The real reasons why people reduce their carbon footprints:
What motivates adults in Western Sydney to take actions that help mitigate climate change?

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Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution.

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Abbreviations

ABC	Australian Broadcasting Corporation
ABC Theory	Attitude, Behaviour, Conditions Theory
ABS	Australian Bureau of Statistics
AC	awareness of consequences
ALP	Australian Labor Party
AR	ascribing responsibility to oneself
AUD	Australian dollars
Big Five	abbreviation for the personality dimensions - extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience
BOM	Bureau of Meteorology
CAS	Climate Action Scale
CO_2	carbon dioxide
CCS	carbon capture and storage
CFI	Carbon Farming Initiative
CPRS	Carbon Pollution Reduction Scheme
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCCEE	former Commonwealth Department of Climate Change and Energy Efficiency, now knows as the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education
DECCW	former NSW Department of Environment, Climate Change and Water, now known as the Office of Environment and Heritage (OEH)
ESAA	Energy Supply Association of Australia
ETS	emissions trading scheme
EU	European Union
GFC	global financial crisis
HEXACO	acronym for personality dimensions - honesty–humility, emotionality, extraversion, agreeableness, conscientiousness and openness
IEO	Index of Education and Occupation
IPART	Independent Pricing and Regulatory Tribunal
IPCC	Intergovernmental Panel on Climate Change
LGA	local government area
LNP	Liberal and National Party coalition
NEP	New Ecological Paradigm
NOAA	National Oceanic and Atmospheric Administration

OEH	Office of Environment and Heritage (in the NSW Department of Premier and Cabinet)
ppm	parts per million
PT	a purposefully targeted interviewee
PV	solar photovoltaic PV panels
S	a postgraduate student assignment
SBS	Special Broadcasting Service
tCO_2-e	tonnes of carbon dioxide equivalent
UNFCC	United Nations Framework Convention on Climate Change
SDT	Self Determination Theory
SES	socio-economic status
SPSS	originally *Statistical Package for the Social Sciences*, then called *Statistical Product and Service Solutions*, now known as *IBM SPSS Statistics*
TAFE	Technical and Further Education
TPB	Theory of Planned Behaviour
UWS	University of Western Sydney
VBN	Value-Belief-Norm model
WEIRD	Western, educated, industrialised, rich and democratic
YG	a Y Green sustainability home audit interviewee.

Abstract

The strong international body of knowledge on the pro-environmental attitudes and behaviour of individuals includes very little on the reasons why individuals take actions that assist in mitigating climate change. This has been a little explored area especially in the Australian context. This research assists in filling this knowledge gap through identifying the motivations of individuals when they habitually engage in behaviours that deliver lower levels of greenhouse gas emissions than do likely alternative actions. The knowledge can be used to assist alignment of climate change mitigation policies and programs with the actual motivations of individuals, thus improving chances of success.

The study characterises climate change as a 'wicked' problem and social dilemma in which we are all complicit. The study author is a sustainability practitioner who was working in local government in Western Sydney during the research period and the approach was transdisciplinary. The focus research question was '*What motivates adults in Western Sydney to undertake actions that help mitigate climate change?'* The research used a convergent parallel mixed methods design which was qualitative and inductive. It included the Climate Action Scale (CAS), a new deductive social research instrument specially developed by and for the study to facilitate engagement with respondents. The CAS formed the basis for a survey of 300 people. Additional in-depth data on motivations were gathered through 24 one-hour interviews with respondents who had demonstrated pro-environmental and/or climate change mitigation behaviour, and analysis of 30 relevant post-graduate student assignments.

The research found that the CAS was effective in engaging individuals and adult education classes in discussion of climate change mitigation from a personal and pragmatic viewpoint. It proved reliable as a gauge of personal commitment to taking mitigation actions, evidenced by CAS score comparisons with attitudes to climate change and the environment. The study further found that an individual often has multiple motivations for any one action that assists in reducing greenhouse gas emissions and that motivations could be categorised as environmental, social or economic, in line with the three pillars of sustainability. Furthermore, three layers of

motivation were identified, these being outer, middle and deepest. The outer layer was derived from survey responses. In this layer, just over 40% of survey-reported motivations were economic, slightly less than 40% were environmental and a little less than 20% were social. Only one in 20 outer layer motivations for taking actions that assist in mitigating climate change were purposely intended to do so, and the majority of outer layer motivations were not intentionally pro-environmental. Survey respondents with higher levels of education, were more likely than others to undertake pro-environmental actions and this may imply potential for this demographic to be targeted in order to encourage and support their participation as 'early adopters'. Outer layer findings are considered to be most useful for informing activities of quick or initial engagement. Findings for the outer layer contrasted with those of the middle and deepest layers.

The middle layer of motivations, which emerged during the considered in-depth discussions and analysis of student assignments, was influenced most by environmental motivations underpinned by social drivers. These are more useful for informing programs to engage those with pre-existing pro-environmental concern and/or projects or courses that require higher levels of commitment. The deepest layer, which described the ways in which in-depth interview and student assignment respondents came by their pro-environmental motivations, was most influenced by social drivers often assimilated in childhood and are most useful for informing engagement strategies with those who influence children, i.e. parents, families, religious and educational organisations. Ryan and Deci's Self-Determination Theory of motivation and Schwartz's normative explanations of helping were found to assist in explaining the process through which social values assimilated in childhood drove intentionally pro-environmental attitudes, motivations and actions in adulthood.

Study findings raise a range of implications useful for informing the development of climate change mitigation policy and programs. Value-action gaps were found to be caused by external conditions and/or situations in which other personal values were considered higher priorities than environmental values. Lack of perceived temporal urgency and lack of socially proximal threat were seen to undermine strong immediate mitigation action. Findings indicated programs were accepted and well-utilised when

they provided high convenience and when costs were shared such that they imposed no obvious additional cost on individuals. Intentional motivation as an adaptive response to climate change and changes in personal behaviour that spark stronger pro-mitigation attitudes were seen to be able to cause chicken-and-egg cycles of continuous mitigation improvement. Further research was recommended to ascertain: if there is a tendency for reciprocal obligation to result from pro-environmental programs with direct benefits to participants; whether cultural and/or other demographic differences influence the degree of acceptance of programs; whether cultural and demographic factors affect use of public transport and/or private cars; whether there are particular circumstances in which normative influence is more or less likely to be explicitly recognised by an individual and reported in social research and; how household decision-making processes affect environmental management and sustainability issues. Due to the localised nature of the research, the ability to generalise findings may be limited.

Chapter 1 Setting the scene: the research context

Knowledge once gained casts a light beyond its own immediate boundaries
– John Tyndall, (Tyndall, 1870)

Introduction

The challenge of anthropogenic climate change

One hundred and fifty years ago, John Tyndall demonstrated the earth's natural greenhouse effect by measuring the relative infrared absorptive powers of nitrogen, oxygen, water vapour, carbon dioxide (CO_2), ozone and methane gases. Early in the twentieth century Svante Arrhenius realised CO_2 released by burning fossil fuels could alter earth's climate. In the 1960s, Guy Callendar compiled empirical evidence that the enhanced greenhouse effect might already be detectable. Since then, Australia's Bureau of Meteorology (BOM) and Commonwealth Science and Industrial Research Organisation (CSIRO), as well as the Intergovernmental Panel on Climate Change (IPCC) have provided considerable evidence of average temperature increases and their current impacts. They have also flagged the ongoing threats of global warming (Hegerl et al., 2007, Le Treut et al., 2007, Hulme, 2009, B.O.M. & C.S.I.R.O., 2010, 2012). Underlying this thesis is the assumption that human activities, largely the combustion of fossil fuels are resulting in increasing emissions of greenhouse gases into the earth's atmosphere, causing unprecedentedly fast changes to the earth's climate likely to have profound impacts on biodiversity, human lives, economies, cultures and human safety. Furthermore, humans can undertake actions that limit atmospheric greenhouse gases and build resilience to climatic change through adapting or even transforming habits and systems. Indeed such mitigation and adaptive measures are taking place, but to a lesser degree than needed to mitigate against and cope with dangerous levels of climatic changes.

With the aim of achieving a 75% chance of keeping average temperature increases to no more than 2°C, the budget or cumulative approach to CO_2 emission reductions allows 1,000 gigatonnes (Gt, being one trillion tonnes) of CO_2 to be emitted

worldwide between the years 2000 and 2050. Already by mid-2013, slightly less than 40% of this budget had been emitted, making emission-reducing behaviours imperative on all levels, international, national, state, organisational and individual (Climate Commission, 2011, Steffen & Hughes, 2013).

Rationale

The knowledge gap

As noted by Whitmarsh (2009), the strong international body of knowledge on the pro-environmental attitudes and behaviour of individuals has not specifically included the reasons why individuals take actions that help to mitigate climate change, and with the exception of Whitmarsh's own (2009) work, this is still the case. In the Australian context, while the past few years has seen social research into individuals' knowledge on anthropogenic climate change, attitudes toward it, perceptions of risk, attitudes toward policies, mitigation actions taken and perceptions of low emissions technologies (Ashworth, 2009, NSW D.E.C.C.W., 2009, 2010, NSW O.E.H., 2010, Ashworth, 2011, Akompab et al., 2012, Hanson, 2012, Reser et al., 2012b), there has been no published research specifically on *the reasons why mitigation actions are voluntarily taken by individuals.* The present study sought to assist in filling this knowledge gap through identifying the motivations of individuals when they habitually engage in behaviours that drive lower levels of greenhouse gas emissions than would be produced by the likely alternative actions. As the household decision-makers, adults were chosen for the research focus. The research aim was to produce knowledge useful to policymakers and practitioners who design and implement climate change mitigation policies and initiatives, on the assumption that those aligned with people's motivations would have a strong chance of success.

Parameters, aim and transdisciplinary approach of thesis

This thesis is the basis for the degree of Doctor of Philosophy in Environmental Studies. Although the thesis includes some focus on the literature of social psychology and environmental psychology and there is an individual level of analysis, it is *not* a psychological exploration into human motivation. Rather, its aim is to develop knowledge directly useful for policymakers and applicable by

practitioners. The Macquarie Dictionary Online (2014) defines the term 'motivates' as 'to enthuse or inspire'. Without denying the importance and usefulness of enthusiasm and inspiration, people do not necessarily need to feel them to take some or all of the actions they do that assist climate change mitigation. In social psychology, 'motivation' refers to the reasons why an individual in a given situation behaves in one way rather than another, or responds more energetically or frequently (Bargh et al., 2010). While the thesis is not a psychological exploration of motivation, this definition helps contextualise the research question – what causes individuals to behave in a way that limits greenhouse gas emissions rather than in a way that is more greenhouse gas intensive? Thus the study aim is to determine the triggers, whether they be intra-individual, inter-individual or external, that cause adults in Western Sydney to take actions that help mitigate climate change.

The study author is a sustainability practitioner with a disciplinary background in environmental management. The research was largely undertaken part-time while the author worked professionally on sustainability and climate change mitigation projects for a local council in Western Sydney. In line with environmental management practice, this social science study draws strategically from a range of academic disciplines and practical interventionist programs. As characterised by Keen et.al (2005) the environmental management profession includes practitioners and units in most levels of government throughout the world and in most major corporations, as well as in non-government organisations (NGOs). Formerly, the profession was comprised largely of practitioners from biology disciplines. However, since 'Our Common Future' defined sustainable development as a concept for balancing economic, social and environmental values and aspirations (World Commission on Environment and Development, 1987), environmental management now also represents *'nearly every other conceivable discipline'* (Keen et al., 2005). Furthermore environmental management is researched and taught as a discipline in its own right.

Keen et al. (2005) state that the broad range of disciplines within the environmental management profession necessitated practitioner engagement in transdisciplinary

collaborations. While this is no doubt true, it should be clarified that the broad range of disciplinary knowledge and skills now located in environmental management gathered in response to the complexity of problems such as ecological degradation and climate change. Effectively addressing such problems requires collaborations of transdisciplinary researchers, disciplinary researchers and interested external players using iterative evolving methodologies to focus on 'real-world' problems (Russell et al., 2008). Transdisciplinarity draws on knowledge from distinct disciplines, integrating this as needed to address the specific problem. It is more integrated than multidisciplinary research, in which researchers retain their disciplinary viewpoints. It is also more integrated than interdisciplinary approaches, in which researchers from different disciplines investigate areas of overlap between their disciplines (Russell et al., 2008, Jahn et al., 2012).

The difficulties of dealing with wicked problems may at times be due to their complexity combined with our compartmentalisation of scientific and professional knowledge and lack of collaboration between scientists, professionals and policymakers (Lawrence & Després, 2004, Lawrence, 2010). It is not unusual for researchers dealing with wicked problems such as environmental degradation to draw on work from a range of disciplines, call for and use cross-discipline approaches and to provide knowledge to other disciplines and to practitioners (Bamberg & Möser, 2007, Steg & Vlek, 2009, Gifford, 2011, Gifford et al., 2011, Osbaldiston & Schott, 2012). As examples, Obaldiston and Schott's (Osbaldiston & Schott, 2012) meta-analysis provided researchers, practitioners, and environmentalists with empirically based knowledge to inform effective pro-environmental interventions and Steg and Vlek's (2009) review of environmental psychology studies called for an interdisciplinary approach to encouraging pro-environmental behaviour because environmental problems have psychological, ecological, technological, and socio-cultural aspects. These studies are highly informative and useful to practitioners, and Obaldiston and Schott's study is arguably cross-disciplinary in the information it integrates. However they are unlikely to represent transdisciplinarity because they did not seem to fuse into one integrated knowledge production project the collaborative work of

transdicsciplinary and/or multi-disciplinary researchers with practitioners and/or communities.

Due its level of integration and stronger allowance for different viewpoints, transdisciplinarity can assist to cut through siloing in research while seeking solutions for specific, real-world problems (Lawrence & Després, 2004). Nevertheless transdisciplinarity raises difficulties due to the inherent paradox between needing to follow established, respected and rigorous methods that provide validity and credibility while welcoming diverse views and local and professional knowledge. This wilful mis-alignment with disciplinary systems has potential to adversely impact academic careers (Aslin & Blackstock, 2010, Brown, 2010a). Yet through acknowledging that their findings complement other work rather than reveal an entire 'truth', transidisciplinary practitioners can work within the contradictions inherent in wicked problems (Russell, 2010b). This thesis contributes to transdisciplinary research on climate change policymaking options through providing a better understanding of the motivations of individuals when they take actions that assist greenhouse gas emission reductions, in a particular geographic and social context.

The thesis does not strictly meet the definition of transdisciplinarity. Rather, it takes a transdisciplinary approach to the following extent: it draws on knowledge from a range of social science disciplines, including social psychology, psychology, environmental psychology and sociology, as well as from findings emanating from practical interventions. Furthermore as outlined in Chapter 3, its research methods included in-depth interviews with householders who had participated in the Y Green Rouse Hill Pilot home sustainability audit program. These interviews and their findings comprised one aspect of the pilot's formative evaluation conducted by the University of Western Sydney and used to guide future Y Green project practice (Barry et al., 2009). The thesis is also guided by the pragmatic, inherently transdisciplinary concerns of an environmental manager.

