic Performance: The Mediating Effect of Organisational Design Change," *Organization and Environment*, vol. 28, no. 3, pp. 307-327.
- Roca, L.C. & Searcy, C. 2012, "An analysis of indicators disclosed in corporate sustainability reports," *Journal of Cleaner Production*, vol. 20, no. 1, pp. 103-118.
- Roland Berger 2015, *Solar PV - could be similar to the shale gas disruption for the utilities industry*.
- Romijn, H.A. & Caniëls, M.C.J. 2011, "The Jatropha biofuels sector in Tanzania 2005-2009: Evolution towards sustainability?" *Research Policy*, vol. 40, no. 4, pp. 618-636.
- Roome, N. 1992, "Developing environmental management strategies," *Business Strategy and the Environment*, vol. 1, no. 1, pp. 11-24.

- Rothaermel, F.T. 2001, "Incumbent's advantage through exploiting complementary assets via interfirm cooperation," *Strategic Management Journal*, vol. 22, no. 6-7, pp. 687-699.
- Rothenberg, S. & Zyglidopoulos, S.C. 2007, "Determinants of environmental innovation adoption in the printing industry: The importance of task environment," *Business Strategy and the Environment*, vol. 16, no. 1, pp. 39-49.
- Rotmans, J. 2011, "*Staat van de Energietransitie in Nederland*," *essay voor de Raad van de Leefomgeving en Infrastructuur*, Available from: http://www.rli.nl/sites/default/files/essay_rotmans_-_staat_van_de_energietransitie_in_nederland_1_0.pdf [Accessed: April 27th 2017].
- Rotmans, J., Kemp, R. & van Asselt, M. 2001, "More evolution than revolution: Transition management in public policy," *Foresight*, vol. 3, no. 1, pp. 15-31.
- Roy, R. & Sarkar, M. 2015, "Knowledge, firm boundaries, and innovation: Mitigating the incumbent's curse during radical technological change," *Strategic Management Journal*, vol. 37, no. 5, pp. 835-854.
- Russo, A. & Perrini, F. 2010, "Investigating stakeholder theory and social capital: CSR in large firms and SMEs," *Journal of Business Ethics*, vol. 91, no. 2, pp. 207-221.
- RVO 2016, *Marktbarometer Uitrol Slimme Meters - Voortgangsrapportage 2015 (Market analysis Smart Meters - Progress report 2015)*, Available from: <https://www.rijksoverheid.nl/documenten/rapporten/2016/05/25/marktbarometer-uitrol-slimme-meters-voortgangsrapportage-2015> [Accessed: April 27th 2017].
- RVO 2015, *Meerjarenafspraken energie-efficiëntie - Resultaten 2014 (Multi-year agreements energy-efficiency - Results 2014)*, Available from: https://www.rvo.nl/sites/default/files/2015/10/150138-01%20RVO%20Populaire%20samenvatting%20reslut%20broch_A4_13.pdf [Accessed: April 27th 2017].
- RVO 2014, *Blok voor Blok: de bevindingen - Grootschalige energiebesparing in de bestaande woningbouw (Block by block: the findings - Large scale energy saving in existing residential building areas)*, Available from: https://www.rvo.nl/sites/default/files/2014/07/blok%20voor%20blok_de%20bevindingen.pdf [Accessed: April 27th 2017].
- Sabatier, P.A. 1998, "The advocacy coalition framework: revisions and relevance for Europe," *Journal of European Public Policy*, vol. 5, no. 1, pp. 98-130.
- Sabatier, P.A. 1988, "An advocacy coalition framework of policy change and the role of policy-oriented learning therein," *Policy Sciences*, vol. 21, no. 2-3, pp. 129-168.

- Sachs, J.D. 2008, *Common wealth: economics for a crowded planet*, New York, NY, Penguin Group.
- Safarzyńska, K. & van den Bergh, J.C.J.M. 2010, "Demand-supply coevolution with multiple increasing returns: Policy analysis for unlocking and system transitions," *Technological Forecasting and Social Change*, vol. 77, no. 2, pp. 297-317.
- Safarzyńska, K., Frenken, K. & van Den Bergh, J.C.J.M. 2012, "Evolutionary theorizing and modeling of sustainability transitions," *Research Policy*, vol. 41, no. 6, pp. 1011-1024.
- Sambasivan, M., Bah, S.M. & Ho, J.-. 2013, "Making the case for operating "green": Impact of environmental proactivity on multiple performance outcomes of Malaysian firms," *Journal of Cleaner Production*, vol. 42, pp. 69-82.
- Sandberg, B. & Aarikka-Stenroos, L. 2014, "What makes it so difficult? A systematic review on barriers to radical innovation," *Industrial Marketing Management*, vol. 43, no. 8, pp. 1293-1305.
- Sarkis, J. & Cordeiro, J.J. 2009, "Investigating technical and ecological efficiencies in the electricity generation industry: Are there win-win opportunities," *Journal of the Operational Research Society*, vol. 60, no. 9, pp. 1160-1172.
- Savelkouls, J. 2016, *Eneco versterkt positie op zonnemarkt met overname Zon-IQ (Eneco strengthens position on solar market with acquisition Zon-IQ)*, Enegeia, Available from: <http://enegeia.nl/nieuws/313077-1602/eneco-versterkt-positie-op-zonnemarkt-met-overname-zon-iq> [Accessed: April 27th 2017].
- Schaefer, A. & Harvey, B. 1998, "Stage models of corporate 'greening': a critical evaluation," *Business Strategy and the Environment*, vol. 7, no. 3, pp. 109-123.
- Schaltegger, S. & Wagner, M. 2011, "Sustainable entrepreneurship and sustainability innovation: Categories and interactions," *Business Strategy and the Environment*, vol. 20, no. 4, pp. 222-237.
- Schleicher-Tappeser, R. 2012, "How renewables will change electricity markets in the next five years," *Energy Policy*, vol. 48, pp. 64-75.
- Schmidt, S.K. & Werle, R. 1998, *Coordinating technology: Studies in the international standardization of telecommunications*, Cambridge MA, The MIT Press.
- Schot, J. & Geels, F.W. 2008, "Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy," *Technology Analysis and Strategic Management*, vol. 20, no. 5, pp. 537-554.

