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## 1. Introduction

The paper published by Rolf Wustenhausen, Maarten Wolsink and Mary Jean Burer in 2007 [1] formalized what is still nowadays generally called the field of research on the social acceptance of renewable energy innovation or renewable energy technologies (RET). Twelve years later, we can say that this paper and associated proposal has been a landmark for research on this area, not only because it helped formalize it as a standalone field of research (see also [2,3]), but because it simultaneously provided a systematization of past research – the need to overcome the NIMBY (*Not in my backyard*) explanation for local opposition - and an orientation for future of research on the social acceptance of RET - to further examine instead the relation between opposition to RET and several socio-political, market and community factors. As such, it provided a turning point in this area of research from – as I will refer to it in this paper - the first to the second wave of research on the social acceptance or RET, or, as based on the proposal of Labussière and Nadaï [4], from normative to criticism approaches. In order to better understand this change, it is relevant to briefly go back to the 1980s and to research, within the risk perception tradition [5; see also 6], on people's responses to hazardous facilities, including several related to energy, such as nuclear power plants.

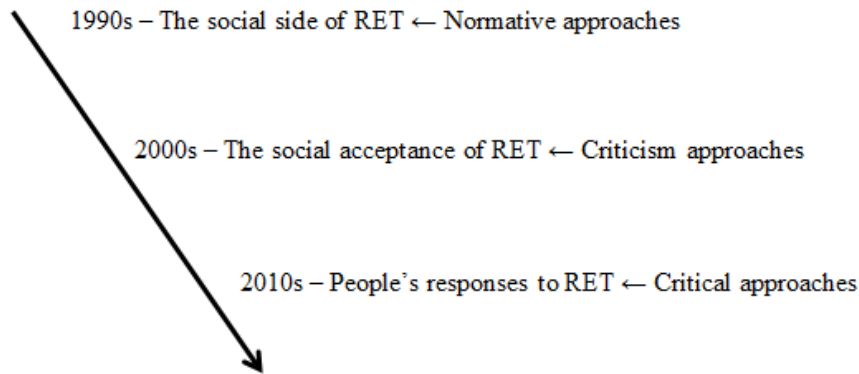
As pointed out by Freudenburg and Pastor [5], much research up until that point would explain public opposition to hazardous facilities and technologies as NIMBY, a syndrome or phenomenon that summarized the idea that people were only opposing those facilities due to them being built in their backyard and thus based only on selfishness (not considering the greater good), ignorance (not being able to understand the need for the construction of such facilities) and irrationality (reacting emotionally) (for more detailed reviews on the origins of NIMBY, see

[7,8]). As will be further discussed below, the NIMBY syndrome therefore remained available to explain local opposition to RET when the opposition to this type of facilities started to increase. A main characteristic of the second wave/criticism approaches to research on the social acceptance of RET – Wustenhagen and colleagues’ [1] proposal included - was precisely the deconstruction of NIMBY as an explanation for publics/communities’ opposition to RET (e.g., [9,10,11]) and the attempt to offer alternatives. These were mainly developed through two pathways, the first focused on considering concomitantly different socio-psychological factors to explain opposition to RET (e.g., [12]; for a review [2]) and specifically issues of distributive justice (with a focus on community benefits - (e.g., [13,14]) and procedural justice (with a focus on deliberative community engagement – e.g., [15,16]). The second pathway focused on understanding local opposition through considering other RET-associated actors and scales beyond community members and local factors [17,18,19,20]. Research within this criticism approach was very prolific and undoubtedly relevant for initiating liaisons with policymakers and RET developers to try and change some of their practices. However, more recently, a third wave of research to people’s responses to RET started to take shape. This third wave can be named critical approaches to research on people’s responses to RET, and they are critical not only in interrogating and criticizing previous approaches; but also because they do so primarily with the aim of addressing RET-related discrimination, injustices and inequalities (including those fostered by RET-related research itself), and by fully considering people’s meaning-making about RET as socially embedded and co-constructed [21,22].

These three waves of research can be systematized as in Figure 1 below. Next, I will further discuss their particularities and give some specific examples of research to illustrate them, to

then, within a critical approach to people’s responses to RET, highlight what seem to be the most promising avenues of future research in this area.