For the purposes of the study, a Human Ethics Application was submitted to the University of Western Sydney (UWS) Human Ethics Committee in 2008 and gained approval as number H6477. In line with the accepted principles of ethics for social science, this study protected the interests, anonymity and confidentiality of participants and ensured that participation was voluntary and based on informed consent (Kemper et al., 2003, Denscombe, n.d.). This thesis focuses on motivations of Western Sydney adults for undertaking actions that help to limit or reduce atmospheric greenhouse gases, regardless of whether or not the individuals involved 'believe' in anthropogenic climate change. One of the earliest findings of the research was that such 'belief' is not a prerequisite for action. Indeed, the range of motivations for taking actions that have a mitigating effect is surprisingly broad. In line with Whitmarsh's UK (2009) findings, for any given mitigation action, motivations of an individual are often multiple and may be unrelated to climate change. To explore the full range of these motivations, this study used an integrated mixed methodology set within a qualitative framework. The methodology was comprised of two main aspects. Firstly, a five minute survey of 300 Western Sydney adults produced both quantitative and qualitative results. Secondly, in-depth data was collected via hour-long interviews with 24 respondents and the qualitative analysis of 30 post-graduate student assignments.

Author background and personal motivations

Participating interviewees and students who permitted analysis of their assignments generously shared personal feelings, philosophies and religious views in discussing their motivations to take actions that assist in mitigating climate change. In exploring these deeper motivations of others, I needed to face my own reasons for acting to reduce emissions, undertaking this research and even reinventing my career to work as a sustainability practitioner. I briefly make my motivations available to readers, so they may be balanced against the findings. My favourite childhood memories are of the freedom and fun of estuary swimming during holidays and wandering from our overgrown, rocky suburban backyard into the adjoining remnant bush gully with its trees, scrubby bush, birds and lizards. At times of difficulty, such as illness or feeling bullied, the quiet bushy backyard and the gully were a comfort. The gully also included hundreds of metres of large

concrete stormwater pipes and at one end, the local rubbish dump, both 'kid-magnets' that we explored after school when the council workers had stopped for the day and the tip was 'closed'. These experiences provided me with an ongoing visceral sense of human-ecological interactions. Natural environments have always provided me with a feeling of wholeness, calm and connection with nature that church, school and other institutions did not. However, my childhood Christian background did encourage empathy and a sense of personal moral obligation to assist where possible. I worked in welfare, then in education and communication roles, always retaining an interest in environmental issues. My concern over global warming grew as increasing information became public. In 2004, I undertook a Master of Environmental Management which led to work as a sustainability practitioner. The degree segued into this research in 2007. The demographic diversity of Western Sydney made the area ideal for social research, which fit well with my local commitments including school-aged children, elderly parents and a full-time job with a local council in Western Sydney.

As outlined in Chapter 2, as part of the UWS evaluation of the Rouse Hill area 'Y Green' home sustainability audit program, I interviewed participating householders, with the findings informing both this thesis and the evaluation (Barry et al., 2009). However, in general this research was distinct from my professional practice. Yet they did inform each other. Lessons from this study assisted me to engage with communities in order to plant bio-diverse carbon forests through the then innovative Regenesis Project (Blacktown City Council & Liverpool Plains Shire Council, 2010). Later it informed collaborations with other staff to develop systems embedding sustainability practice into council operations and procurement processes. Experience gained through these projects reinforced a lesson gained via welfare and education work: in order to make substantial changes, people must gain something they need or want. Motivation is the key.

The research question

The initial research question was: *'What motivates adults in Western Sydney to undertake actions **to** help mitigate climate change?'* Implicit was the assumption that when people undertook actions that assist to mitigate climate change, they *intended* to help mitigate climate change. However, as outlined by Stern (2000), people may have a pro-environmental *impact with or without an intention* to do so and, likewise they may *intend* their action to have a pro-environmental impact even though no such impact results. An individual's goal setting is dependent on what they find desirable, and feasible and then on their decision to commit to reaching that goal. The goal content is a strong factor in whether or not the goal is reached, with evidence that intrinsic goals are more likely to be implemented (Bargh et al., 2010), as discussed chapter 2. Logically, even when motivated to act in ways that help minimise greenhouse gas emissions, an individual can be pursuing a goal that is unrelated to climate change mitigation. Therefore, motivation and goals may be aligned with, partially aligned with, or in conflict with mitigation outcomes.

As outlined in Chapter 3, when this study's survey was trialled with 40 respondents, results indicated that mitigating climate change was a lesser motivation for personal mitigation actions than other drivers. These preliminary results exemplified Stern's (2000) distinction between *intention* and *impact* and supported observations that people may have a range of motivations unrelated to the environment for behaviours which happen to provide pro-environmental benefits. For example someone may ride their bicycle to work or switch off lights and appliances to save money rather than to reduce greenhouse gas emissions (Kaiser & Wilson, 2004, Whitmarsh, 2009). Therefore, the research question was amended to become the more pragmatic: '*What motivates adults in Western Sydney to undertake actions **that** help mitigate climate change?'* The amended question enabled exploration of all motivations whether or not they related to climate change.

Context

Victim, perpetrator, denier and mitigator: Australia's contradictory roles

Of all developed nations, Australia is the most vulnerable to the more extreme weather patterns predicted by climate science (Garnaut, 2011). In contrast to the past pattern of high and record breaking temperatures occurring regionally and influenced by an El Nino event, the record-breaking average temperatures of the 2012-13 summer occurred across 70% of the Australian continent and in the absence of an El Nino event (B.O.M., 2013c, b, Steffen, 2013, Steffen et al., 2013). Average temperature rises which may *seem* small have resulted in more energy and moisture in the climate system, affecting weather and exacerbating weather extremes (Steffen, 2013). Parts of Queensland and northern NSW again flooded while severe bushfires were experienced in parts of Western Australia, Victoria and Tasmania.

Yet Australia has one of the largest per-capita carbon footprints in the world (Garnaut, 2011) and is the world's 15th largest carbon emitter (Steffen et al., 2013). Australia's dominant modes of production, consumption and lifestyle are powered by fossil fuels. On average, 70% of the greenhouse gas emissions caused by an Australian's lifestyle relates to the food and goods they purchase, caused by emissions from the mining, production, storage, transport and other processes needed to deliver the items, as well as management of any associated wastes. A much smaller carbon footprint is attributable to an individual's usage of domestic electricity and fuel for personal vehicles. Therefore, substantial reductions in greenhouse gas emissions rely on large, complex changes, not possible through mere encouragement of individuals to reduce their personal electricity and petrol use (Jackson, 2005b, Australian Conservation Foundation, 2007, Booth, 2012). While this thesis focuses on the motivations of individuals, it views those motivations and their underlying values in the broader economic and social context, with the aim of leveraging motivations wherever possible to assist in climate change mitigation.

Technologies that emit greenhouse gases are systemically embedded in the economy. While this is due to the substantial financial rewards offered by exploitation of the east coast's plentiful coal resources, it is also driven by a history of sunken costs, infrastructure, regional economies, social arrangements and political allegiances developed over many years to support the coal industry which fuels most of Australia's electricity (Pearse, 2006, A.B.S., 2010, Tomaney & Somerville, 2010, Waitt et al., 2012, Australian Coal Association, n.d.). More than 96% of fuels used to generate electricity in Australia are non-renewable. In black coal rich NSW, nearly 90% of electricity is produced from black coal. Coal-fired electricity underpins energy intensive industries including manufacturing which employs nearly one million Australians (A.B.S., 2010, Australian Coal Association, n.d.).

Furthermore, Australia is the world's largest coal exporter in return for an estimated $49 billion in 2011-12. Coal is Australia's second largest export commodity, with exports increasing by more than 50% over the past 10 years. (A.B.S., 2010, Australian Coal Association, n.d.). Coal provided an estimated $4.5 billion in royalties to state governments in 2011-12 and the industry estimates an annual expenditure in Australia of $16 billion, although a recent sudden downturn may impact this (Australian Coal Association, 2012, *Coal Downturn*, 2012). NSW Government received $1.7 billion in coal mining royalties in 2011-12 (Australian Coal Association, 2012) while simultaneously acknowledging that the state's 2010 emissions were 157 million tonnes of carbon dioxide equivalent (tCO_2-e) - more than three quarters coming from fossil fuels, primarily coal. It further acknowledged that the NSW per capita emissions at 23 tCO_2-e compared with 10 tCO_2-e for UK, German and Japanese citizens and the industrialised nation average of 13 tCO_2-e (NSW O.E.H., 2012a). Note that the NSW per capita footprint of 23 tCO_2e refers only to gases emitted in NSW and does not account for the carbon emissions displaced through coal exports (Christoff, 2012). Nations receiving the larger quantities of coal exports, Japan, China, The Republic of Korea, India and Taiwan (Australian Coal Association, 2012) either have or are introducing some level of carbon pricing in the near future (SBS, 2012, Cubby, 2013) and are

therefore likely to look to reduce their carbon intensity, and presumably their coal imports.

Those within the coal industry emphasise carbon capture and storage (CCS) improvements to reduce coal's emission intensity (Tomaney & Somerville, 2010, Williams, 2012) but the technology is relatively untested. Internationally, more work is needed on site suitability and selection (Le Gallo & Lecomte, 2011), such technology needs long lead times (Azar et al., 2010) and many technological, commercial and political hurdles need overcoming before carbon capture and storage can play a major role in limiting climate change (Haszeldine, 2009). While a number of projects are planned, there is currently only one fully operational CCS demonstration facility in Australia, the 2CRC Otway Project in Victoria (Cooperative Research Centre for Greenhouse Gas Technologies, 2012).

Adding to Australia's fossil fuel reliance, motor vehicles are the primary means of transport with car ownership influenced by a range of factors including incomes, interest rates, car prices and the number or people living in households. In March 2009, there were more than 12 million registered passenger vehicles in Australia, comprising 77% of Australia's vehicle fleet, with 552 passenger vehicles for every 1,000 people, i.e. slightly more than one vehicle for every two people. Whether or not a car is used for a specific journey depends in part on anticipated levels of congestion, fuel prices, and the availability, affordability and convenience of alternative transport (A.B.S., 2010).

Climate change is a 'wicked' and 'diabolical' policy problem

Rittel and Webber (1973) postulated that many social policy problems were 'wicked', not in the sense of being morally 'bad'; rather they were inherently complex, with solutions completely dependent on perspective and framing of the problem. They compared 'wicked' problems with 'tame' problems, which can be singly defined and for which solutions can be more clearly tested and evaluated. Rittel and Webber defined wicked problems using 10 criteria, each listed in Table 1.1, along with an example that demonstrates how climate change fits the criterion.

The 'wicked' nature of anthropogenic climate change constitutes a *'diabolical policy problem'* - global rather than national, uncertain in form and extent, insidious rather than confrontational, with impacts and remedies that are long term rather than immediate (Garnaut, 2008). Mitigation affects strong vested interests at all levels from individuals to regions to whole industries and some will try to direct policy, perhaps to the detriment of national and international interests (Tomaney & Somerville, 2010, Garnaut, 2011, Waitt et al., 2012).

Table 1.1 Characteristics of 'wicked' social policy problems

Characteristics of a wicked problem	Climate change example
1. There is no definitive formulation of a wicked problem, in that the information needed to understand the problem depends upon one's idea for solving it.	Depending on perspective, academic discipline and profession, ways to tackle climate change include geotechnical solutions, carbon pricing, public education, carbon capture and storage and refuting its existence. Each of these approaches requires different information.
2. There is no stopping rule. Rather people stop work on the problem for reasons such as they feel they have done the best they can within the limitations of a particular project.	In 2010, Prime Minister Rudd decided to postpone introducing an emissions trading scheme (ETS) after the Carbon Pollution Reduction Scheme was blocked twice by the Senate.
3. Solutions to wicked problems are not true-or-false, but good-or-bad, and more often, better-or-worse, or good-enough.	An Australian ETS impacts only on Australia's direct greenhouse gas emissions, being about 1.4% of global emissions. Yet it sends the signal that Australia is taking action and can assist Australian industries adjust to become competitive in lower carbon economies.
4. There are no immediate and no ultimate exact tests of a solution.	Once a large scale policy is implemented, it is hard to know what would have occurred without it.
5. Every solution to a wicked problem is a 'one-shot operation'; because there is no opportunity to learn by trial-and-error, every attempt counts significantly because it has a social impact.	As part of a stimulus response to the GFC, the Home Insulation Program was designed so that its budget would be spent quickly. While more than 1 million homes were insulated, large community uptake & the speed of the implementation led to a paucity of oversight and regulation which may have contributed to unscrupulous practices, house fires and several installer deaths (Hawke, 2010, Taylor & Uren, 2010, Edis, 2013f).
6. There is no exhaustively describable set of potential solutions, some may be overlooked & it is a matter of judgement which ones should be pursued.	Findings of a 2012 Lowy Institute opinion poll (Hanson, 2012) indicate division over the introduction of the 'carbon tax' & wide diversity of opinion as to why the scheme was unsuitable. Some believed that it would cause job losses while others thought it was not stringent enough on industries with high levels of carbon emissions.

7. Every wicked problem is essentially unique in that there are no sub-classes of problems which share most characteristics	As problems, ozone depletion may seem similar to climate change but ozone-depletion was limited and more manageable. Unlike fossil fuels, ozone-depleting gases were not deeply embedded as major parts of economies. Rather, they were produced primarily by two large multinational corporations. Global consumption of ozone-depleting substances fell by more than 90% between 1986 and 2004 (Hulme, 2009). A similar drop in fossil fuel use will be much harder to achieve.
8. It can be can be considered to be a symptom of another problem	Increases in atmospheric carbon have been framed as a symptom of a range of problems including humans becoming 'distant' from nature, lack of human acceptance that they are part of nature and over-consumption.
9. The causal existence of a wicked problem can be explained in numerous ways and the choice of explanation determines the nature of the problem's resolution.	Causes of global warming have been postulated variously as: part of natural variation; due to forcing from human activities; caused by the power & influence of fossil fuel industries; lack of international responsibility and agreement.
10. The planner or policymaker has no right to be wrong	Policymakers are responsible and liable for the consequences of the policies they make. This is felt politically.

Source: Adapted from Ritter and Webber (1973)

Backdrop of controversy: the unfolding politics

In August 2007, when this research study began, community interest in climate change was growing, fuelled by publicity surrounding Al Gore's feature-length documentary *'An Inconvenient Truth'* and Nicholas Stern's *'Review on the Economics of Climate Change'* (Guggenheim, 2006, Stern, 2006). NSW levels of interest in climate change seemed to peak around this time. The three-yearly NSW *'Who Cares about the Environment?'* tracking survey found that in 2006, 12% of people in NSW nominated climate change as of the two most important environmental issues in NSW. The supplementary 2007 *'Who Cares?'* survey, which focused strongly on water and climate change, found that this figure had doubled to 26% (NSW D.E.C.C.W., 2009). Since then, interest levels in climate change have waned, with 23% in 2009 and 12% in 2012 considering it to be in the top two environmental issues. Similarly, 12% of respondents nominated energy and fuel in the top two environmental issues in 2006, peaking at 17% in 2009 and returning to 12% in 2012 (NSW O.E.H., 2013).