- Schumpeter, J.A. 1950, *Capitalism, Socialism, and Democracy*. 3rd edition, New York, NY, Harper & Brothers.
- Schumpeter, J.A. 1934, *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*, New Brunswick, NJ, Transaction publishers.
- Schwarz, N. & Ernst, A. 2009, "Agent-based modeling of the diffusion of environmental innovations - An empirical approach," *Technological Forecasting and Social Change*, vol. 76, no. 4, pp. 497-511.
- Segarra-Oña, M.D.V., Mondéjar-Jiménez, J., Peiró-Signes, A. & Mondéjar-Jiménez, J.-. 2015, "Heterogeneous behavioral patterns influencing the proactive environmental orientation of firms: How does your company look?" *Innovation: Management, Policy and Practice*, vol. 17, no. 1, pp. 69-80.
- Sen, P., Roy, M. & Pal, P. 2015, "Exploring role of environmental proactivity in financial performance of manufacturing enterprises: A structural modelling approach," *Journal of Cleaner Production*, vol. 108, pp. 1-12.
- Senge, P.M., Lichtenstein, B.B., Kaeufer, K., Bradbury, H. & Carroll, J. 2007, "Collaborating for systemic change," *MIT Sloan Management Review*, vol. 48, no. 2, pp. 44-53+92.
- SER 2013, *Energieakkoord voor duurzame groei (Energy Agreement for sustainable growth)*.
- Sharma, S. 2000, "Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy," *Academy of Management Journal*, vol. 43, no. 4, pp. 681-697.
- Sharma, S. & Vredenburg, H. 1998, "Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities," *Strategic Management Journal*, vol. 19, no. 8, pp. 729-753.
- Sharma, S., Aragón-Correa, J.A. & Rueda-Manzanares, A. 2007, "The contingent influence of organizational capabilities on proactive environmental strategy in the service sector: An analysis of North American and European ski resorts," *Canadian Journal of Administrative Sciences*, vol. 24, no. 4, pp. 268-283.
- Shrivastava, P. 1995, "The role of corporations in achieving ecological sustainability," *Academy of Management Review*, vol. 20, no. 4, pp. 936-960.

- Shrivastava, P. & Busch, T. 2013, "Avoiding a global carbon crisis: Learning from the financial crisis," *Thunderbird International Business Review*, vol. 55, no. 6, pp. 647-658.
- Siebenhüner, B. & Arnold, M. 2007, "Organizational learning to manage sustainable development," *Business Strategy and the Environment*, vol. 16, no. 5, pp. 339-353.
- SIRA Consulting 2014, *Evaluatie Bouwbesluit 2012: Een ex post onderzoek naar de doeltreffendheid en doelmatigheid van het Bouwbesluit 2012 (Evaluation 2012 Construction policy: Ex post review of the effectiveness and efficiency)*, Available from: <http://www.rijksbegroting.nl/system/files/18/bijlage-evaluatie-bouwbesluit-2012-wr-eebn.pdf> [Accessed: April 27th 2017].
- Slater, S.F., Mohr, J.J. & Sengupta, S. 2014, "Radical product innovation capability: Literature review, synthesis, and illustrative research propositions," *Journal of Product Innovation Management*, vol. 31, no. 3, pp. 552-566.
- Slawinski, N. & Bansal, P. 2012, "A Matter of Time: The Temporal Perspectives of Organizational Responses to Climate Change," *Organization Studies*, vol. 33, no. 11, pp. 1537-1563.
- Slayton, R. & Spinardi, G. 2016, "Radical innovation in scaling up: Boeing's Dreamliner and the challenge of socio-technical transitions," *Technovation*, vol. 47, pp. 47-58.
- Smets, M., Morris, T. & Greenwood, R. 2012, "From practice to field: A multi-level model of practice-driven institutional change," *Academy of Management Journal*, vol. 55, no. 4, pp. 877-904.
- Smink, M.M. 2015, "Chapter 1. Introduction," *In: Incumbents and institutions in sustainability transitions, PhD thesis M.M. Smink*, Utrecht, Available from: <https://dspace.library.uu.nl/handle/1874/322962> [Accessed April 26th 2017], pp. 11-26.
- Smink, M.M., Hekkert, M.P. & Negro, S.O. 2013, "Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies," *Business Strategy and the Environment*, vol. 24, no. 2, pp. 86-101.
- Smink, M.M., Koch, J., Niesten, E., Negro, S. & Hekkert, M. 2015, "Institutional entrepreneurship in the emerging renewable energy field: incumbents versus new entrants," *In: Smink, M.M., "Incumbents and institutions in sustainability transitions," Available from: https://dspace.library.uu.nl/handle/1874/322962* [Accessed April 26th 2017], pp. 78-109.