**Figure 1** – Overview of the three waves of research on the social acceptance of RET<sup>1 2</sup>



## 2. A deeper look at the three waves of research on the social acceptance of RET

It was also during the 1980s that the first modern utility large-scale wind farms were built in various parts of the Global North, including the USA, Denmark and Germany. It was then with this backdrop that research on the social side of RET with a more international reach (but see [23]) and within a specific socio-geographical area, the Global North, started to develop. We can perhaps trace this back to the mid-90's, with the 1995 paper by Gordon Walker on ‘Renewable energy and the public,’ published in the journal *Land Use Policy* [24], being a landmark for a more formal acknowledgment of the applied importance and hence relevance of academic research on the social side of RET (see also [25]).

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<sup>1</sup> This is an attempt to offer an easy to grasp systematization of the main proposal of this paper, but it should be noted that, as also clear throughout the paper (e.g., [57] [64]), these are not completely independent nor fully consecutive, waves/periods.

<sup>2</sup> The concept of ‘normative approaches’ does not aim to suggest that the other approaches are not normative – as in proposing a specific way regarding how things should be, as described in Table 1 – but instead to refer to the fact that this first period/wave followed what was more mainstream or institutionally normative at the moment, i.e., overcoming opposition to RET.

This first wave of research on the social side of RET can be characterized for making the case for the importance of considering that large-scale renewable energy generation and associated infrastructures have social impacts, given that they "have all the characteristics of the most contentious developments: they are large, intrusive, technically complex and are perceived to have serious and possible irreversible environmental impacts" [24] (p.49). In other words, and as with other large-scale facilities such as waste incinerators and nuclear power plants [27,28], public acceptability issues began to show up and to increase in number: as Walker puts it "despite the high level of support for renewable energy in general, attitudes towards specific projects among some parts of 'the public' can be more negative, and conflict can appear particularly within processes of planning approval" [24] (p.49). Therefore, the main rationale behind this first wave is to importantly acknowledge that the deployment of renewable energy generation technologies also generates social impacts and that academic research must come up with "possible responses and ways to reduce opposition" (ibid).

Recently, Labussière and Nadaï [4] briefly suggested that social sciences' research interested in issues of energy transition has a large spectrum (p. 3), including normative and critical approaches and criticisms, but without giving a full account of what type of research can be considered within each type of approach or exactly what they mean with each one of them.

Building up on their proposal, research within the first wave of research on people's responses to RET can then be designated the normative approaches, given that they generally depart from the assumption that the social side of RET has to be better understood in order to reduce public opposition so that RET can be easily deployed and contribute to the greater good of mitigating climate change, or, in Nadaï and Labussière's words [4] (p.3), "take transition agendas as given and look for ways of surmounting barriers to their implementation". Other examples within this

type of approach are research that characterizes opposers and supporters and that identifies the main factors leading to those positions (e.g., [29,30]); and even research that still tries to examine if NIMBY (i.e., as in physical proximity) explains opposition or not (e.g., [31,32,33]). It is precisely in relation – or in opposition - to this type of uptake and explanation of local opposition, that a new wave of research on the social acceptance of RET starts to emerge and grow. Authors such as Patrick Devine-Wright [19,34,35], Clare Haggett [36,37,38] and Maarten Wolsink [11,39,40,41], to name but a few - and including the proposal by Wüstenhagen and colleagues (2007) -, have contributed research on the social acceptance of RET that departed from criticisms to the NIMBY explanation while offering alternative frameworks that aimed to allow a better understanding of the factors associated with local opposition to RET. This second wave of research on the social acceptance of RET can be seen as organized around two main strands of research. One of those strands explicitly criticizes the NIMBY explanation and tries to offer alternatives to understand local opposition. Examples of this are re-conceptualizing local opposition as place-protective action, in an attempt to defend against place changes that are damaging to local communities' emotional and symbolic relations with the place where they live [35,42,43,44]; re-conceiving local opposition as qualified resistance – we agree with wind farms being deployed in our backyards, if certain conditions are met/considered [17,45,46]; acknowledging developers and policy-makers' role in fostering local opposition by imagining publics as NIMBY [20,47]; and considering how processes and factors at other scales and levels (national, regional, institutional, political) affect local opposition, such as planning systems, financial support mechanisms, landscape protection organizations, amongst others [1,18,48]. Another strand within criticism approaches to the social acceptance of RET has placed more focus on how certain socio-psychological and community factors impact community members'