In the lead up to the 2007 Australian federal election, then Prime Minister John Howard matched Opposition Leader Kevin Rudd's promise to introduce a carbon Emissions Trading Scheme (ETS), the main difference between the policy promises being that Howard's ETS would take an additional year before coming into operation. In November 2007, a Rudd-led Australian Labor Party was elected, at least in part for its promises for action on climate change which included introducing the ETS and ratification of the Kyoto Protocol, which Howard had opposed (Archer, 2010, Grattan, 2010, McKay, 2010). Australia's entry to the Kyoto Protocol came into force in March 2008 (Sydney Morning Herald, 2007, U.N.F.C.C.C., n.d.), however an ETS proved more elusive. After four years of *'political havoc'* the Clean Energy Future legislative package passed the senate in November 2011 (Taylor, 2011). The first phase of Australia's mandatory carbon pricing with its fixed price of $23 AUD per tonne, came into force on 1 July 2012. The first phase amounted to a tax on Australia's 500 largest carbon emitting businesses, with the revenue allocated to assist households cope with associated price rises, support jobs and competitiveness in affected industries, and invest in clean energy and climate change programs (Australian Government, 2011). The scheme was originally set to transition to a floating price, therefore an ETS, on 1 July 2015 (Cubby, 2012) but this has been moved to 1 July 2014 (Hannam, 2013, Martin, 2013). Figure 1.1's timeline, outlines political milestones, alongside two-party preferred voter opinion polling, and major coinciding events. The research study underpinning this thesis took place during this time period.

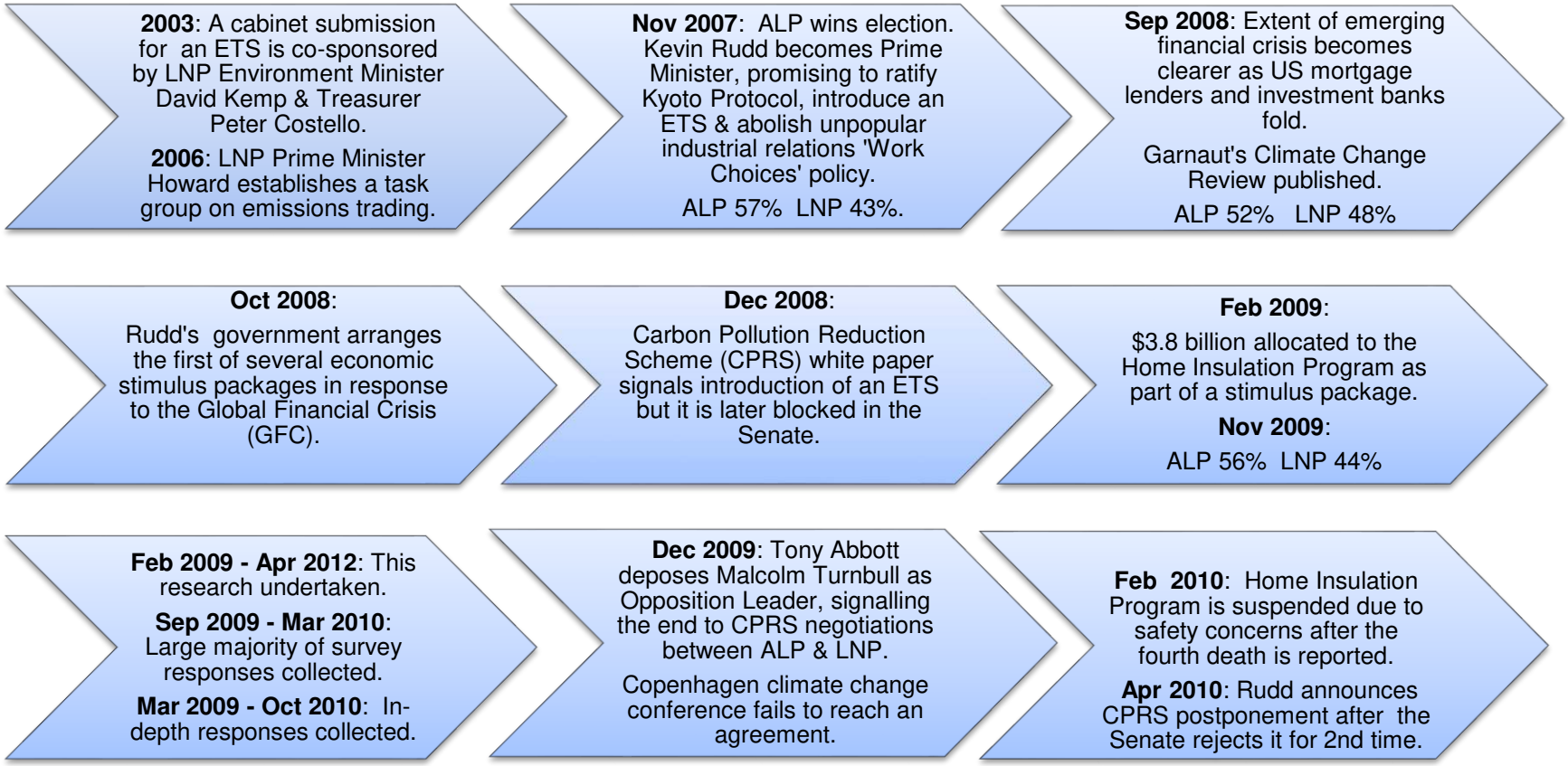
While a thorough political analysis is not within the purview of this thesis, Figure 1.1 demonstrates the political complexities that faced policymakers aiming to introduce an ETS. It also outlines the socio-political context in which research respondents shared their thoughts. The polling results shown in Figure 1.1 imply an electoral backlash after Prime Minister Rudd announced postponing introduction of an ETS (Tomaney & Somerville, 2010) and another backlash in response to the carbon tax introduced by Prime Minister Gillard. Intriguingly, the two party preferred polling showed that in November 2007, Australian Labor Party (ALP) led the Liberal National Party Coalition (LNP) 57%-43%, yet by June 2013 this was completed reversed, with LNP at 57% and ALP at 43% (Cubby, 2012, Kenny,

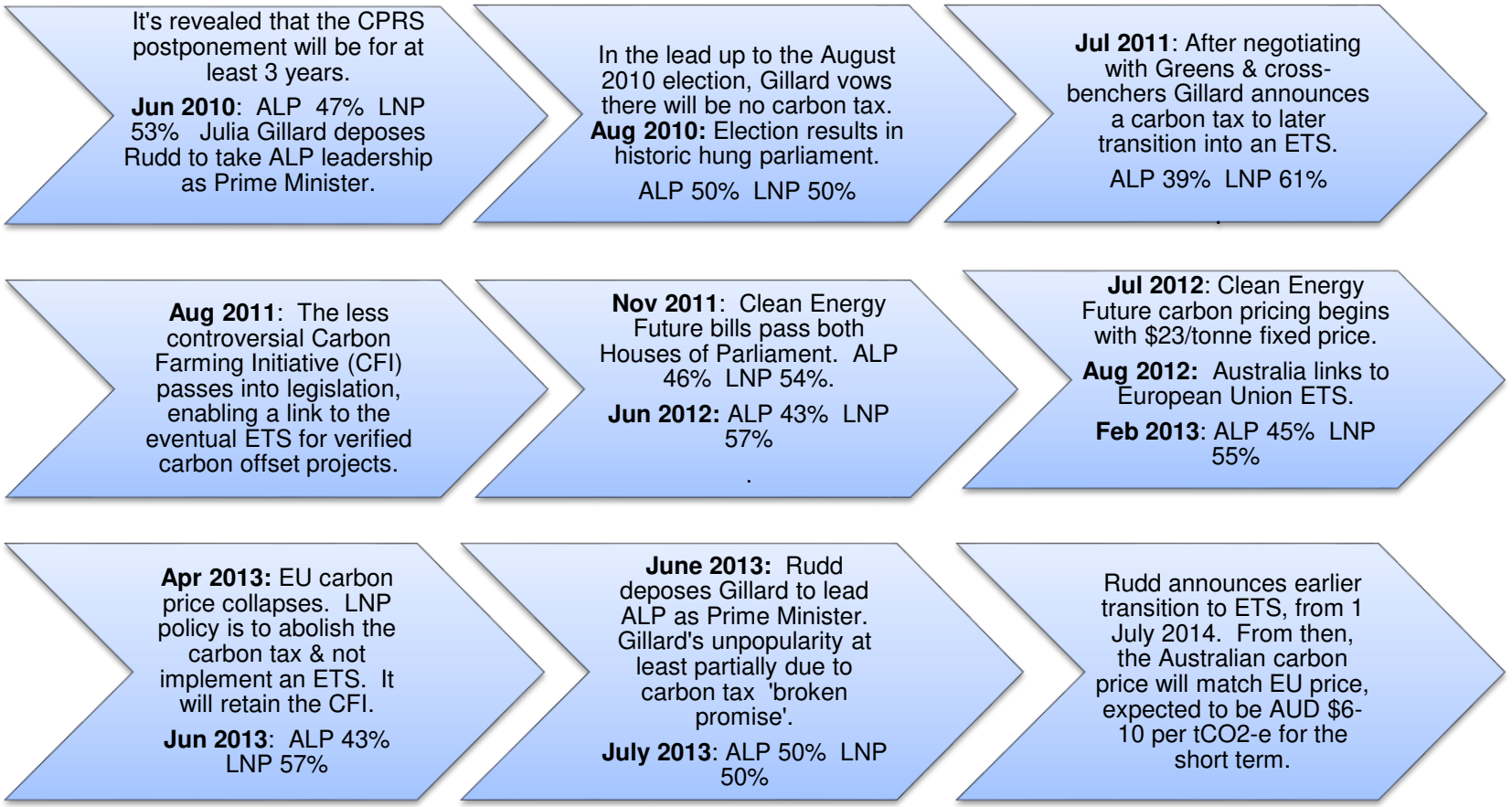
2013b). July 2013 polling showed LNP and ALP each with 50%, a result similar to that which resulted in a hung parliament in August 2010. Given the many policies and issues in the public political discourse at any one time, it is difficult to isolate and measure the effect of carbon pricing on voting intentions, however it seems to have been a considerable influence throughout this volatile time. Carbon pricing is complex and even where people agree that anthropogenic climate change is a threat and even where they agree that carbon emissions should be priced, they may disagree on the details of the pricing mechanism (Hulme, 2009).

Lowy Institute polling in March and April 2012, found 63% of Australians were against the legislation *'introducing a fixed price on carbon that will then lead to an Emissions Trading Scheme'.* When given three options for why they might oppose the legislation, 52% agreed that *'it will result in job losses',* 38% agreed that *'it is not necessary to act before other countries'*, while 33% agreed that *'the measures are not strict enough to result in substantial emissions reductions'* (Hanson, 2012). Interestingly, 53% of men were strongly against the legislation compared with 36% of women, while 58% of those with a bachelor degree or higher education were either strongly or somewhat in favour of the legislation (Hanson, 2012).

Figure 1.1 Timeline showing the political steps taken toward the introduction of an Australian Carbon Emissions Trading Scheme, selected other major events and two party preferred polling results

ALP=Australian Labor Party LNP=Liberal-National Party Coalition.





Sources: Adapted largely from Cubby (2012), with additional sources being Taylor (2010), Priest (2011), Liberal Party (2013), Minister for Climate Change & Energy Efficiency (2012), Australian Government (2012), (Kenny, 2013b, e, c, d), Kenny & Aston (2013), Edis (2013c), (Plunging carbon price to hit budget, 2013).

Challenge of building broadly agreed policy on ever-shifting political sands

Interestingly, the Lowy Institute poll also found that Australians' willingness to pay for mitigation has decreased since 2006, which would accord with the drop in opinion polling approval for the Government after announcements regarding introduction of the carbon tax. Responding to three options for dealing with global warming, 68% in 2006 compared with 36% in 2012 agreed with, *'global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs'*. In 2012, 45% agreed with '*the problem of global warming should be addressed, but its effects will be gradual, so we can deal with the problem gradually by taking steps that are low in cost'*. In 2006, 7% compared with 18% in 2012 agreed with *'until we are sure that global warming is really a problem, we should not take any steps that would have economic costs'*, intriguing as only 7% of 2012 respondents said they had become less concerned about climate change, while 55% reported having not changed their mind and 38% reported they had become more concerned (Hanson, 2012).

There are several points to be made regarding this. Firstly, the polling question did not identify *who* would pay the '*significant costs'* that may be needed for mitigation. In 2006 public understanding of an ETS was vague but by the time of the 2012 Lowy Institute poll, the Clean Energy Future scheme's fixed price 'carbon tax' period would be operating within three months and who would pay had been much discussed. Scheme details were released in July 2011, a year prior to the scheme's implementation, with every household receiving a 20 page booklet detailing carbon price impacts, including the financial compensation they would receive; a website provided even more detail and there was strong media reporting of the scheme (Australian Government Clean Energy Future, 2011a, b, Combet, 2011, Keane, 2011, *PM unveils carbon tax package*, 2011).

Secondly on the other hand, there was a vocal campaign against the carbon tax by the Opposition which even in its own climate change policy document, *Direct Action Plan* referred to the Clean Energy Future Legislation as *'a great big new tax on everything'* (Taylor, 2009, Abbott, 2012, Hetherington, 2013, Liberal Party,

n.d.). This campaign seems to have been effective because by October 2012, a Per Capita survey found that respondents were generally unaware of the personal financial benefits they received through the scheme's compensation packages, and more than half of the respondents stated that petrol prices had increased due to the carbon tax, despite there being no levy on petrol (Hetherington, 2013). Thirdly, there was criticism of the scheme's generous compensation to large carbon emitting companies – thought necessary by policy-makers to keep larger emissions intensive industries both onshore and onside - and scepticism over whether the scheme could deliver the significant carbon emission cuts needed (Ewbank, 2011, Pearse, 2011). The latter criticism was at least partially validated when in September 2011, the expected closure of Australia's 'dirtiest' brown coal power stations did not eventuate because owners refused to close for the compensation price offered (Packham, 2012).

Fourthly, although Reser's (2011) critique targeted the 2011 Lowy poll there are aspects worth considering in relation to the 2012 poll being discussed. There seems to be validity in the criticism that Lowy questions were complex in the context of a phone conversation; answer options were limited, loaded with multiple nuances and perhaps not representative of people's real opinions. Reser further pointed out that the Lowy findings at first glance seemed inconsistent with international and Australian surveys with regard to the quite high level of public concern about climate change. While this is perhaps true, Reser is not comparing the same concepts. Indeed there is ample and continuing evidence of high levels of concern regarding climate change all over the world including in Australia (Nisbet & Myers, 2007, Brechin & Bhandari, 2011, Krosnick & MacInnes, 2011, Leiserowitz et al., 2011, Leviston & Walker, 2011a, b, Reser et al., 2012c, Reser et al., 2012b). However, when *willingness to pay for mitigating climate change* is compared across surveys, the results are consistent with those of the Lowy poll, which asked about willingness to pay rather than concern.