- Smith, A., Stirling, A. & Berkhout, F. 2005, "The governance of sustainable socio-technical transitions," *Research Policy*, vol. 34, no. 10, pp. 1491-1510.
- Smith, M. & Crotty, J. 2008, "Environmental regulation and innovation driving ecological design in the UK automotive industry," *Business Strategy and the Environment*, vol. 17, no. 6, pp. 341-349.
- Srivastava, R.K., Shervani, T.A. & Fahey, L. 1998, "Market-based assets and shareholder value: A framework for analysis," *The Journal of Marketing*, vol. 62, no. 1, pp. 2-18.
- Stafford, E.R., Polonsky, M.J. & Hartman, C.L. 2000, "Environmental NGO-business collaboration and strategic bridging: A case analysis of the greenpeace-foron alliance," *Business Strategy and the Environment*, vol. 9, no. 2, pp. 122-135.
- Stenzel, T. & Frenzel, A. 2008, "Regulating technological change-The strategic reactions of utility companies towards subsidy policies in the German, Spanish and UK electricity markets," *Energy Policy*, vol. 36, no. 7, pp. 2645-2657.
- Stern, N.H. 2006, *Stern Review: The economics of climate change*, London, HM Treasury, Available from: http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/sternreview_index.htm [Accessed April 26th 2017].
- Suurs, R.A. & Hekkert, M.P. 2009a, "Competition between first and second generation technologies: Lessons from the formation of a biofuels innovation system in the Netherlands," *Energy*, vol. 34, no. 5, pp. 669-679.
- Suurs, R.A.A. & Hekkert, M.P. 2009b, "Cumulative causation in the formation of a technological innovation system: The case of biofuels in the Netherlands," *Technological Forecasting and Social Change*, vol. 76, no. 8, pp. 1003-1020.
- Szarka, J. 2004, "Wind power, discourse coalitions and climate change: breaking the stalemate?" *European Environment*, vol. 14, no. 6, pp. 317-330.
- Taplin, J.R.D., Bent, D. & Aeron-Thomas, D. 2006, "Developing a sustainability accounting framework to inform strategic business decisions: A case study from the chemicals industry," *Business Strategy and the Environment*, vol. 15, no. 5, pp. 347-360.
- Tate, W.L., Ellram, L.M. & Kirchoff, J.F. 2010, "Corporate social responsibility reports: A thematic analysis related to supply chain management," *Journal of Supply Chain Management*, vol. 46, no. 1, pp. 19-44.
- TEC & CE Delft 2014, *Review Topsector Energie - Deelonderzoek 2: Thema's en Governancestructuur TSE (Review "Topsector" Energy - Part 2: Themes & Governance structure TSE)*, Available from: <http://topsectorenergie.nl/wp->

content/uploads/2014/12/Review-Topsector-Energie-deelonderzoek2-2014.pdf
[Accessed April 26th 2017].

- Teece, D.J. 1986, "Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy," *Research Policy*, vol. 15, no. 6, pp. 285-305.
- Teece, D.J., Pisano, G. & Shuen, A. 1997, "Dynamic capabilities and strategic management," *Strategic Management Journal*, vo. 18, no. 7, pp. 509-533.
- Testa, F., Gusmerottia, N.M., Corsini, F., Passetti, E. & Iraldo, F. 2015, "Factors Affecting Environmental Management by Small and Micro Firms: The Importance of Entrepreneurs' Attitudes and Environmental Investment," *Corporate Social Responsibility and Environmental Management*, vol. 23, no. 6, pp. 373-385.
- Tideman, S.G., Arts, M.C. & Zandee, D.P. 2013, "Sustainable leadership: Towards a workable definition," *Journal of Corporate Citizenship*, no. 49, pp. 17-33.
- Tilley, F. 1999, "Small-firm environmental strategy: The UK experience," *Greener Management International*, no. 25, pp. 67-80.
- Toppinen, A., Li, N., Tuppuru, A. & Xiong, Y. 2012, "Corporate Responsibility and Strategic Groups in the Forest-based Industry: Exploratory Analysis based on the Global Reporting Initiative (GRI) Framework," *Corporate Social Responsibility and Environmental Management*, vol. 19, no. 4, pp. 191-205.
- Torugsa, N.A., O'Donohue, W. & Hecker, R. 2013, "Proactive CSR: An Empirical Analysis of the Role of its Economic, Social and Environmental Dimensions on the Association between Capabilities and Performance," *Journal of Business Ethics*, vol. 115, no. 2, pp. 383-402.
- Torugsa, N.A., O'Donohue, W. & Hecker, R. 2012, "Capabilities, Proactive CSR and Financial Performance in SMEs: Empirical Evidence from an Australian Manufacturing Industry Sector," *Journal of Business Ethics*, vol. 109, no. 4, pp. 483-500.
- Tran, M., Banister, D., Bishop, J.D.K. & McCulloch, M.D. 2012, "Simulating early adoption of alternative fuel vehicles for sustainability," *Technological Forecasting and Social Change*, vo. 80, no. 5, pp. 865-875.
- Tripsas, M. 1997, "Unraveling the process of creative destruction: Complementary assets and incumbent survival in the typesetter industry," *Strategic Management Journal*, vol. 18, no. S1, pp. 119-142.