perceptions of RET and, through that, their opposition or acceptance of them (for a review see [2]). Special consideration has been given to the role of perceived negative impacts of RET, such as on health, property values, tourism and the local environment [49,50,51,52]; perception of procedural justice, or how much community members have perceived the decision-making process to deploy RET as fair, transparent and allowing them a voice; and perception of distributive justice, or the perceived ratio between the costs and benefits of the deployment of RET at a local level [12,16,30,53]. In turn, this has cascaded into research on community engagement in (RET) decision-making processes, much based on the deliberative turn to democratic processes [15,47,54], and on research on the role of community benefits in fostering acceptance [13,14,55,56].

This summary gives us a sense not only of the breadth and prolificacy of research on the social acceptance of RET, but also of its importance in supporting this field to move beyond the NIMBY paradigm (for a fuller review, see [2]). However, it also hints at some of its own limitations. In 2010, Mhairi Aitken [57] published a paper discussing “Why we still don’t understand the social aspects of wind power: A critique of key assumptions in the literature”, which highlighted the move of some research on the social acceptance of RET away from some of the main limitations of this literature and towards a more critical approach to it. This third wave of research on people’s responses to RET, or critical approach, can be tentatively organized in three main axes (clearly interrelated and so artificially separated only for analytical efficacy) – ideological, theoretical and methodological.

The ideological change operated by/within this third wave is very well illustrated in Aitken’s 2010 paper. It openly criticizes the normative stance that, explicitly or implicitly, has pervaded (and still does) most research on people’s responses to RET, regarding the need to foster and

facilitate the social acceptance of (mostly large-scale, centralised) RET and, in an associated way, the conception of local opposition as deviant and something to understand only in order to be overcome. This change has therefore been prompted by researchers considering more and more the role of the larger socio-political and economic system, namely neo-liberal capitalism, in the promotion and deployment of RET worldwide and, in an associated way, the role of researchers themselves in reproducing or otherwise contesting business as usual modes of most RET-related research funding, policy-making and other institutional practices [4,58,59,60]. In so being, this more recent wave of research on people's responses to RET increasingly acknowledges and contests the fact that the deployment of RET and associated decision-making is often apolitical, unjust and undemocratic, or just another materialization of the neoliberal capitalist system [22,60,61].

This ideological change, which highlights the importance of always examining what is being said, how, by whom and for whom, within research on people's responses to RET, has been translated into roughly three main interrelated avenues of theoretical discussion: research on the social acceptance of RET; the need to build RET and their location; and how RET are deployed in the relation between expert-political and lay systems and how democratic those relations are. Discussion around research on the social acceptance of RET (or on research within criticism and previous approaches) has mainly attempted to identify limitations of past research and propose ways to overcome those, especially in relation to the abovementioned normative stances of that research. This has materialized in different conceptual and theoretical proposals, such as moving the focus away from research on *acceptance* to research on other responses, such as support, tolerance, indifference and so on [3,63]; adopting more relational theoretical frameworks, which do not consider a separation between the local and the national and between consumption and



production sides of energy systems [59,64,65,66]; further considering the role of time and history in energy transitions and the deployment of RET [67,68,69]; and the role of socio-political-ideological contexts, such as the rise of right-wing populism in Western societies, on energy transitions [70]. Discussion around the need for RET and their location has also taken different shapes. One of the most prolific ones has been research exploring the technical and social potential of more decentralised, community modes of renewable energy generation and related new conceptions and roles of and for communities [71,72,73,74]. Another emerging critical line of research is on energy colonialism, as deemed by Batel and Devine-Wright [75], in its manifold manifestations – for some examples, see [75,76,77,78,79,80]. Finally, discussion on how RET are deployed in the relation between expert-political and lay systems and how democratic those relations are, has been mainly translated into questioning the main assumptions of the deliberative turn and its focus on consensus-making as the solution to promote RET, as well as, more generally into considering the role of power relations in energy transitions and associated issues [81,82,83]. Research in this area has highlighted how those ‘consensuses’ are actually still pervaded by power relations and how they also try to erase any conflict, when conflict has been deemed as crucial for healthy functioning democracies [59,62,84].