Surveys, including Reser's, that cover both climate change concern level and willingness to pay to reduce climate change, show a considerable gap between the two, with willingness to pay consistently lower (Nisbet & Myers, 2007, Leviston &

Walker, 2011b, Reser et al., 2012c). There is also variation according to types of paying, with a higher willingness for more vague descriptions of how payment would occur. This is in line with the first and second points made above that the vague understanding of an ETS in 2006 gained more support than the more concrete and politically disputed proposal of the Gillard government. Interestingly, a selective global overview of climate change surveys across 25 countries representing the Americas, Europe, Asia, the Middle East and Africa, but not Australia (Brechin & Bhandari, 2011) found a stronger willingness to pay to protect the environment *'even if it slows growth and costs jobs'* than to *'pay higher prices in order to address global climate change'*. The reason for this finding is unclear. The finding may indicate that the intensity of feeling is greater for environmental protection than for climate change mitigation. On the other hand, it may indicate that people are less open to paying higher prices (which would seem to *definitely* affect them) than to slower growth and fewer jobs (which they may see as *possibly* affecting them). Consistency in wording is essential for comparison.

Reser (2011) was also critical of the Lowy poll's approach of including the climate change related question in the context of questions on many issues of national importance, whereas his own studies (Reser et al., 2012b, Reser et al., 2012c) concentrated specifically on climate change. Such criticism is perhaps misplaced given that gathering information across a range of issues is the Lowy poll's purpose. Indeed while Reser's studies provide rich and ground-breaking information on individual's attitudes, feelings and intentional actions regarding climate change, they do little to contextualise these in relation to other issues and pressures faced by individuals, communities and government. In the context of everyday lived experience, no single social research study could outline the entire Australian picture of attitudes, feelings, actions, willingness to change and willingness to pay related to climate change. All studies have limitations.

Inherent difficulty of gauging public opinion on complex issues

Comparisons of public opinion across locations and longitudinally are confused by the use of different tracking questions. As an example of cross-country comparison, Reser et al.'s (2012b) report includes a table summarising levels of acceptance of

(or 'belief in') climate change as a phenomenon and the degree of attribution to human causes. The table includes findings from Australian surveys including Reser et al.'s own 2010 and 2011 studies and their 2010 UK co-study (Reser et al., 2012b), CSIRO's 2010 and 2011 studies (Leviston & Walker, 2011a, b), Newspoll surveys in 2010 and 2011, Ipsos Eureka's 2010 survey and US surveys undertaken in 2010 (Krosnick & MacInnes, 2011) and in 2010 and 2011 (Leiserowitz et al., 2011). Some aspects show a similar pattern. Eight or fewer percent of respondents think climate change is not occurring at all. Up to five percent stated that they did not know if it was occurring. However, when comparing the huge and well-populated middle area there is no clarity regarding the degree to which respondents attribute climate change to natural and human causes. Differences in questions and answer options make it impossible to compare them.

The Lowy Institute findings (Hanson, 2012) and the reduced importance of climate change as an environmental issue (NSW O.E.H., 2013) may indicate that people are learning to live with climate change rather than continuing to conceptualise it as an urgent crisis needing policy solutions. That only 7% of the Lowy Institute's 2012 respondents said they had become less concerned about climate change, while 55% reported having not changed their mind and 38% saying they had become more concerned may be seen as evidence that people are psychologically adapting to climate change as part of life. Reser (2012b) observed that we live in a world of various threats which we continually question and minimise in order to reality-test the concerns and to psychologically protect ourselves from them. There may also be a degree of disillusionment and even disengagement with the ongoing political wrangling over mandatory carbon pricing which ironically in November 2007 was the stated policy of both the Australian Labor Party and the Liberal-National Party Coalition.

There is inherent difficulty in interpreting and quantifying opinions on complex subjects like climate change. From their review of 22 studies Leviston et. al. (2011) noted that interpretation, measurement and tracking of Australians' views on climate change is complex and influenced by the individual survey question wording. To overcome this, they recommended systematic, rigorous gathering of

longitudinal data from multiple sources. Leviston et. al. noted the difficulty in assessing public responses to complex policy options, given the challenges of presenting to the public complex policy initiatives such as an ETS or a carbon tax with compensation arrangements. Yet presentation of policy options is important in a democracy, to raise general understanding of the options and to achieve public acceptance. While the following argument was put in regard to assessing social impacts of new technology, it seem to also apply to policymaking: the normative assumptions underlying options should be socially negotiated and while the resulting understanding of social context may not always lead to better decisions, it will promote transparency and accountability, which should gradually improve the decision making process (Russell, 2010a).

Context counts

The issue of climate change and how to deal with it does not occur in a vacuum. Rather it exists within a complex web of economic, social and political circumstances and occurrences that affect individuals, households, businesses, industries and policymakers. For example, in the three years leading up to December 2010, NSW electricity costs had increased by 43%, of which 80% was due to increasing network costs, with the second biggest contributor being the costs of NSW and Federal schemes to encourage development of renewable energy resources, funded by electricity charges rather than by taxpayers. Further electricity price increases were expected as costs for the NSW Solar Bonus Scheme began to be recovered in 2011 (Industry & Investment NSW, 2010a, b). The Solar Bonus Scheme subsidised feed-in tariffs, being the electricity retailer payments to eligible suppliers, such as householders with rooftop solar photovoltaic (PV) panels that generate electricity and feed it into the grid. By July 2012, the NSW Independent Pricing and Regulatory Tribunal (IPART) had determined that electricity prices would rise again for a typical household, with the carbon tax itself adding 8.9% and network charges 8.4% to 2011 prices (I.PA.R.T, 2012). Therefore, it is probable that the public was particularly sensitive to further electricity price rises in mid-2012 when the carbon tax came into force.

Garnaut's (2008) description of climate change as a '*diabolical policy problem'* is exemplified and validated through examination of the NSW Solar Bonus Scheme and the Clean Energy Futures scheme. The NSW Solar Bonus Scheme which began in January 2010 diffused costs among all NSW electricity purchasers, and in doing so created 'haves' and 'have-nots'. Home owners with appropriate roof space, and financial means and who applied within the short time frameworks of the scheme still continue to benefit. Yet most renters and others also pay their (albeit small) share of the costs without personally benefitting from the scheme. This may not have raised such an issue of fairness, for many government benefits go to some rather than all. However, when the scheme was developed in 2008 and 2009, PV panel prices were high. A 60 cent per kilowatt hour (c/kWh) feed-in tariff was seen as necessary to encourage uptake because it was expected that a 1.5 kW system payback period would be about 8 years. Then an unforeseen drop in PV panel prices meant that by 2010 this payback period was two years with some scheme beneficiaries receiving high returns – basically profits – paid by other electricity customers. Especially amid rising electricity costs due to infrastructure upgrades, this became a fairness issue. After review, the feed-in tariff was dropped to 20c/kWh, but *only* for new entrants to the scheme. Although the scheme is now completely closed to new entrants, the feed-in tariff payments for 60c/kWh and 20c/kWh continue until the end of 2016, fully paid by NSW electricity buyers (Industry & Investment NSW, 2010b).

Evolving policy rather than one-shot operations

Like the Home Insulation Program (Hawke, 2010, Taylor & Uren, 2010, Edis, 2013f), the NSW Solar Bonus Scheme and the Clean Energy Future scheme seem to exemplify the fifth characteristic of 'wicked problems': that every solution is a 'one-shot operation', with no opportunity to learn by trial-and-error and every attempt counts significantly because it has a social impact (Rittel & Webber, 1973). However, this characteristic seems exaggerated. Trial-and-error followed by review and reflection often result in re-trial-and-success. At about the same time as this study was conducted, seven Solar City projects across Australia, representing a total Federal Government investment of $94 million, were each managed separately and locally, and provided ongoing reductions in energy use and costs for participating

businesses and households. One of the projects was conducted by a consortium in the Blacktown LGA and by coincidence a small number of householders who participated in Blacktown Solar City also participated in the present study. Solar City projects continue to provide energy generation and usage data through smart meter technology (Blacktown Solar City, 2012) assisting policymakers and energy suppliers to understand patterns such as energy peak times. This data may also provide some insight into the existence and/or extent of the *rebound effect*, the notion of energy efficiency improvements quickly becoming neutralised due to the tendency to waste or overuse energy *specifically because the technology is more efficient* (Berkhout et al., 2000, Greening et al., 2000, Hens et al., 2010, Frondel & Vance, 2013, Gillingham et al., 2013). Solar City projects had evaluation systems built into their designs, yet it is imperative to learn from all programs. Valuable insight can be gained from programs exhibiting problems as much as from programs that are first time successes.

Goals achieved despite problems

Despite the likelihood of declined public trust in large scale 'green schemes' due to mistakes and omissions that are especially clear in hindsight, the Home Insulation Program and the NSW Bonus Scheme achieved their goals (Hawke, 2010, Taylor & Uren, 2010, Eadie & Elliott, 2013, Edis, 2013f). Furthermore, when data collection for this research was beginning in 2008, PV installations in Australia numbered about 20,000, whereas by March 2013, this number had increased to one million installations, although total generation from these represents only about 1.2% of Australia's electricity demand (Arup, 2013b, Edis, 2013a, Palmer, 2013a). This rapid uptake of PV was supported by a range of government schemes and rebates. Despite even the valid criticisms and problems facing Clean Energy Future, Australia's carbon emissions have dropped since its introduction, primarily in the electricity sector, where the proportion of Australian coal-fired electricity declined from 79.1% of the total electricity mix to 74.7% in the nine months after implementation of the carbon price. This meant that Australia's carbon emissions from power generation dropped by 7.7% or 10 million tonnes, compared with the previous nine months. This significant fall seems most likely to have been driven by frugality and energy efficiency spurred by the carbon tax, other government

policies and spikes in network charges, as well as PV price reductions, the high Australian dollar, rapidly rising gas prices and voluntary mitigation actions (Australian Government, 2013, Climate Institute, 2013, Edis, 2013b, Palmer, 2013b, Swan, 2013). While it is difficult to gauge the degree to which Clean Energy Future carbon pricing itself drove this reduction in electricity-related carbon emissions, the size of the reduction implies that the scheme is having a positive effective.

The major policy options heading into the September 2013 election

Gaining favour with voters in marginally held Western Sydney seats is seen as one of the main keys for winning the upcoming 2013 election. In March 2013, Western Sydney voters were wooed by then Prime Minister Julia Gillard and Opposition Leader Tony Abbott (A.B.C., 2013, Saulwick, 2013). Both simultaneously reflected and helped lead Australia's ongoing ambiguity toward climate change through promising funding to extend the western M4 motorway, rather than, for example, offering support to improve public transport and/or rail links to Port Botany. While there was criticism of the proposed M4 extension to the Sydney central business district (Saulwick, 2013), neither leader seemed to notice the irony of the their offers standing alongside pre-existing policies to tackle climate change, the Prime Minister's Clean Energy Futures legislative package, including the Carbon Farming Initiative (Australian Government, 2011) and the Opposition Leader's *Direct Action Plan* (Liberal Party, n.d.).

This thesis's outline of the politics surrounding Australian carbon pricing ends on 31 July 2013, with the outlook for the Clean Energy Future scheme uncertain. In the lead up to an election in September 2013, the ALP aims to transition the carbon tax to an ETS on 1 July 2014 while LNP aims to abolish carbon pricing, although both have pledged to honour the Gillard carbon tax compensation promises and, as at the end of July, both parties are polling equally well (Hannam, 2013, Kenny, 2013d, a, Kenny & Aston, 2013, Martin, 2013).

There are several reasons why an earlier transition to an ETS. (Cubby, 2012), might be both feasible and effective. Firstly, concerns about Australia's trading competitiveness being undermined by carbon pricing are increasingly less relevant as more of Australia's international trading competitors and partners introduce their own carbon pricing systems (SBS, 2012, Cubby, 2013), especially given the current very low price of market-driven EU carbon permits, although of course market driven prices will change over time. The Business Council of Australia and the Australian Industry Group have indicated that they would be likely to support such a move, although it is acknowledged that these groups do not represent all major industries (Australian Financial Review, 2013, Australian Industry Group, 2013, Edis, 2013e). Voters may be less likely to *perceive* an emissions trading scheme as a personal impost on them, especially if communication strategies acknowledge and highlight that carbon pricing is now becoming an international norm. On the other hand, one criticism that the Opposition's *'Direct Action Plan'* attracts is that it is unlikely to deliver large emission reductions and drive investment in less carbon intensive technologies and systems. While *'Direct Action's'* aims of increasing energy efficiency would reduce demand for fossil fuel use, and its support of forest sequestration would help redistribute carbon and may offer environmental co-benefits, they cannot 'offset' Australia's massive fossil fuel use, raising concern that these strategies may provide excuse to delay decarbonisation of the economy (Mackey et al., 2013, Steffen & Hughes, 2013). The other main criticism is the Plan's potential for cost blow outs in achieving the abatement levels needed to meet Australia's Kyoto Protocol commitments (Coalition's direct action plan, 2013, Edis, 2013d, Lubcke, 2013, Priest, 2013). Furthermore, without a carbon-focused income stream, there may be less guarantee that *'Direct Action Plan'* budget al locations would remain a priority among the many competing calls on the Federal budget. (Garnaut, 2011, Steffen, 2013, Steffen & Hughes, 2013, Steffen et al., 2013).

Thesis structure

Overview

The first two chapters of this thesis present an overview of the scientific and political context in which the research took place, and a review of literature relating to human motivation especially that which focuses on pro-environmental behaviour. These are followed by Chapter 3 which outlines the study's methodological approach and methods. The three sustainability pillars - social, environmental and economic - were selected to form the thesis framework because they are well-known to environmental managers and policymakers as well as to researchers; and because no other existing conceptual model could be found to logically include motivations for pro-environmental behaviour ***whether or not*** the motivational *intention* was pro-environmental. In line with Stern's (2000) observation, the pilot of this study's Climate Action Scale research tool found that people often reported taking climate change mitigation actions for reasons unrelated to the environment. Thus it was essential for the thesis structure to take account of drivers unrelated to the environment in addition to exploring intentionality, and discussing the importance of framing messages and interventions to encourage intentionally pro-environmental behaviour. As the motivations that emerged from the research data could be classified in line with the environmental, social and economic pillars of sustainability, the results chapters are organised under these headings. Thus, Chapter 4 presents the results relating to environmental motivations, Chapter 5 presents those related to social motivations and Chapter 6 presents those related to economic motivations. Chapter 7 provides an integration of the research findings and implications relevant for the development of climate change mitigation policy and programs. With the exception of the introductory Chapter 1, all chapters begin with a summary of the chapter's contents.

Chapter 1 Setting the scene: the research context

The aim of Chapter 1 is to describe the background context of the research, thus it describes the reasons for taking action to mitigate climate change and the extent of action needed. It further outlines the knowledge gap addressed by this thesis. As the research focuses on personal discussions of motivations provided by respondents, there is a brief description of the author's own motivations so they

may be balanced against the findings. The research question is introduced. There is an overview of Australia's high level of reliance on fossil fuels. The issue of climate change is presented in light of its characteristics as a 'wicked problem'. The recent volatile politics of Australian climate change policy are outlined and discussed. The chapter closes with an explanation of the reasons for the transdisciplinary approach to the research.