- Turnheim, B. & Geels, F.W. 2013, "The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913–1967)," *Research Policy*, vol. 42, no. 10, pp. 1749-1767.
- Turnheim, B. & Geels, F.W. 2012, "Regime destabilisation as the flipside of energy transitions: Lessons from the history of the British coal industry (1913–1997)," *Energy Policy*, vol. 50, pp. 35-49.
- Tushman, M.L. & Anderson, P. 1986, "Technological discontinuities and organizational environments," *Administrative Science Quarterly*, vol. 31, no. 3, pp. 439-465.
- Uhlaner, L.M., Berent-Braun, M.M., Jeurissen, R.J. & de Wit, G. 2012, "Beyond size: Predicting engagement in environmental management practices of Dutch SMEs," *Journal of Business Ethics*, vol. 109, no. 4, pp. 411-429.
- UNFCCC 2016, *Marrakech Action Proclamation for our Climate and Sustainable Development*, Available from: https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/marrakech_action_proclamation.pdf [Accessed April 26th 2017].
- Unruh, G.C. 2000, "Understanding carbon lock-in," *Energy Policy*, vol. 28, no. 12, pp. 817-830.
- Vaara, E., Kleymann, B. & Seristö, H. 2004, "Strategies as discursive constructions: The case of airline alliances," *Journal of Management Studies*, vol. 41, no. 1, pp. 1-35.
- Valente, M. 2012, "Theorizing Firm Adoption of Sustaincentrism," *Organization Studies*, vol. 33, no. 4, pp. 563-591.
- van de Ven, A.H. & Poole, M.S. 1990, "Methods for studying innovation development in the Minnesota Innovation Research Program," *Organization Science*, vol. 1, no. 3, pp. 313-335.
- van de Kerkhof, M. & Wieczorek, A. 2005, "Learning and stakeholder participation in transition processes towards sustainability: Methodological considerations," *Technological Forecasting and Social Change*, vol. 72, no. 6 SPEC. ISS., pp. 733-747.
- van den Ende, J. & Kemp, R. 1999, "Technological transformations in history: how the computer regime grew out of existing computing regimes," *Research Policy*, vol. 28, no. 8, pp. 833-851.
- van der Vleuten, E. & Högselius, P. 2012, "Resisting Change. The transnational dynamics of European energy regimes," In: Verbong, G. & Loorbach, D. (eds.) *Governing the Energy Transition: Reality, Illusion or Necessity?* London, Routledge, pp. 75-100.

- van Huijstee, M. & Glasbergen, P. 2010, "NGOs Moving Business: An Analysis of Contrasting Strategies," *Business and Society*, vol. 49, no. 4, pp. 591-618.
- van Marrewijk, M. & Werre, M. 2003, "Multiple levels of corporate sustainability," *Journal of Business Ethics*, vol. 44, no. 2, pp. 107-119.
- van Rooijen, S.N. & van Wees, M.T. 2006, "Green electricity policies in the Netherlands: an analysis of policy decisions," *Energy Policy*, vol. 34, no. 1, pp. 60-71.
- van Tulder, R., Seitanidi, M.M., Crane, A. & Brammer, S. 2016, "Enhancing the impact of cross-sector partnerships," *Journal of Business Ethics*, vol. 135, no. 1, pp. 1-17.
- van Tulder, R. & van der Zwart, A. 2006, *International business-society management: linking corporate responsibility and globalization*, Routledge.
- van Tulder, R., van Tilburg, R., Francken, M. & de Rosa, A. 2014, *Managing the transition to a sustainable enterprise*, Oxon, Routledge.
- van Tulder, R., van Wijk, J. & Kolk, A. 2009, "From chain liability to chain responsibility : MNE approaches to implement safety and health codes in international supply chains," *Journal of Business Ethics*, vol. 85, no. Suppl. 2, pp. 399-412.
- Vastag, G., Kerekes, S. & Rondinelli, D.A. 1996, "Evaluation of corporate environmental management approaches: A framework and application," *International Journal of Production Economics*, vol. 43, no. 2, pp. 193-211.
- Vazquez-Brust, D.A., Liston-Heyes, C., Plaza-Úbeda, J.A. & Burgos-Jiménez, J. 2010, "Stakeholders Pressures and Strategic Prioritisation: An Empirical Analysis of Environmental Responses in Argentinean Firms," *Journal of Business Ethics*, vol. 91, no. Suppl. 2, pp. 171-192.
- Verain, M.C.D., Bartels, J., Dagevos, H., Sijtsema, S.J., Onwezen, M.C. & Antonides, G. 2012, "Segments of sustainable food consumers: A literature review," *International Journal of Consumer Studies*, vol. 36, no. 2, pp. 123-132.
- Verbong, G., Geels, F.W. & Raven, R. 2008, "Multi-niche analysis of dynamics and policies in Dutch renewable energy innovation journeys (1970–2006): hype-cycles, closed networks and technology-focused learning," *Technology Analysis and Strategic Management*, vol. 20, no. 5, pp. 555-573.
- Vermeulen, F. 2005, "On rigor and relevance: Fostering dialectic progress in management research," *Academy of Management Journal*, vol. 48, no. 6, pp. 978-982.