A final dimension of the critical wave of research on people’s responses to RET is the methodological one. Some authors have also been adopting a more critical approach to the methods used within research on the social side and acceptance of RET and highlighted their uncritical theoretical and ideological underpinnings. In particular, the systematic use of surveys within positivist and individualist frameworks has been criticized and alternative proposals developed, generally more focused on discourse analysis, as better equipped to analyze people’s

responses to RET as socially constructed through discourse and communication and to acknowledge and examine how power relations shape those responses [38,46,64,85,86].

We can thus summarize the three waves of research on the social acceptance of RET as illustrated in Table 1.

Table 1 – Main lines of enquiry and assumptions within the three waves of research on the social acceptance of RET

	<b>Normative approaches</b>	<b>Criticism approaches</b>	<b>Critical approaches</b>
<b>Main assumptions regarding local opposition to RET</b>	Need to examine NIMBY	Need to criticize NIMBY and propose alternatives	Need to focus on how power relations shape RET, their deployment and people’s responses
<b>Main lines of enquiry</b>	Characterizing opposers and supporters	Examining which socio-psychological and community factors affect opposition to RET, including and mainly perceived procedural justice and distributive justice	Adopting a critical approach at ideological (e.g., revealing and contesting RET as business as usual), theoretical (e.g., applying agonist approaches to community

			engagement) and methodological levels (e.g., using discourse analysis)
<b>Expected societal implications</b>	To overcome opposition to RET	To understand opposition and ease the transition to RET	To question if opposition to RET should be reduced/overcome

**3. Wrapping up research on people’s responses to RET - some emerging trends and suggestions for the future**

Departing from this last, critical approach to people’s responses to RET, I will now wrap this overview by highlighting which are the lines of enquiry and research that I think should be pursued, within this approach, in the future of energy research and social sciences.

Understanding people’s responses to RET as set against the background of neoliberal capitalist societies is clearly one of them, given that one of the main axes of critical approaches is precisely bringing to the fore how many of the injustices and inequalities brought by RET stem from their neoliberal capitalist underpinnings. This brings to the fore not only issues of energy colonialism and dispossession as pointed out before (see also [75] [87]), but also issues of governmentality [88,89] and what Rathzel and Uzzell [90] have called the everyday of (energy) production, moving the focus away from individual and residential consumption to corporate practices of production (see also [22,91]). Another clearly relevant area to be further developed in the future at an empirical level is that on the dynamics of people’s responses to RET over time, at local,

national and global levels [4,66]. Relatedly, it is foreseeable that more and more research will adopt multilevel and polycentric perspectives, that look simultaneously at how the practices of different stakeholders at different levels, impact people's responses to RET at a local scale [60,92]. In the same vein, social conflict over RET – at local, national, and global levels – will also be more acknowledged and examined not as a problem, but as participation [59,84], with the challenge being on how to devise ways to transform those conflicts - or agreeing to disagree [93] -, into practices, policies and regulations that give voice and reflect everyone interested and affected [94]. Finally, with new methodological and associated theoretical and ideological proposals based on a more critical perspective, we can also envision – and hope – that new data collection methods such as ethnography, diaries, life-history interviews and social media analysis will be increasingly used (for some insightful examples see [95,96,97]).

As is hopefully clear by now, this paper did not aim to be an exhaustive review of the literature on the social acceptance of RET throughout the years, nor to offer a detailed definition and discussion of existent concepts and theoretical trends within research on the social acceptance of RET. It aimed instead to offer an arguably useful perspective on how this field of research has, sometimes organically, sometimes ideologically, tended to be organized in the last years, and where it seems to be – or should be - headed in the future. A good metaphor to encapsulate this last, critical, turn in research on people's responses to RET is perhaps Derrida's *pharmakon*, “which acts as both remedy and poison” [98] (p.429). Critical, and hopefully future, approaches to people's responses to RET problematize RET as they are being deployed in current neoliberal capitalist systems as both remedy and poison in their role as mitigators of climate change, as often simultaneously sustainable and unsustainable, renewable and non-renewable, non-fossil and fossil, just and unjust. This more critical, emergent and, still, minority turn is then indeed

crucial to allow this area of research and research on post carbon energy transitions in general to be able to contribute to create more just, democratic and sustainable societies and human-non-human relations.

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