Chapter 2 Lessons from the literature

Chapter 2 was written with two aims. It presents a review of the literature on pro-environmental behaviour of individuals and describes the local context, being Western Sydney. The chapter overviews the importance of external conditions as well as concepts such as personal values and norms, normative influence, the Theory of Cognitive Dissonance and the 'value-action gap', and their potential for influencing whether or not individuals take steps to reduce greenhouse gas emissions. Thus it considers current understanding of human motivation as it relates to pro-environmental actions, with particular reference to the Self-Determination Theory of motivation (Ryan & Deci, 2000b, a) and work building on normative explanations of helping (Schwartz, 1973, 1977). This work shows links between an individual's values and behaviour that is intentionally pro-environmental (Stern, 2000, Schultz, 2001, Snelgar, 2006). The chapter notes that behaviours motivated by factors which *unintentionally* lead to pro-environmental and climate change mitigation cannot be forced into such frameworks. This seems to be because the frameworks were developed to explain behaviours where the intentions directly relate to the outcomes under study. Additionally, key aspects of the Self-Determination Theory and the values-based models developed to explain intentionally pro-environmental behaviours were seen to align with the three pillars of sustainability. Therefore sustainability is suggested as a suitable framework for viewing motivations for actions that assist in reducing greenhouse gas emissions. There is a presentation of conceptual links between the three pillars of sustainability and major theories relating to pro-environmental behaviour distilled from the environmental psychology literature. Chapter 2 closes with a description of the diversity of Western Sydney and a brief overview of climate change mitigation

programs that have influenced and informed the thesis, most notably the Y Green home sustainability audit pilot conducted in the Rouse Hill area.

Chapter 3 The research tools: methodology and methods

The aim of Chapter 3 is to present an overview of the methodological approach and a step by step chronology of the methods used. A convergent parallel mixed methods design employed three data collection processes to produce four distinct datasets, analysed separately using a consistent system for coding the themes that emerged. A deductive, measurement instrument, the Climate Action Scale was developed by the study to help engage research participants and gauge their individual commitment to climate change mitigation actions. The Scale formed the basis of a survey of 300 adults in Western Sydney. Some of the survey data was able to be analysed in a quantitative manner, using the SPSS software package. All other data was qualitative in nature. In-depth data collection was undertaken through 24 one-hour interviews and the analysis of 30 relevant written student assignments. Separate analysis of each dataset allowed comparison of findings. The NSW Government *'Who Cares about the Environment?'* survey series was identified as an appropriate comparison for aspects of the research and where appropriate the findings from the '*Who Cares?'* surveys were used to triangulate findings.

Chapter 4 Results: Environmental motivations

The first of the three results chapters, Chapter 4 provides an overview of the major findings, laying the groundwork for more detailed presentation of results. Motivations could be classified as environmental, social or economic in nature. Furthermore, three layers of motivation were identified. As enabled by the survey's quantitative data there is a discussion of Climate Action Scale results and demographic influences on the Climate Scale scores. Utilising Goodland and Daly's (1996) definition of 'environmental', there is presentation of the findings related to environmental motivations. This discussion begins with environment-related findings from the outer 'top-of-mind' layer, where environmental drivers were found to be fairly influential. The middle layer of environmental motivations, emerging from the in-depth discussions, revealed pro-environmentalism to be quite

a strong influence in the middle layer of motivation. The deepest layer of motivation described the ways in which respondents came by their pro-environmental motivations. As these underpinnings were found to generally be social in nature, they were discussed in Chapter 5.

Chapter 5 Results: Social motivations

The second of the three results chapters, Chapter 5 utilises Goodland and Daly's (1996) definition of 'social', to present the findings relating to social motivations. It follows the pattern of describing outer layer findings first, then discussing middle layer findings and then deepest layer findings. Social motivators were found to be less influential than economic and environmental drivers in the outer layer of motivation. However they were fairly influential in the middle layer of motivation. Social drivers were found to be most influential in the deepest layer of motivation, where they took the form of encouraging and developing a sense of moral obligation to take actions to assist other humans. In-depth responses revealed that this process largely occurred in childhood, learned from parents, family, friends and sometimes religious teachings. An anthropocentric sense of moral obligation was found to underpin intentionally pro-environmental actions.

Chapter 6 Results: Economic motivations

The third of three results chapters, Chapter 6 utilises Goodland and Daly's (1996) definition of 'economic' to present the findings related to economic motivations. The chapter also follows the pattern of describing outer layer findings first, then discussing middle layer findings and then deepest layer findings. Economic motivators were found to be more influential than either environmental or social drivers in the outer layer of motivation. However, they had less relative influence in the middle layer of motivation. Deepest layer discussions provide some insight into ways in which in-depth respondents had assimilated the finance-related views and practices of their parents and families. This chapter also discusses the importance of government leadership, support and infrastructure, with particular reference to financial incentives for household solar technologies, the Y Green program and recycling schemes.

Chapter 7 Integrating the findings ready for use

The last chapter combines all findings across the motivational categories, triangulating results where practicable. It begins with a holistic view of the outer layer of motivation, then discusses the findings relating to the middle and deepest layers of motivation in light of The Self-Determination Theory of motivation (Ryan & Deci, 2000b) and normative explanations of helping (Schwartz, 1973, 1977), postulating how the elements of these two theoretical constructs explain the findings of this research. Policy and program implications distilled from the findings are detailed, along with areas that may benefit from further research. The thesis concludes with some final reflections.

Next, Chapter 2 reviews a broad range of relevant literature, with a particular focus on Self-Determination Theory (Ryan & Deci, 2000b, a), normative explanations of helping (Schwartz, 1973, 1977) as well as other social science models found to be relevant to the research question and research into pro-environmental behaviour. It outlines the reasons why the thesis structure utilises the three pillars of sustainability for its structure.

Chapter 2 Lessons from the literature

There is nothing so practical as a good theory – Kurt Lewin (Lewin, 1951)

Summary

Self Determination Theory (SDT) states that motivation can be supported by autonomy, relatedness and contextual conditions, and autonomous motivation provides better outcomes than extrinsic motivators. Several values-based theories that have commonalities with Schwartz's 'normative explanations of helping' assist in understanding the intentionally pro-environmental behaviours of individuals. Schwartz's model describes three components: an awareness of consequences (AC), here mainly referring to environmental consequences of taking a specific action; a sense of personal moral obligation to act; and a self-perception that one has the capability to act and has control over the consequences of their actions. Childhood social learning and opportunities for direct contact with nature tend to predict concern for nature, and adults can assist children to become environmentally responsible adults by encouraging pro-environmental behaviour, a sense of competence, civic action and competence in collaborating. Normative influences on individuals' behaviours have been found to be potent, yet they seem to often go undetected by the individuals themselves. Sustainability is inherently anthropocentric, aiming to integrate human and environmental interests, has the flexibility to continue to evolve, is in common practical usage, and therefore has been chosen as the framework for this thesis. Relevant aspects of the values-based behaviour models align with social, environmental and economic pillars of sustainability. Here, sustainability is defined in accordance with Goodland and Daly's (1996) definitions of the three pillars. Thus social sustainability focuses on community participation, shared values, equal rights and community, religious and cultural interactions; environmental sustainability focuses on protecting the sources of raw materials used for human needs and ensuring that the sinks for human wastes are not exceeded; and economic sustainability maintains natural, human-made, social and human capital.

The three sustainability pillars also have links with the research tasks needed to develop effective program-specific communication strategies. The research focus area encompasses the demographically diverse local government areas of Blacktown, Penrith, Hawkesbury and Hills Shire. Three local climate change mitigation programs coincided with the research timeframe, each influencing the study to some degree. Of these, the study is most influenced by the UWS-conducted evaluation of the Y Green Rouse Hill home sustainability audit project.

The importance of values

Values motivate

Environmental psychology has found that altruistic and biospheric oriented values and personal norms generally predict pro-environmental intentions and behaviour (Stern, 2000, Schultz, 2001, Dietz, 2005, Kalof & Satterfield, 2005, Snelgar, 2006, Barr & Gilg, 2007, Whitmarsh, 2009, de Groot & Steg, 2010) although it should be noted that most of the relevant studies rely on self-reports rather than examinations of behaviour (Dietz, 2005). As might be expected, in the interplay between values and motivation, the higher the altruistic and biospheric value orientation, the more self-determined one is to act pro-environmentally (de Groot & Steg, 2010). Furthermore the value-behaviour link is sometimes strengthened by feelings of connectedness to nature, a feeling of being part of nature and sometimes through an attachment to a particular natural place (Mayer & Frantz, 2004, Schultz et al., 2004, Gosling & Williams, 2010).

Values underpin personal norms and morals

As the thesis draws on a range of traditions from across disciplines, it is multi-stranded rather than descriptive of one thread of a single thought tradition. Yet several of the main theoretical models discussed rely on Schwartz's (Schwartz, 1973, 1977, 1992, 1994, 2006) conceptualisation of values. This conceptualisation was empirically derived from co-ordinated international research. So, while also discussing human values as conceptualised by others, the thesis returns to Schwartz's work where needed. Values: are beliefs tied to emotion, not objective ideas; are motivational standards of behaviour referring to the desirable goals an individual strives to attain; are abstract in that they transcend specific situations;

guide selection or evaluation of behaviour, and are ranked according to relative importance in relation to each other (Schwartz, 1973, 1992, 2006). Schwartz identified ten basic values which he grouped into four areas of a 'circumplex' or circular continuum model. The circumplex model shows: the Openness to Change area which includes the values of self-direction, stimulation, hedonism; its near neighbour Self-Enhancement which includes the values of achievement and power; its near neighbour Conservation which includes security, and conformity and tradition; its near neighbour Self-Transcendence which includes benevolence and universalism: which abuts the first area of the circle, Openness to Change. These areas, and the values within, are closely aligned, congruent in nature or in conflict with each other (Schwartz, 1994, 2006).

Personal norms are an individual's self-expectations for taking specific action in particular situations and are experienced as feelings of moral obligation rather than intention (Schwartz, 1977). Underpinned by values and the antecedent of personal norms (Schwartz, 1973), morals are an individual's guide for distinguishing right from wrong and tend to be so internalised as to be almost intuitive, with people feeling moral responses to trigger situations prior to cognitively formulating justifications for their responses (Haidt, 2012). Human morality seems to have co-evolved with physical and social evolution, and results from both individual and group selection. Morality evolved as it aided survival and protection of the group (Darwin, 1871, Haidt, 2012, Wilson, 2012). Haidt (2012) empirically identified the following six sets of moral foundations which he expresses as continuums between good/bad dichotomies: care/harm, fairness/cheating, liberty/oppression, loyalty/betrayal, authority/subversion and sanctity/degradation. While these foundations for a sense of morality are innate, the actual strength of each moral sensibility differs according to culture, personality and experience (Haidt, 2012). In a culturally based example, Western, educated, industrialised, democratic and rich (WEIRD) cultures tend to be more individualistic while non-WEIRD cultures tend to be more collective in outlook.

That political conservatives are now more inclined to be sceptical of anthropogenic climate change than are liberals (Whitmarsh, 2011, Leviston & Walker, 2012, Reser

et al., 2012d, Hamilton, 2013, Lewandowsky, in press 2013) may be at least partially explained by Haidt's (2012) research. Haidt found that political liberals, being those who align more with left-wing politics, focus most strongly on the foundations of fairness and care, with their approach to care being the aim of limiting harm. Interestingly, this aligns with the concept of mitigation. In contrast, political conservatives have a higher sensitivity to all six moral foundations. In regard to the fairness/cheating foundation, conservatives have a stronger focus on proportionality, i.e. not accepting more responsibility than is proportionally warranted and the expectation that everyone should undertake their fair share of work rather than receive a 'free ride'. While they may have a strong sense of care for in-group members, conservatives are less likely to extend feelings of care to out-groups. It is possible that in-groups are not considered at threat by climate change. Note that the six moral foundations focus on belonging to a group and seem to inherently reference other humans. Nevertheless, it may be that where an individual feels a connection with nature or a belonging to nature (Mayer & Frantz, 2004, Schultz et al., 2004) they extend to nature their sense of moral obligation.

Some types of anthropocentrism promote pro-environmental behaviour

From their review of the literature, Kalof and Satterfield (2005) identified two broad types of environmental values. *Axiomatic values* are expert-driven and aim to protect the intrinsic worth of an ecosystem, species or by extension to mitigate against the dangers of climate change. In contrast, *relativist or subjectivist values* are guided by individual human preferences. Rather than imply 'right' or 'wrong', they express differences between preferences. It seems likely that climate change mitigation programs that combine axiomatic and relativist values can provide the broad engagement called for by Hoppner and Whitmarsh (2011) by tapping into people's intrinsic motivation and enhancing their self-efficacy in reducing carbon emissions. Example programs include carbon reduction action groups (CRAGs), Transition Towns (Hoppner & Whitmarsh, 2011), Carbon Conversations (Todhunter, 2011), the Y Green Home Sustainability project (Barry et al., 2009), Regenesis (Australian Carbon Traders, 2010) and Blacktown Solar City (Australian Government Solar Cities, n.d.).

The axiomatic tradition developed from ecological economics e.g. Constanza (1995) and Goodland and Daly (1996), which seeks to manage natural resources for the benefit of society, and from environmental ethics, being the reasoned basis for defending 'right' or 'wrong' conduct toward the biophysical world, e.g. Callicott (1990), (2005) and Norton (2005). Callicott's (2005) belief in a deeply felt, widely shared moral intuition regarding the *intrinsic value* of the biosphere appears untested and does not fit Haidt's (2012) empirically tested moral foundation framework, except perhaps where there is an extension of moral obligation to nature. Yet Callicott calls for an environmental ethics theory that is humanistic but not anthropocentric. More persuasively, Norton (2005) argues that as environmental ethics *cannot* derive from either non-humans or the yet unborn, they *are inherently anthropocentric*, so he calls for a *weak anthropocentrism* that seeks human harmony with nature as opposed to a *strong anthropocentrism* which heavily exploits nature. Furthermore, Norton argues that an environmental ethic needs to be non-individualistic which is in line with evidence that pro-environmental behaviour is positively correlated with altruism (Mayer & Frantz, 2004, Fraj & Martinez, 2006, Kaiser & Byrka, 2010).

Religion may provide a moral obligation for pro-environmental action

Clearly related to ethics, morals, values and personal norms, religions are considered by Haidt (2012) to play a Durkheimian or functional role in societies, by creating and fostering groups and caring for in-group members. There has been considerable discussion of White's 1967 (1995) assertion that Christianity's belief in human dominion over nature is a root cause of ecological problems with some accepting this and others decrying it (Black, 1997, Jenkins, 2008). Yet among people with religious beliefs, environmental values and behaviour vary according to the specific beliefs and practices already embedded. For example, climate change might be seen as a punishment, or as something that only God controls, or it can be seen as a threat to God's creation which we are responsible for protecting (Wolf & Moser, 2011).