- Veryzer, R.W. 1998, "Key factors affecting customer evaluation of discontinuous new products," *Journal of Product Innovation Management*, vol. 15, no. 2, pp. 136-150.
- von Weltzien Hoivik, H. & Melé, D. 2009, "Can an SME become a global corporate citizen? Evidence from a case study," *Journal of Business Ethics*, vol. 88, no. 3, pp. 551-563.
- Wagner, M. 2010, "Corporate social performance and innovation with high social benefits: A quantitative analysis," *Journal of Business Ethics*, vol. 94, no. 4, pp. 581-594.
- Wagner, M. 2009, "Innovation and competitive advantages from the integration of strategic aspects with social and environmental management in european firms," *Business Strategy and the Environment*, vol. 18, no. 5, pp. 291-306.
- Wagner, M. 2007, "On the relationship between environmental management, environmental innovation and patenting: Evidence from German manufacturing firms," *Research Policy*, vol. 36, no. 10, pp. 1587-1602.
- Walker, K., Ni, N. & Huo, W. 2014, "Is the Red Dragon Green? An Examination of the Antecedents and Consequences of Environmental Proactivity in China," *Journal of Business Ethics*, vol. 125, no. 1, pp. 27-43.
- Walls, J.L., Phan, P.H. & Berrone, P. 2011, "Measuring environmental strategy: Construct development, reliability, and validity," *Business and Society*, vol. 50, no. 1, pp. 71-115.
- Walsh, P.R. 2012, "Innovation Nirvana or Innovation Wasteland? Identifying commercialization strategies for small and medium renewable energy enterprises," *Technovation*, vol. 32, no. 1, pp. 32-42.
- Wartick, S.L. & Cochran, P.L. 1985, "The evolution of the corporate social performance model," *Academy of Management Review*, vol. 10, no. 4, pp. 758-769.
- WBCSD 2015, *2050 - An Agenda for Action*. Geneva, WBCSD.
- WBCSD, WRI 2004, "The Greenhouse Gas Protocol. A corporate accounting and reporting standard, revised edition," Available from: www.ghgprotocol.org/sites/default/files/ghgp/standards/ghg-protocol-revised.pdf [Accessed April 26th 2017].
- Weible, C.M., Sabatier, P.A. & McQueen, K. 2009, "Themes and variations: Taking stock of the advocacy coalition framework," *Policy Studies Journal*, vol. 37, no. 1, pp. 121-140.

- Wesseling, J., Farla, J., Sperling, D. & Hekkert, M. 2014, "Car manufacturers' changing political strategies on the ZEV mandate," *Transportation Research Part D: Transport and Environment*, vol. 33, pp. 196-209.
- Wessner, C.W. 2005, "Driving innovations across the valley of death," *Research Technology Management*, vol. 48, no. 1, pp. 9-12.
- White, H. 2009, "Theory-based impact evaluation: principles and practice," *Journal of Development Effectiveness*, vol. 1, no. 3, pp. 271-284.
- Windrum, P., Ciarli, T. & Birchenhall, C. 2009, "Consumer heterogeneity and the development of environmentally friendly technologies," *Technological Forecasting and Social Change*, vol. 76, no. 4, pp. 533-551.
- Winkel, G., Gleißner, J., Pistorius, T., Sotirov, M. & Storch, S. 2011, "The sustainably managed forest heats up: discursive struggles over forest management and climate change in Germany," *Critical Policy Studies*, vol. 5, no. 4, pp. 361-390.
- Winn, M.I. & Angell, L.C. 2000, "Towards a process model of corporate greening," *Organization Studies*, vol. 21, no. 6, pp. 1119-1147.
- Wu, T., Jim Wu, Y.-., Chen, Y.J. & Goh, M. 2013, "Aligning supply chain strategy with corporate environmental strategy: A contingency approach," *International Journal of Production Economics*, vol. 147, no. Part B, pp. 220-229.
- Yang, D., Zhao, P., Lou, R. & Wei, H. 2013, "Environmental marketing strategy effects on market-based assets," *Total Quality Management and Business Excellence*, vol. 24, no. 5-6, pp. 707-718.
- Yin, R.K. 2008, *Case study research: Design and methods*, Sage Publications, Incorporated.
- Yunus, M., Moingeon, B. & Lehmann-Ortega, L. 2010, "Building social business models: Lessons from the grameen experience," *Long Range Planning*, vol. 43, no. 2-3, pp. 308-325.
- Zadek, S. 2004, "The path to corporate responsibility," *Harvard Business Review*, vol. 82, no. 12, pp. 125-132+150.
- Zahra, S.A. 1996, "Technology strategy and financial performance: Examining the moderating role of the firm's competitive environment," *Journal of Business Venturing*, vol. 11, no. 3, pp. 189-219.
- Zailani, S.H.M., Eltayeb, T.K., Hsu, C.-. & Tan, K.C. 2012, "The impact of external institutional drivers and internal strategy on environmental performance,"

International Journal of Operations and Production Management, vol. 32, no. 6, pp. 721-745.

Summary

There is a strong sense of urgency across the global community that the sustainability of the global economic system and its outcomes need to be improved. This entails a daunting innovation and transformation effort for incumbents in many sectors. Both the public and scientific debate about their role and contribution can, however, be characterized as heavily contested and highly polarized. This thesis attempts to make a contribution to this debate by developing a fourfold typology of ideal types of incumbent strategies in sustainability transitions. The diverging findings and views of incumbents and their contribution can be related to these different ideal types. The typology builds on earlier literature about the proactiveness of CSR strategies. It systematically elaborates the existence of these ideal types and shows how their internal congruence relates to different underlying mindsets. The operationalization with regard to innovation and context creating behavior is improved by integrating concepts of transition and innovation literature.

The empirical part of this thesis builds on an enlightening case study of three incumbents in the Dutch electricity sector. This case is extremely relevant because it captures an integral perspective of incumbents and their context in an accelerating phase (2010-2014) of the transition. Furthermore, these incumbents each pursue a distinct strategy and the leadership one of them (Eneco) has adopted a dominantly proactive mindset and strategy. Therefore, this case provides much-needed evidence that proactive strategies of incumbents are feasible in practice and affords the opportunity to compare behavior and outcomes with reactive and active strategies.