Some Christians for example argue that Christianity can do more than it currently does to help alleviate environmental problems (Jenkins, 2008, Bergmann, 2009,

Pearce et al., 2009). Where belief in the Bible as the inerrant word of God accompanies its interpretation as directing human stewardship of nature, the notion of stewardship becomes an ethical guide, which may be further enhanced through related church participation (Sherkat & Ellison, 2007). Such a theocentric view suggests that every act taken toward others and toward nature finds its meaning and value in God and a similar obligation for being considerate and charitable toward others is required toward nature (Hoffman & Sandelands, 2005). Similarly, in Islam, it is believed that God has granted to humans all the resources of nature with an obligation on the part of humans to conserve them both quantitatively and qualitatively (Al-Damkhi, 2008). However, as religion influences political orientations which often inform environmental beliefs and actions, Sherkat and Ellison (2007) found that membership in conservative Christian denominations and church participation drive political conservatism. As political conservatism is associated with climate change denial (Hamilton, 2013), this raises the question of whether this is also the case among the more conservative Christian denominations an area that may warrant further research.

The degree to which religion can potentially affect environmental practice is considerable, although this may be on the decline. In the 2011 Australian Census, about 70% of respondents nominated a personal religion, the great majority indicating a form of Christianity but the 70% also represented Hinduism, Sikhism, Buddhism and Islam, reflecting immigration patterns, as well as other religions. The largest single broad change in the 2011 religion statistics compared with the previous 2006 census was the increase in those stating 'no religion', up from 18.7% of the population in 2006 to 22.3% in 2011, continuing the ongoing trend of increasing selection of the 'no religion option'. This proportion has almost doubled over the past 20 years (A.B.S., 2012b, Profile id, 2012b, Zwartz, 2012, Profile id, 2013a).

In contrast to religion-based moral obligation to environmental protection, spiritual feelings activated by and in natural surroundings may have no particular moral basis, yet may result in increased feelings of responsibility for environmental protection. In a Victorian study, Snell and Simmonds (2012) found that feelings

of awe, wholeness and connectedness can promote increased psychological well-being, pro-environmental behaviour, a desire to protect environments, personal changes, the formation of vivid memories and increased contact with nature. For some, such feelings co-exist with religious beliefs and may be considered as part of a religious experience, while for others such feelings are unrelated to religion (Snell & Simmonds, 2012). Irrespective of whether their source is religion, spiritual and/or feelings of a connectedness to nature, where positive feelings regarding nature promote stewardship for the environment, they may promote climate change mitigation actions.

Openness to experience, honesty-humility link to pro-environmentalism

Studies into links between pro-environmental behaviour and the 'Big Five' personality dimensions - extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience and 'HEXACO' personality dimensions - honesty–humility, emotionality, extraversion, agreeableness, conscientiousness and openness to experience agree on the positive correlation with openness to experience but are equivocal regarding relationships with the other dimensions (Hirsh, 2010, Hilbig et al., 2012, Markowitz et al., 2012, Milfont & Sibley, 2012). Agreeableness was sometimes found to be a pro-environmental indicator using the Big Five (Hirsh, 2010, Milfont & Sibley, 2012). However, using HEXACO, Hilbig (2012) found otherwise, explaining that agreeableness demonstrates re-active cooperativeness reliant on other leadership rather than being a driver of pro-active behaviour. Furthermore Hilbig found that those high in the honesty–humility scale tended to show more pro-environmental behaviour. He postulated that this may be partly due to those high in honesty–humility being less engaged in high status consumption and partly due to the cooperativeness of those high in honesty–humility, which may lead them to participate in joint pro-environmental projects likely to have larger impacts than individual projects.

Values have been found to be key predictors of pro-environmentalism

Values have been found to be more predictive of pro-environmental intentions than motivations, suggesting that people do not act out of environmental motivations

alone and that pro-environmental behaviours are based on multiple motivations (de Groot & Steg, 2010). Values tend to be stable over time and are not easily changed. However, there may be scope for making biospheric and altruistic values which are related to pro-environmental behaviour, more salient in a specific situation, or weaken the influence of egoistic values which are associated with reduced pro-environmental behaviours (de Groot & Steg, 2010). There remains the question of how individual values could be better utilised in collective decision making (Dietz, 2005). Within a corporate culture, upper management must be perceived as committed to sustainability in order for middle managers to exemplify and support sustainability behaviour, even where middle managers are personally pro-sustainability (Andersson et al., 2005).

Social Dilemma Model gives perspective combining values & conditions

Gifford's (2008) ongoing integration of the many influences on and outcomes from social dilemmas, like climate change, has included development of a heuristic model showing the complexities in the decision-making of individuals. The model is also useful in seeing how the components interact and how they are likely to affect group decisions. Gifford's Social Dilemma Model is built from the following major components:

- Influences that may be from geophysical, governance, decision-maker, interpersonal, and/or technological factors;
- The level of awareness of the dilemma, and whether or not such awareness causes anxiety;
- The decision-making strategies used by decision-makers;
- Outcomes for decision-makers, e.g. social reprobation or admiration; and
- Environmental outcomes.

While the model does not explicitly refer to transdisciplinarity, it provides a clear argument for why such cooperative approaches are required for social dilemmas or 'wicked problems'.

Model commonalities may be useful

Theories and models based on values and normative explanations of helping (Schwartz, 1973, 1977, 1992, 1994), the Theory of Planned Behaviour (Ajzen, 1991, 2002), ABC Theory (Guagnano et al., 1995), the Value-Belief-Norm Model (Stern, 1999, Stern, 2000) and the Social Dilemma System model (Gifford, 2008) have commonalities, although this thesis does not claim that they are by any means the same. Rather, the degree of shared scholarship history, overlapping interest in human motivation for altruistic and pro-environmental behaviour and approaches to environmental dilemmas enables them to be used to supplement each other. Interestingly, the major components of each of the values and normative theories and models mentioned above can be categorised to relate to the three major strands of the others and to the social, environmental and **economic aspects of sustainability, as discussed later in this chapter.**

The largely unrecognised power of normative influence

Personal norms derive from socially held norms (Schwartz, 1973). Research shows that people want to act consistently with social norms and the tendency of human behaviour to conform with social norms is known as 'normative influence'. One type of normative influence is that of 'social proof', exemplified by situations in which many people behave in a certain manner in a given situation, leading others to accept that this is the correct behaviour in the situation, and follow suit. For example, an experiment showed that people staying in hotels are more likely to re-use towels, rather than have them collected for washing each day, when the messaging states that most of the hotel's patrons re-use their towels; however the frequency of towel re-use was lower when messaging invoked patrons to re-use towels for the sake of the environment (Cialdini, 2003, Goldstein et al., 2007, Cialdini, 2009). It has been shown that people are most likely to seek social proof of how to behave in a situation when facts or threats of danger are unclear, resulting in feelings of uncertainty (Cialdini, 2009), and the link between this and climate change is discussed shortly. Furthermore, people especially like to be consistent *with the normative behaviour of people like themselves,* which may help to explain increased rapidity in the diffusion of innovations where potential adoptees learn the benefits of an innovation from someone they perceive to be like themselves

(Rogers, 1983). Intriguingly, while the perception of whether someone is like oneself may be based on obvious similarities or commonalities, like gender, age, friendship or shared interests, this is not always necessary. For example in the hotel towel re-use experiment, patrons *were even more likely* to re-use the towels when the messaging stated that most people who had stayed *in that particular room* had done so (Goldstein et al., 2007, Goldstein et al., 2008).

Rather than presenting examples or statistics on the behaviour that is being discouraged, normative appeals for improved environmental behaviour can be optimised by focussing on the helpful actions that other people already actually people do, (Cialdini, 2003, Goldstein et al., 2008). This aligns *descriptive norms*, i.e. what people – especially people like those in the target audience - typically do with *injunctive norms* i.e. what is wanted for them to do (Cialdini, 2003). Naturally, it is essential for the specific information in such appeals and campaigns to be both honest and verifiable to ensure and retain credibility. A remarkable aspect of normative influence is the lack of self-awareness held by individuals regarding how strongly it affects their behaviour. For example a large-scale experiment comparing descriptive norm messaging on the positive energy-saving behaviour of people in the local community with messaging appealing to money-saving and environmental motivations demonstrated that the descriptive norms were more potent in achieving energy use reductions. These results were verified by electricity meter-readings. Interviewed participants typically considered the descriptive norm messaging less influential on their behaviour than the money-saving or pro-environmental motivations, implying a lack of self-awareness of what really drove their behaviour. These findings are in line with Nisbett and Wilson's (1977) findings that people may not notice their own change in behaviour and/or wrongly attribute its cause to themselves. Nolan's study concluded that despite people not believing that the behaviour of others should influence them, it did, and along with the hotel towel re-use experiment, the findings provide compelling evidence that using appropriate descriptive norms enhances the pro-environmental behaviour of individuals (Nolan et al., 2008).

Three factors create *intentional* pro-environmental action

For some time, Schwartz's normative explanations of helping (Schwartz, 1973, 1977) has been recognised for its ability to explain actions that are intentionally altruistic as well as those that are pro-environmental, because pro-environmental actions are also seen to be for the community good (Stern, 2000). Schwartz's theory explains that personal norms have sanctions tied to the self-concept, so that one's anticipation or actual violation of the norm, results in guilt, self-deprecation and loss of self-esteem, while behaviour that accords with the norm, results in pride, enhanced self-esteem and a sense of security. A personal norm's most central characteristic is the intensity of moral obligation felt by the individual to engage in a particular behaviour (Schwartz, 1973). Schwartz (1977) argued that personal norm activation necessitates one's awareness of consequences (AC) in a relevant situation – for example realising that sourcing electricity from coal-fired generators adds to greenhouse gas emissions which adversely impact climate systems. Norm activation simultaneously requires ascribing responsibility (AR) to oneself. AR includes two aspects: holding personal norms based on a sense of moral obligation requiring action pertinent to the consequences, and feeling capable of controlling the action and its outcomes (Schwartz, 1973), in for example, taking actions that reduce electricity use.

Both AC and AR are strongly challenged by anthropogenic climate change, with its diffusion of responsibility and the accurate assessment that any one individual's mitigation action has minimal effect in the overall scheme. Some argue that this is causing a 'bystander effect', the term for the empirical finding that when others are present and an emergency or an attack on someone occurs, people are slow to intervene, waiting for someone else to act first, then perceiving the behaviour of earlier responders as 'social proof' that action is needed (Marshall, 2003, Gifford, 2011). With reference to the passive involvement of average citizens in the holocaust, Booth (2012) argues that bystanding is morally wrong; furthermore that citizens in high carbon emitting countries, such as Australia, are largely non-acting bystanders who need encouragement to lobby governments to undertake effective mitigation and adaptation actions. Stepping beyond Jackson's (2005b) observation that consumers are often 'locked into' unsustainable consumption patterns by

factors beyond their control, Booth argues that while individuals do not have the capability to end or strongly reduce Australia's embedded reliance on fossil fuels, they do have the capability of lobbying governments to do so. The problem, as outlined in Chapter 1, is that so far there has not been broad scale, ongoing agreement on how this should be done. Referring to Schwartz's theory, perhaps another problem is that although individuals may have the ability to take actions that lobby government they cannot necessarily control the outcome, in that they cannot be sure of success and this is likely to reduce the numbers of people willing to take this course.

The Theory of Planned Behaviour (TPB) seeks to predict an individual's specified action in a specified context. In developing TPB, Ajzen revised the Theory of Reasoned Action to include *perceived behavioural control*, the subjectively perceived degree of control over performance of the behaviour (Ajzen, 1991, 2002). While borrowing from Bandura's work on self-efficacy (Ajzen, 2002), TPB also echoes the capability and control aspects of ascription of responsibility to self or AR. Ajzen (2002) postulated that perceived behavioural control included both internal (self-efficacy) and external aspects. This raises no inconsistencies with AR. Interestingly, perceived behavioural control has been found to be an accurate proxy for external contextual factors where barriers to the particular behaviour are obvious, e.g. where lack of public transport means people need to drive. However when barriers are aggregated across several behaviours, accuracy fails (Kaiser & Gutscher, 2003). This is consistent with Ajzen's (1991) claim that TPB is accurate only in relation to a specified action within a specified context. A more serious limitation of TPB is that because it focuses only on decided intentional actions, it does not take account of key behavioural aspects that are normative, affective or habitual (Jackson, 2005b).

Egoistic, altruistic and biospheric values as drivers of *intentional* behaviour

Schwartz's awareness of consequences (AC) and ascription of responsibility (AR) concepts provide two of five causal chain variables leading to behaviour in the Value-Belief-Norm (VBN) model (Stern, 2000). The chain begins with personal

values which can be classified as egoistic, altruistic or biospheric and which can be measured by the New Ecological Paradigm (NEP), an environmental attitude measurement scale implicitly acknowledging that humans are impacted by the limits of natural resources and waste repositories (Dunlap et al., 2000, Dunlap & Van Liere, 2008). The causal chain moves to include AR and AC beliefs about general conditions in the biophysical environment, then on to include personal norms for pro-environmental action which lead to behaviour. Testing the VBN theory, Schultz (2001) found that people cluster their *environmental concerns* according to how environmental problems will impact self (i.e. underpinned by an egoistic value), other people (underpinned by an altruistic value), or the biosphere (underpinned by a biospheric value). Schultz postulated that the type of concerns an individual develops is based on the degree to which they perceive an interconnection between themselves and other people or between themselves and nature. Snelgar's (2006) study found that egoistic and altruistic values were more closely aligned than were altruistic and biospheric values. This means that there is a stronger division between values relating to human and non-human objects and life forms, than between values relating to oneself and other people.

Note that the VBN model and its related egoistic, altruistic and biospheric value concepts were developed and tested to describe only *intentionally* pro-environmental behaviours. While, pro-environmental behaviour driven by biospheric values is intentionally pro-environmental, this is not necessarily the case for egoistic or altruistic motives. For example, one might want or need to save energy to reduce pressure on the family budget. While this might be altruistic in that it seeks to care for one's family, it has no pro-environmental intent. Of course, one might also have a combination of motives that includes both protecting the family budget and the environment.

Note also that AC and AR are implicit in the Attitude aspect of Guagnano, Stern and Dietz's work on Attitude, Behaviour, Conditions i.e. ABC Theory (Guagnano et al., 1995). The VBN theory relies on the notion that predisposition for pro-environmental action is contingent on an individual's beliefs about who or what is impacted by environmental conditions, how valued they are by the individual, and

whether there are actions that can mitigate against the threats to them (Stern, 2000). That an individual's pro-environmental personal norms and predisposition to act may be influenced by information pertaining to these beliefs highlights the interdependence of AC and AR. Furthermore it raises the possibility that when those negatively impacted by environmental problems are not particularly favoured, people may see little reason for taking pro-environmental actions that protect them.