Each of the three empirical chapters studies a different aspect of the interaction between incumbents and their context in a sustainability transition. *Chapter five* investigates how incumbents react and anticipate contextual trends. It is shown that different types of contextual influence predominantly reinforce a specific mindset. For example, negative NGO campaigns stimulate reactive behavior, while strategic partnerships with NGOs enable proactive strategies. Furthermore, it is illustrated that (re)active mindsets are an important explanation for misinterpretation of the context by most incumbents and lead to very expensive late investments in fossil fuel assets. *Chapter six* documents the counter-directional process of incumbents shaping their context. It demonstrates the influential role of incumbents in several dominant advocacy-coalitions in the public debate and analyzes their influence on the 2013 Energy Agreement. It reveals that a limited number of proactive firms from different sectors had a crucial influence on the progressive elements in what can be characterized as the policy consensus for the next decade. Furthermore, it is shown that reactive and proactive mindsets of incumbents are a key explanation for the content of the discourses of the central advocacy coalitions as well as processes of regime fragmentation and coalition building. *Chapter seven* studies the relationship between mindset, innovation

portfolios, and outcomes on firm level. It is shown that Eneco's proactive mindset has resulted in substantially less incremental innovation and a higher average level of radicalness of the portfolio. In contrast, Eneco was not (yet) able to convincingly scale radical new business models beyond the pilot level. On the level of outcomes, the differences between the proactive and (re)active approach was further amplified. The gap in CO₂ performance, for example, almost tripled over the studied period and Eneco's initiatives were less often reversed or cancelled. Eneco also effectively realized a competitive advantage based on its proactive strategy.

The findings have several implications for further research and practice. They are outlined in the second part of *chapter eight*. Research on the actual impact of sustainability activities by firms remains much needed, as a supplement to the broad base of research on the financial outcomes of these activities. Besides replication and extension, finding early indicators of transition and linking behavior of incumbents to transition patterns could be helpful in this respect. What triggers the emergence and evolution of mindsets of incumbents' leadership also deserves considerable academic attention. In terms of innovation, it is relevant to further understand what enables incumbents to overcome pilot paralysis in scaling radical new business models. The understanding of context creation could be elaborated by comparing the effects of different actor configurations in advocacy coalitions and policy agreements as well as studying other context creating activities such as knowledge creation and market standardization.

Incumbent executives can find in this thesis an extensive argument to support the adoption of proactive strategies in key sustainability transitions. It is demonstrated how they improve the firm's survival chances, can prevent costly write-downs on stranded assets, can be a path to build competitive advantage, and can leverage the societal relevance and impact of the firm. The case also provides a rich illustration of the tactics employed by Eneco, including a targeted acquisition strategy, an open innovation, and a cross-sector coalition-building approach. For policy makers and other stakeholders this thesis provides evidence that incumbents are highly relevant actors in transitions and can make a strong positive contribution. The thesis highlights the importance of reliably differentiating between incumbent strategies and underlines that policies supporting active and proactive strategies are not the same. Finally, specific recommendations for the Electricity sector are presented.

Samenvatting (Dutch summary)

Er is een sterk gevoel van urgentie dat de duurzaamheid van het globale economische systeem en haar uitkomsten sterk verbeterd moeten worden. Dit zorgt voor een indrukwekkende opgave ten aanzien van innovatie en transformatie voor het gevestigde grootbedrijf in vele sectoren. Zowel het publieke als het wetenschappelijke debat over de rol van deze bedrijven kan worden gekarakteriseerd als sterk gepolariseerd. Dit proefschrift levert een bijdrage aan dit debat door het ontwikkelen van een typologie van vier ideaaltypes van strategieën van deze bedrijven in duurzaamheidstransities. Deze typologie bouwt voort op eerdere literatuur over de pro-activiteit van strategieën op het gebied van maatschappelijke verantwoord ondernemen (MVO) en werkt systematisch uit dat het bestaan en de interne samenhang van de ideaaltypes voortvloeit uit onderliggende mind-sets. Ten tweede wordt een verbeterde operationalisering met betrekking tot innovatie- en contextcreatiegedrag gepresenteerd, die is gebaseerd op het integreren van concepten uit de innovatie- en transitieliteratuur.

Het empirische deel van het proefschrift is gebaseerd op een verhelderende casestudie, waarin drie gevestigde grootbedrijven in de Nederlandse elektriciteitssector worden vergeleken. Deze case is sterk relevant omdat zij een integraal perspectief geeft van de bedrijven en hun context in een accelererende fase van de transitie (2010-2014). Ten tweede volgen deze drie bedrijven elk een verschillende strategie en heeft het leiderschap van een van de bedrijven (Eneco) een strategie en mind-set omarmt, die als overwegend proactief is te karakteriseren. Daarom vormt deze case hoognodig bewijs dat proactieve strategieën in de praktijk haalbaar zijn en biedt ze ook de kans om gedrag en uitkomsten te vergelijken met zowel reactieve als actieve strategieën.

Elk van de drie empirische hoofdstukken belicht een ander aspect van de interactie tussen deze bedrijven en hun context in de dynamiek van een duurzaamheidstransitie. *Hoofdstuk 5* bestudeert hoe de bedrijven reageren en anticiperen op trends in hun externe omgeving. Daarbij wordt beschreven hoe verschillende contextuele invloeden een specifieke mind-set bekrachtigen. Een voorbeeld is dat negatieve campagnes door NGO's vooral reactief gedrag stimuleren, terwijl strategische partnerships tussen NGO's en deze bedrijven juist proactief gedrag in de hand werken. Daarnaast wordt geïllustreerd dat (re)actieve mind-sets een belangrijke verklaring zijn voor de misinterpretatie van trends in de externe omgeving, die onder andere leidt tot kostbare late investeringen in fossiele centrales. *Hoofdstuk 6* documenteert het tegenovergestelde proces: hoe deze bedrijven hun context beïnvloeden. De analyse richt zich op hoe de bedrijven een centrale rol spelen in meerdere invloedrijke coalities in het publieke debat en analyseert hun invloed op het Energie Akkoord uit 2013. Dit toont aan dat een beperkt aantal bedrijven uit verschillende sectoren met een proactieve mind-set een cruciale invloed hadden op belangrijke progressieve elementen in het akkoord,

dat is bedoeld als de beleidsconsensus voor het komende decennium. Ten slotte wordt getoond hoe de proactieve en reactieve mind-set van deze bedrijven een belangrijke verklaring biedt voor de inhoud van het discours van de coalities en de relevante processen van regime-fragmentatie en coalitie-ontwikkeling. *Hoofdstuk 7* bestudeert de samenhang tussen mind-set, innovatie portfolio's en uitkomsten op het niveau van de individuele bedrijven. Dit maakt duidelijk dat Eneco's proactieve mind-set resulteerde in substantieel minder incrementele innovatie en een gemiddeld hoger niveau van radicaliteit van het innovatieportfolio. Echter ook Eneco is (nog) niet in staat om op overtuigende wijze radicale nieuwe bedrijfsmodellen te implementeren op meer dan pilotschaal. Als we naar de uitkomsten kijken worden de verschillen tussen de (re)actieve en proactieve aanpak nog groter. Het verschil in CO₂ efficiency verdrievoudigde bijna in de bestudeerde periode en Eneco's initiatieven worden minder vaak op een later tijdstip teruggedraaid. Naast de grotere maatschappelijk impact was Eneco ook in staat om een concurrentievoordeel op te bouwen door middel van deze proactieve strategie.

In het *tweede gedeelte van hoofdstuk 8* worden de implicaties voor verder onderzoek en de praktijk opgesomd. Als eerste blijft onderzoek naar de daadwerkelijke impact van duurzaamheidsinitiatieven van bedrijven hoognodig, als aanvulling op de vele bestaande onderzoeken die zich vooral richten op de financiële gevolgen van deze activiteiten. Naast de verlenging en replicatie van de gepresenteerde aanpak biedt het zoeken naar "vroegere indicatoren" van transitie en het koppelen van het gedrag van bedrijven aan transitiepatronen interessante aanknopingspunten. Triggers van het ontstaan en de ontwikkeling van mind-sets is een ander gebied dat verder onderzoek behoeft. Met betrekking tot innovatiegedrag is het relevant om te onderzoeken hoe bedrijven "pilot paralysis" kunnen ontstijgen met betrekking tot het implementeren van radicale nieuwe bedrijfsmodellen. Ten slotte wordt aanbevolen om het onderzoek naar contextcreatie door bedrijven te versterken door het effect van verschillende actorconfiguraties in coalities te vergelijken en te kijken naar andere context creatie-activiteiten zoals kennisontwikkeling en marktstandaardisatie.

Bestuurders van gevestigde grootbedrijven kunnen dit proefschrift benutten als uitgebreide onderbouwing van het belang van proactieve strategieën in transities. Dit onderzoek toont aan dat deze strategieën de overlevingskansen verbeteren, kostbare afschrijving op assets kunnen voorkomen, een pad kunnen zijn om concurrentievoordeel te behalen en een manier zijn om de maatschappelijke impact van hun bedrijven te vermenigvuldigen. De beschrijving biedt ook inspiratiemateriaal voor hoe Eneco haar strategie heeft geïmplementeerd en laat onder andere het belang zien van een gerichte acquisitiestrategie, open innovatie- en coalitieontwikkeling over maatschappelijke sectoren heen. Voor beleidsmakers en andere maatschappelijke actoren onderstreept dit proefschrift de relevantie van gevestigde grootbedrijven en de cruciale en positieve bijdrage die deze bedrijven kunnen leveren aan

transities. Ook wordt beschreven hoe er betrouwbaar onderscheid kan worden gemaakt tussen de strategieën van gevestigde grootbedrijven en dat beleid dat actieve strategieën stimuleert niet hetzelfde is als beleid dat proactieve strategieën ondersteunt. Ten slotte worden specifieke aanbevelingen voor de elektriciteitssector gepresenteerd.

About the author

Gerbert Hengelaar was born July 31st 1983 in Lienden. He received his Masters degree in Industrial Engineering and Management at Universiteit Twente in 2007. During his studies in Twente he developed an understanding of the growing relevance of sustainability to business and discovered that in participating in this movement his values and competencies could be combined in a unique sense. Since then he has worked for TNT, Boer&Croon, IFES and Next2Company, on the intersection of strategic management, innovation and business development, always with a focus on business models with a positive impact. He has made a contribution to several sustainability initiatives such as the Access to Seeds Index, the Lean & Green innovation hub and the Innovating Justice Accelerator. Currently, he works as an impact strategist at Next2Company, a boutique firm focused on developing sustainable business models with an entrepreneurial approach.