Childhood learning and nature contact predict pro-environmentalism

Despite scope for further research in this area, childhood concern for the natural world as shaped through social learning and opportunities for direct contact with nature are clear predictors of pro-environmental behaviour in adulthood: (Chawla, 1988). In this context, childhood activities in nature seemed to be mediated (or explained) by affinity with nature (Palmer et al., 1999, Hinds & Sparks, 2008). Furthermore, those with rural childhoods have more positive affective connections with nature, stronger natural place identification, stronger behavioural intentions, more positive attitudes, and greater personal behavioural control about engaging with the natural environment than do those with urban childhoods (Hinds & Sparks, 2008, Muller, 2009). Affective connection with nature was found to independently predict pro-environment engagement intention, whereas place identification so predicted only in combination with affective connection (Hinds & Sparks, 2008). Some argue that unsupervised childhood play in nature improves the mental and physical health of children and assists them in building self-confidence (Louv, 2009, Nature Deficit Disorder, 2010). Bixler and colleagues (2002) found that childhood play in natural 'wildland' environments is related to young adult environmental competencies and recreational preferences but not necessarily to intellectual interest in environmental sciences or environmentalism.

Deci and Ryan (1985) describe a process through which an individual child progresses toward self-determined regulation. Firstly, competence is essential in that children should be requested to undertake tasks according to the level of their development, so in the case of pro-environmental actions, those fitting of their ability to understand mutual obligation and to carry out the action. Secondly, any level of level of conflict with intrinsic motivations for alternative actions should be

considered. Such considerations might lead adults to align the behaviours with children's sense of fun. Thirdly, there should not be undue pressure to comply.

Chawla and Flanders Cushing (2007) postulate that adult modelling and encouragement of four conditions assist children to become adults with a sense of environmental responsibility. The conditions are: responsible environmental behaviour in private and public spheres, which aligns with a personal norm of moral obligation to behave pro-environmentally (Schwartz, 1973); a sense of individual competence, aligning with self-perceived capability to take actions and control their outcomes (Schwartz, 1973, Ajzen, 2002); civic action; and collective competence because many effective or high impact actions require political and/or collective behaviour which aligns with observations by Stern (2000) and Booth (2012).

Individual mitigation intent, or lack of it, is not directly related to impact

(Stern, 2000) made an important distinction between pro-environmental *intent* and *impact*, showing that the intention of benefitting the environment does not necessarily have the desired impact. Further understanding of *impact-oriented* behaviour is important for generating knowledge on identifying actions that are preferable because they make a large pro-environmental impact. Knowledge of *intent-oriented* behaviours can be used to identify knowledge gaps and re-orient actions so that they will better meet their intention by producing more effective impacts (Stern, 2000). In her UK survey which used Stern's intent/impact distinction and VBN framework (2000), Whitmarsh (2009) gained results implying that *intent is not necessary for mitigation action to occur and even where there is greenhouse gas reduction intent, it does not necessarily have much impact.* Less than a third of her survey respondents took action due to concern for climate change, however those that did so, acted due to a sense of moral obligation to do so. Respondents often had multiple reasons for pro-environmental actions, and their most common pro-environmental activity was recycling which, depending on the actual processes involved, assists mitigation but probably to a lesser degree than reduced driving or reductions in energy use. Interestingly, energy use was not seen as a moral issue and the main reason for active reductions was financial. Whitmarsh

(2009) also found that actions to reduce car travel and energy use were mainly motivated by reasons unrelated to the environment, and there was greater willingness to reduce domestic energy consumption than to change travel habits. On the other hand, while socialisation of children and adolescents seems to play a role in whether or not young adults prefer to use cars or public transport (Haustein et al., 2009), there is evidence in Australia and elsewhere that young adults are increasingly using public transport, walking and cycling, possibly motivated by the efficiency of using mobile phones and Ipads to undertake work and/or recreation during public transport trips rather than concerns over climate change and/or the environment (Munro, 2012).

In contrast, Booth (2012) approaches the impact/intent relationship from the standpoint of promoting large scale transitional action. Booth is not alone in arguing that even in aggregate, individual actions are unlikely to have the required mitigating power to forestall severe climatic changes (Uzzell & Räthzel, 2009, Shove, 2010). Across the literature, and perhaps related to the disciplinary approach, there is a continuum of views as to the level of effectiveness that individuals really have regarding climate change mitigation. Booth in particular argues strongly that they have little, except at a political scale. Wolf and Moser (2011) strongly link the personal and political scales, pointing out that cognitive and affective engagement with climate change issues are important motivators of personal and political actions. Booth argues that individual intent is undermined by a range of issues, including knowing that individual or household reductions have only tiny impacts; the context of a society '*whose cogs turn on fossil fuels and whose temptations are often greenhouse gas costly'*; and free-riding or refusal (Butler, 2010, Booth, 2012). Rather than focus on everyday personal actions, Booth calls for moral-based appeals that encourage citizen activism, because of its greater potential for impact in breaking societal reliance on fossil fuels. Such activism occurs in Australia through larger organisations such as GetUp and Oxfam which facilitate online petitions, advertising of climate-related issues and community gatherings, and through smaller groups including Frontline Action Against Coal, perhaps best known for its less orthodox, morally questionable step of faking an ANZ Bank media release to gain attention for the environmental problems of open-

cut mining including climate change (Ker & Cubby, 2013, GetUp, n.d., Oxfam, n.d.-a). Booth concedes that activism faces the uncertainties of all political actions and may fail, in some circumstances even to the point of increasing resistance to change.

Where conditions foster action, a sense of moral duty is not needed

Whitmarsh's (2009) finding that lacking a sense of moral obligation to act does not preclude pro-environmental behaviour where conditions facilitate that behaviour support previous findings. These include findings by Corraliza and Berenguer (2000) that interactions between personal and situational variables are influential in whether or not an individual acts pro-environmentally. Furthermore, ABC Theory explicitly includes 'conditions' to clarify the relationship between attitudes and conditions in enabling or restricting behaviour (Guagnano et al., 1995). While Stern conceptualised conditions like economic and political context as external to the VBN framework, he did consider them as potential influences on action (Stern, 2000). Gifford's Social Dilemma approach (2008) provides a thorough taxonomy of internal and external influences on an individual's decision-making regarding the environmental impacts of their actions.

Where policy-makers rely on psychology-based models to the exclusion of conditions such as financial factors, governance systems and infrastructure, there is valid cause for criticism (Uzzell & Räthzel, 2009, Shove, 2010, 2011, Whitmarsh et al., 2011b), just as excluding the available psychological knowledge would be foolish (Gifford, 2008). In line with Uzzell and Rathzel's (2009) call for a relational view of individuals, society and their reciprocal relationships with the environment, this thesis seeks to draw on knowledge from the models so far discussed, in combination with consideration of contextual conditions to view empirical findings on personal motivation. Such a relational view is essential given the disparity between Australia's massive reliance on fossil fuels and the current focus on small scale individual actions in appeals to the public for mitigation action (Booth, 2012).

Three factors can support autonomous motivation

The empirically based Self Determination Theory (SDT) provides insight into human motivation and ways in which motivations can be supported to achieve behavioural action. Table 2.1 outlines Ryan and Deci's (2000b) continuum of degrees of self-determined motivation, from the complete lack of motivation, being amotivation to the most self-determined form, being intrinsic motivation. An individual's *intrinsic* motivation is activated only for behaviour that hold intrinsic interest for them, i.e. novelty, challenge, or aesthetic value. However most human activities are not intrinsically motivated, especially after early childhood when social demands and roles require responsibility for tasks and behaviour that is not intrinsically interesting (Ryan & Deci, 2000a).

On the other hand, *extrinsic* motivation is activated by external rewards or threats of punishment. *Autonomous* motivation includes both *intrinsic* types of motivation and *extrinsic* types of motivation, but in the latter case only where the value of the activity or goal has been fully integrated into the sense of self. In contrast, *controlled* motivation, consists of extrinsic motivation plus *introjected regulation*, activated by approval from others and avoidance of shame (Deci & Ryan, 2008). The internalization and assimilation of external social mores occurs in four stages. At first there is external regulation, where integration has not occurred at all and motivation is completely reliant on external factors. The second stage is introjected regulation, reliant on partially internalized values. Thirdly, there is identified regulation in which there is recognition and acceptance of the underlying value of behaviour. Finally in integration, there is a complete internalisation (Deci & Ryan, 2000). Both autonomous and controlled types of motivation energize and direct behaviour, while amotivation is the lack of intention and motivation.

Table 2.1 Self-Determination Theory motivation types

Each is listed with its related regulatory style, locus of causality and regularity process. The continuum reads from top to bottom, from the least self-determined lack of motivation or amotivation, to the most self-determined type, intrinsic motivation. Autonomous types of motivation are shown in grey. Where extrinsic motivation values have been fully integrated into the sense of self, motivation is also considered autonomous.

Motivation	Regulatory style	Perceived locus of causality	Relevant regularity processes
Amotivation	non-regulation	impersonal	non-intentional, non-valuing, incompetence, lack of control
Extrinsic motivation	External regulation	External	Compliance, external rewards and punishments
Extrinsic motivation	Introjected regulation	Somewhat external	Self-control, Ego-involvement, internal rewards and punishments
Extrinsic motivation	Identified regulation	Somewhat internal	Personal important, conscious valuing
Extrinsic motivation	Integrated regulation	Internal	Congruence, awareness, synthesis with self
Intrinsic motivation	Intrinsic regulation	Internal	Interest, enjoyment, inherent satisfaction

Autonomous motivation

Source: Adapted from Ryan and Deci (2000b) and Deci and Ryan (2008)

SDT asserts that achievement of feelings of competence and both intrinsic and extrinsically motivated goals can be assisted by three factors: autonomy, relatedness and contextual conditions (Ryan & Deci, 2000b).

Autonomous motivation is more effective than extrinsic motivation

SDT's description of the process of internalization and assimilation of social values (Deci & Ryan, 2000) seems to be one of the likely mechanisms occurring in situations cited by Cialdini (2009) where people who initially agreed to undertake one small task, later agree to undertake more burdensome, related tasks. Cialdini further argues that the human need for consistency also plays a part in such situations, so that once someone has undertaken a small task, e.g. performed a small community service, they begin to see themselves as someone who performs services to the community and they are more likely to do so in a range of situations. Deci, et al. (1994) identified three components for making requests that support the

autonomy of the individual (or group) of whom the request is being made. Firstly, perspectives of the individual/group should be acknowledged, e.g. if the action is difficult, it is important to acknowledge this and empathise with their situation, so people know that you recognise the effort they will need to make. Secondly, the group/individual should be allowed as much choice as possible in how they might go about complying with the request, so they retain as much autonomy as possible. Thirdly, there should be provision of a rational reason for the request – why this action is needed.

Persistence in pro-environmental actions is more successfully achieved by autonomous and especially intrinsic motivation than by controlled and extrinsic motivation (Pelletier et al., 1998, Pelletier et al., 1999, Darner, 2009, Black, 2010, Darner, 2012). So additional to the limits of political acceptance of punitive measures to curb greenhouse gas emissions, such measures can undermine people's intrinsic motivation and enjoyment or feelings of achievement from taking mitigation steps. Punitive measures may even reduce the chances of further mitigation actions because people tend to dislike and even avoid a domain in their life where they attribute their related behaviour to external punishment or threats of it (Osbaldiston & Sheldon, 2002).

Some research suggests that intrinsic motivation is more potent alone than in combination with extrinsic motivation (Pelletier & Sharp, 2008) yet there is also evidence that extrinsic motivation may assist (Tabernero & Hernández, 2012). Without resort to extrinsic motivators, an Australian study combined intrinsic motivation with technology that gave feedback on electricity use. This resulted in reduced energy consumption by young adults, a group considered resistant to adopting pro-environmental behaviours (Black, 2010). Autonomous motivations combined with stronger perceptions of self-efficacy seem to increase pro-environmental behaviour (Tabernero & Hernández, 2011, 2012). In support of this, government autonomy-support was found to positively contribute to autonomous motivation for more frequent pro-environmental behaviour. On the other hand, perceived government control was related to both controlled motivation and

amotivation, resulting in less frequent pro-environmental action (Lavergne et al., 2010).

Petellier and Sharp (2008) postulate SDT integration with message tailoring and message framing for the three phases of behaviour change. This would utilise messaging that outlines the problem for the detection phase; messaging to help people decide whether to take action and what action to take for the decision phase; and information on how to take action for the implementation phase. The approach shows some synergy with Whitmarsh's (2011a) typology of climate change engagement activities. While fostering autonomous motivation, Whitmarsh advocates focussing on individuals for awareness raising at the public level, behaviour change and awareness raising at individual and community levels and increased public involvement in climate change policy and decision making, each with tailored approaches and methods. Currently, there is little understanding of whether and how media information on climate change affects people's mitigation behaviour (Pelletier & Sharp, 2008). It may be counterproductive once the detection phase has passed to present information on the problem rather than on practical options for assisting mitigation.

Diffusion of innovation

It is important to also consider how changes or innovations are transmitted throughout societies and how such diffusion interacts with personal motivation. Sociologist, Everett Rogers' work on the diffusion of innovations provides considerable insight based on empirical findings. In this context, an innovation is an idea, practice or technology, whether or not new, which an individual or organisation may or may not adopt, i.e. they have not yet adopted or rejected it (Rogers, 1962, Rogers, 1983, Rogers, 2003). The most rapidly adopted innovations are those subjectively perceived to: provide a strong relative advantage, being the degree to which the innovation is better than the idea or item it will succeed; offer compatibility being its congruence with existing values, past experiences and needs; be simple rather than complex to understand, which varies according to the cultural context and the experience of those adopting; 'observability' being the extent to which it can be seen in action; and trial-ability, being the degree to which it can be

tested in a limited way to ensure its suitability. While the first few people to take up an innovation or the 'early adopters' are more likely to depend on the salient, often scientific and technological information in making their decision to adopt, most people depend mainly on the subjective evaluation of someone perceived to be like themselves, who has adopted the innovation (Rogers, 2003). Empirical studies into the diffusion of innovations have enabled the players to be categorised into the following ideal types abstracted from the data. Note here that the 'adoption system' refers to the whole group that adopts an innovation, e.g. all Australians who installed solar heating. *Innovators* are fascinated with new ideas and tend to be cosmopolitan rather than localised in their social relationships. *Early adopters* are likely to be opinion-leaders held in respect among peers and they reduce uncertainty about an innovation by adopting it and offering a subjective evaluation of it interpersonally through their networks. Although less likely to be opinion leaders than early adopters and tending to deliberate longer over whether or not to adopt, the *early majority adopters* interact frequently with their peers, represent about one third of an adoption system and are therefore an important link in diffusion. Also representing a third of the adoption system, the *late majority* are more sceptical of innovation and may be more driven by economic necessity to make the change. By definition this group is normatively influenced, in that the normal practice of the adoption system needs to favour the adoption before the late majority will do so. *Laggards* tend to be suspicious of innovation and change agents and tend to be limited in their social interconnectedness (Rogers, 2003). Rogers makes the point, important in the context of climate change mitigation policies, that laggards may well not be to blame for system failures that do not accommodate the needs of all in the potential adoption system, e.g. affordability of an innovation.