During his time at TNT, Gerbert's academic curiosity was triggered with regard to the opportunities and complexities for incumbents to lead in sustainability transitions. He developed a proposal for research as an external PhD in conversation with Prof. Dr. Rob van Tulder of the Rotterdam School of Management. In mid-2010 he joined the Researchers Inc. group of the Partnership Resource Centre lead by van Tulder. This thesis is the result of seven years of research activities alongside of four consecutive jobs in practice. In the near future, Gerbert hopes to contribute to the further dissemination of the findings of this thesis in both the academic world and practice and investigate opportunities to pursue some of many opportunities for further research.

Portfolio

Training & academic development

- The core of the author's academic training can be characterized as **supervised and systematic independent study**. This process involved systematic introduction to the relevant literature based on two systematic literature reviews (see Chapter 2 & 3 and Appendix A.1), as well as a systematic study of methodology literature (see Chapter 4 and esp. section 4.1 for an overview).
- Second, the author participated in the **researchers group** of the Partnership Resource Centre monthly research meetings, which functioned during most of the research period. During these meetings, research projects and methodologies were discussed, but visiting scholars also presented several times. He participated in a smaller **interview group** with two other PhD researchers from the group with comparable focus, in which manuscripts were discussed in more detail, as well as relevant methods such as systematic literature review.
- The author participated in the **PhD seminar of EABIS** (July 2012).
- Finally, the author completed the **integrity course** of the RSM (November 2015).

Conferences & academic interaction

- The author **visited four conferences** during the process:
 - EABIS Seminar "Corporate Responsibility & innovation," April 2011, Dijon (extended abstract submitted & presentation)
 - EABIS Colloquium "Strategic Innovation for Sustainability," July 2012, Lausanne (extended abstract & presentation)
 - EABIS PhD Conference, July 2012, Lausanne (extended abstract & presentation)
 - International Sustainability Transitions Conference "Impact & Institutions," August 2014, Utrecht
- Next, the author **presented his own work approximately five times** during the monthly research meetings.
- During the process, the author had **interaction with several academics** on an individual level. Besides regular interaction with Prof. Dr. van Tulder and Dr. Dittrich as supervisors, he consulted with other senior academics during the drafting of his research proposal (3) as well as the finalization of his case study protocol (2). He also cooperated with two researchers in the empirical data analysis. See section 1.5 for more details on the contributions of other academics to this thesis.

Teaching

- The author hosted a **workshop on systematic literature reviews** for the researchers group and provided individual training and knowledge to fellow researchers on this subject.
- He also **co-supervised two master students** in writing their master thesis on subjects related to this thesis.

Working papers & publications

During the process of developing this thesis approximately each year a **working paper** was produced:

- 2011, Sustainability innovation: debate in need of convergence, Literature review of the sustainability innovation literature 2000 to April 2011.
- 2012, Understanding proactiveness of the innovation behavior of incumbents in the sustainability transition in the Electricity sector of the Netherlands, Pilot case study on the Electricity sector in 2011.
- 2013, Proactivity: on the move towards business leadership in sustainability transitions?, Systematic literature survey of and future agenda for proactivity as analytical concept in CSR research.
- 2014/2015, Understanding incumbent behavior in radical sustainability transitions, A protocol for multi-level, longitudinal case studies.
- 2015, Making sense of incumbents' behavior in sustainability transitions, A systematic and differentiated method to explore proactiveness and its antecedents.
- 2016, Disruption in slow motion, System level analysis of the electricity sector in transition 2010-2014.
- 2016, Eneco/Nuon/Essent firm profile (3x).

Several of the chapters of this thesis are **in preparation for submission as publication in an academic journal**. Chapter two and three are in advanced preparation for submission. For chapters six and seven a publication is also planned.

The ERIM PhD Series

The ERIM PhD Series contains PhD dissertations in the field of Research in Management defended at Erasmus University Rotterdam and supervised by senior researchers affiliated to the Erasmus Research Institute of Management (ERIM). All dissertations in the ERIM PhD Series are available in full text through the ERIM Electronic Series Portal: <http://repub.eur.nl/pub>. ERIM is the joint research institute of the Rotterdam School of Management (RSM) and the Erasmus School of Economics at the Erasmus University Rotterdam (EUR).

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Why is the contribution of incumbents to sustainability transitions so heavily debated? And is it possible in practice for incumbents to pursue a proactive strategy? This thesis contributes by developing a framework to differentiate between four types of incumbent strategies and demonstrates how the proactiveness of the mindset of the incumbent's leadership is crucial to understand the differences between them. The operationalization of the concept is made more reliable and dynamic by integrating concepts from the innovation and transitions literature. This framework is applied in the context of the Dutch electricity sector in the midst of the Energy transition. It is demonstrated that a proactive strategy by an incumbent is possible and that it improves the firm's survival chances, can prevent costly write-downs of stranded assets, can leverage their societal relevance and impact, and can be a path to build competitive advantage.

Incumbent executives can find in this thesis an extensive argument to support the adoption of proactive strategies in key sustainability transitions. The presented case also provides a rich illustration on the tactics of proactive incumbents to facilitate transformation. For policy makers and other stakeholders this thesis provides evidence that incumbents are highly relevant actors in transitions and can make a strong positive contribution. The thesis develops tools to reliably differentiate between incumbent strategies and emphasizes that policies supporting active and proactive strategies are not the same. Finally, specific recommendations for the Electricity sector are presented.

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