Household decision-making structures

In 2011, 71.5% of Australian households were families, with over 80% of these being couples with or without children. An additional 4.1% of households were group households (A.B.S., n.d.). This indicates that Australian households typically have more than one adult, which raises the question of decision-making regarding household mitigation behaviour. A household decision-making survey across 31 countries, including Australia and largely focussing on heterosexual couples, found

that: shared decision-making was more common than individual control; women rather than men use an income advantage to take more control of household decision-making; the level of involvement of the husband is linked to shared management; and shared decision making typically occurs in cultures with higher rates of female employment and more egalitarian gender ideologies (Treas & Tai, 2012). However there is also evidence that a woman's intra-household negotiating power regarding family resources correlates positively with her income (Himmelweit et al., 2013) and this may be related to the Treas and Tai finding that women are more likely to use an income advantage to take more control in household decisions. Fonseca et al. (2012) also found that financial decision-making in households was typically shared, although men seemed to usually have a higher level of financial literacy than did women. These nuanced findings tend to indicate that decision-making in Australian households is likely to be shared yet gender and income variables may influence who makes the final decision on higher cost and higher environmental impact purchases, such as white goods, insulation, solar hot water and PV systems. As women tend to report higher levels of pro-environmental concern and behaviour (NSW D.E.C.C.W., 2010, Wolf & Moser, 2011, NSW O.E.H., 2013) this might be an area worthy of further research.

Household decision-making regarding everyday transport use, especially whether people walk, cycle or use a car is strongly dependent on practical concerns. For example, where young children or the elderly need to be transported, those caring for them (even if they personally prefer walking or cycling) are more likely to use a car even for short distances. This is especially the case where people feel time-pressured, such as when adults take children to childcare or school on their way to work (Pooley et al., 2011).

Additional aspects of human motivation

Motivation specifically born of psychological adaptation

Reser et al. (2012a) argue that knowledge of psychological adaptation and coping provides useful lessons for the climate change context despite such understanding mainly deriving from the study of situations smaller in scale, less threatening in the long-term and less contested than climate change. They point out that threat

appraisal is inherently a response to a perceived threat and that there is no clear demarcation between psychosocial impacts and response. While adaptation includes psycho-physiological responses, such as sensory habituation to changes in stimuli e.g. temperature, it also includes coping, being the more consciously made efforts to adjust (Reser & Swim, 2011, Reser et al., 2012a).

Reser et al. (2012a) consider that climate change mitigation and adaptation broadly align with the psychological concepts of threat appraisal and emotional and problem-focused coping. These authors define *psychological adaptation to climate change* as encompassing community and societal changes in the perception, understanding and responses to climate change; and intra-individual appraisals and responses, and personal management of these internal responses, including protection motivation and coping strategies (Reser & Swim, 2011, Reser et al., 2012a, Reser et al., 2012b). They point out that intra-individual responses have received little attention in the context of climate change despite considerable discussion on the importance of individual behaviour change. They further argue the importance of investigation into the nature and dynamics of individual coping and adaptation to climate change given the influence these have on attitudes, values, understanding and behaviour. Indeed, acts of *intentional mitigation are adaptive coping responses* to climate change (Reser & Swim, 2011).

Reser et al.'s (2012b) analysis of the results of their large survey into climate change perceptions and responses included development of a model. This showed of linear ways in which belief, i.e. acceptance of climate change as a phenomenon, perception of risk and concern, self-efficacy, distress, a sense of responsibility and psychological adaptation to climate change correlated with each other as antecedents to mitigation behaviours. However, no specific causality was shown. Psychological distress in response to the climate change threat (self-reported, as were the other variables) was the strongest predictor of psychological adaptation. Psychological adaptation appeared to be motivating many to take actions, and there were associations between climate change distress and each of: adaptation, felt responsibility, self-efficacy, green self-identity, and behavioural engagement – although it is possible that the level of some factors could have pre-existed concerns

regarding climate change. The study authors noted that psychological adaptation to climate change has both benefits in assisting mitigation, and costs which may include distress.

Motivation-related insights from social psychology

The ultimate aim of this thesis is to inform policies and strategies to become optimally successful in reducing atmospheric greenhouse gases, through creating changes to current human behaviour. Response to the notion of climate change and the level of motivation to take actions that mitigate climate change rely on both intra-personal and inter-personal processes. Humans are inherently a social species, their biology, psychology and culture having co-evolved (Caporael, 2007). Behaviour change of the scale required depends on social processes and social psychology provides insights to the mechanisms involved. Social psychology, especially in North America where the discipline is well-represented, investigates the behaviour of individuals as influenced by others, and/or influences the thoughts, feelings or behaviour of others (Allport, 1954, 1985, Jones, 1998). This definition is agreed even by some who believe these disciplinary boundaries are inappropriate or too narrow (Samuelson, 2000, Greenwood, 2005)

The role of cognitive dissonance in motivation

Cognitive dissonance (Festinger, 1957, Festinger & Carlsmith, 1959) has been one of the most well-known, most tested and most contested theories in social psychology (Nail & Boniecki, 2011). Festinger's (1957) proposition was that cognitive dissonance is essentially a motivator of attitude change, i.e. it acts in the service of reducing the psychological discomfort of any gap between one's own belief and one's own action. The proposition has been supported empirically by many studies over the years (Nail & Boniecki, 2011) and aligns with the basic notion that people generally wish to be consistent in their behaviours, a tendency that increases as people age (Goldstein et al., 2007). Despite limited empirical cognitive dissonance work specific to climate change *causes* (Lorenzoni & Pidgeon, 2006), cognitive dissonance has been suggested as a reason for mismatch between public concern over climate change and continuance of high carbon emitting lifestyles (Becken, 2007, Lorenzoni et al., 2007, Norgaard, 2011).

However cognitive dissonance theory has been *applied* in a diversity of settings (Nail & Boniecki, 2011). Notably, the Osbaldiston and Schott (2012) meta-analysis seeking to identify levels of effectiveness of pro-environmental interventions found that cognitive dissonance approaches based on pre-existing beliefs or attitudes were relatively effective compared with other interventions.

The Theory of Cognitive Dissonance (Festinger, 1957) centres on its implicit acceptance that people desire to behave consistently with their beliefs (Thøgersen, 2004) and, where there is inconsistency, they will go to some lengths to reduce that inconsistency. The theory relies on two hypotheses: *(1) The existence of dissonance, being psychologically uncomfortable, will motivate the person to try to reduce the dissonance and achieve consonance. (2) When dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance* (Festinger, 1957). Furthermore, it is the *net* magnitude of the dissonance that matters (Festinger & Carlsmith, 1959). Therefore *dissonances*, which are the conflicts between belief and action, are *offset by consonances*. Consonances can be anything that accords with the action yet conflicts with the belief. So, consonances can include rewards for taking action inconsistent with belief or threats of punishment for not taking such action.

Bem (1967) argued and demonstrated that the findings of the major types of cognitive dissonance experiments conducted during the theory's first decade of existence could also be explained through self-perception theory, in which an individual considered their behaviour from the viewpoint of someone else and made decisions based on that viewpoint. While Bem's assessment was accurate, self-perception theory was later found not to have the same explanatory power that cognitive dissonance theory had for a range of the research projects later undertaken (Nail & Boniecki, 2011). There is considerable evidence for Aronson's (1968) argument that cognitive dissonance occurs only where important elements of one's self-concept are being threatened (Thibodeau & Aronson, 1992, Thøgersen, 2004, Brehm, 2007) For example those who pre-tested to show high results on a Machiavellianism scale, show little or no dissonance when asked to lie. Factors

that contribute to cognitive dissonance - dissonance elements, consonant elements, social support (for either) and the level of importance of elements depend on individuals' goals, social groups, culture and expectations which influence the reality the individuals perceive (Nail & Boniecki, 2011). Thus the same two relevant cognitive elements may be perceived by one person as dissonant yet by another as consonant, helping to explain some of the disagreement regarding climate change and the actions, if any, we should take.

Counter to Festinger's original expectations that cognitive dissonance is nomothetic there is evidence that perhaps as few as one third of the population is strongly affected by cognitive dissonance (Nail & Boniecki, 2011). Reviews of the work of Cialdini and colleagues on preference for consistency indicates that not everyone feels a strong need for consistency, and that the level for this preference has a considerable effect on decisions (Guadagno & Cialdini, 2010, Nail & Boniecki, 2011). This may also help explain lack of action on climate change even where people state concern.

Several additional concepts outlined in Nail and Boniecki's overview of cognitive dissonance literature have relevance for climate change issues. They point out that three factors - the dissonant elements, the consonant elements and the importance level of the elements (to the relevant individual) can be manipulated to reduce dissonance. This could help in explaining the effects or potential of trivialising or denying climate change, as discussed shortly in relation to Weintrobe and Norgaard. Because cognitive dissonance is the net balance between consonance and dissonance relating to the issue at hand, adding consonant elements reduces dissonance - and perhaps the large income derived by Australia from coal resources outlined in Chapter 1 can be seen as a societal example of this. Nail and Boniecki (2011) point out that the early cognitive dissonance experiments and indeed the theory were pioneering in showing that while we often think of an individual's attitude causing their behaviour, the converse also occurs, that one's behaviour can also affect one's attitude. In relation to this aspect, Cialdini (2009) argues that too large a reward offered to an individual for taking an action achieves compliance only while the reward is offered because the person typically views the action as

something they did to get the reward, not something they autonomously chose to do. He further argues that if the aim is to change or develop behaviour for the long term, the ideal reward is large enough to encourage the behaviour but not large enough to be seen as an excuse for the behaviour. Such a tempered reward is more likely to encourage those who took the action, to later consider that they autonomously chose to do so, internalise the values underlying the action and be more committed to take similar actions in the future (Cialdini, 2009).

Self-concept factors align with personal norms and moral standards (Thøgersen, 2004), hence show commonality with AR (Schwartz, 1973). Furthermore, cognitive dissonance is activated *only* where a specific behaviour would be the logical outcome from a related specific belief or opinion (Festinger, 1957). So, like the Theory of Planned Behaviour (Ajzen, 1991) and ABC Theory (Guagnano et al., 1995), the theory of cognitive dissonance can only be applied where specific behaviour could be expected of people with related specific views

There may be several ways in which the theory of cognitive dissonance could play out within the climate change mitigation context. Two ways will be examined below: one that would promote denial of climate change and another that would advance mitigation action. Imagine an Australian that will be called Sam for the purpose of the example. Sam believes himself to be a responsible person and global citizen. A businessman, a leader in his field, Sam frequently travels overseas for meetings, conferences and guest lectures. Sam has felt increasing dissonance regarding his air flights versus growing knowledge of anthropogenic climate change. In the first scenario, Sam can set about reducing the dissonance by avoiding information on global warming and seeking more information on climate science scepticism, eventually joining online forums as a sceptic and feeling happier about flying. In the second scenario, Sam can consciously reduce his air travel and use his leader status to encourage similar action from others, by conducting and advocating phone hook ups, video conferencing and train travel wherever possible, and feel happier about flying less often. Theoretically, in relation to climate change mitigation, an individual might resolve any cognitive dissonance through denying or minimising the importance of climate change, *or* they might increase their

mitigation action. Where policies or programs seek to leverage potential of the latter, feelings of guilt must be treated carefully to avoid strategies misfiring and creating denial or disempowerment (Whitmarsh & O'Neill, 2010).

Underpinnings of self-regulation as motivator

In their overview of self-regulation and its importance in relationships and building cooperation in social animals and culture among humans, Baumeister et al. (2007) stress the human need to belong. Thought to have co-evolved with social and cultural evolution, self-regulation can be either an unconscious following of normative expectations and others' actions, such as quietly watching the movie when in a cinema, or it can be a conscious action, such as delaying gratification for a longer-term reward. There are three aspects to the self, each with intra-individual and inter-individual aspects. Firstly there is reflexive awareness, i.e. the knower of oneself and the one known to others. Secondly there is the aspect of self that interacts with others, i.e. comes to know itself by doing and interacting with others and is also the 'belonger' or group member. Thirdly there is the self's executive function, the self as agent, i.e. the doer who acts to regulate the self and control the environment, which may include the social environment of others (Baumeister et al., 2007). Self-regulation is related to making decisions and is arguably an important mechanism in enabling mitigation decisions and actions. Self-regulation might occur unconsciously, for example the self might use the recycling bin because that is the family norm or because there was an earlier individual decision to recycle and the behaviour is now automatic. On the other hand, self-regulation might be a conscious decision such as replacing certain car trips with using public transport to reduce one's carbon footprint.

Self-regulation depends on three things. Firstly, the self must commit to a particular standard, and given that conflicting standards are a known source of self-regulation failure, the controversy over anthropogenic climate change would be expected to reduce commitment to mitigation. Secondly, there is a monitoring of self and behaviours. Thirdly, there must be an availability of whatever is needed to effect the required behaviour change, e.g. someone living in an area without public transport is unlikely to set the unachievable standard of using public transport rather

than driving. The question remains as to why and how individuals are motivated to commit to standards and this is discussed in the next section.

Forming judgements and motivation

Regulatory focus theory goes some way to explaining why people commit to certain standards for themselves. Regulatory focus theory postulates that people constantly balance their desire for nurturance, growth and goal-attainment being 'ideals' – *promotion focus* - against their desire for security through the meeting of obligations, being 'oughts' – *prevention focus*. Individuals tend to have a chronic preference for either promotion or prevention regulatory focus, but either way they usually feel worse after failing to live up to an 'ought' than after failing to reach an 'ideal'. This may be because failing to live up to an 'ought' might risk social banishment (Idson et al., 2000, Higgins & Spiegel, 2004, Baumeister et al., 2007).

It has been shown that self-regulation and effortful decision-making utilise the same intra-individual resource, a resource known in common parlance as 'willpower'. This psychological resource appears to be finite until replenished through rest, sleep or an emotionally light and fun activity such as watching a comedy. Depletion of this resource through making difficult choices or effortful self-control is known as ego-depletion (Baumeister et al., 2007). Ego-depletion, especially in busy people may be a cause of not taking more complex and less automatic mitigation action, especially if thinking about such actions is relegated to the end of a work day, when the decision-making and self-regulation resource has been 'spent'.

Kruglanski and Sleeth-Keppler's (2007) overview of the social psychology literature on judgement formation and motivation is pertinent to response and action related to the controversial notion of climate change. When making social judgements, individuals starting with different premises may come to different, and sometimes opposite conclusions even when given the same information (Kruglanski & Sleeth-Keppler, 2007). This aligns with Hulme's (2009) discussion of pre-existing world views and personal context underpinning the considerable disagreement over the very notion of anthropogenic climate change. Another factor

in making judgements is the level of effort needed to process information. This level of effort is considered a form of non-directional motivation, in that it refers only to the processing but does not influence the *direction* of the resulting judgement, although it may influence the judgement itself. The weighting given to information that accords with desired outcomes is a form of directional motivation, and is likely to include a bias toward the judgement most in line with the wishes of the individual.

Intriguingly, it seems that the need for high levels of information processing of information incongruent with the interests of the individual is more likely to sway their view (Chaiken & Giner-Sorolla, 1997, Kruglanski & Sleeth-Keppler, 2007). The reason for this has been outlined as follows. It is easier and quicker to make decisions via heuristics or 'rules of thumb' than by more detailed systematic processing. While these two decision-making styles might be used together, the systematic processing often diminishes the heuristic cues (Chaiken & Giner-Sorolla, 1997). Where individuals have defensive motivations, such as desiring attitudes aligned with their perceived material interest or self-defining beliefs, they selectively process heuristic information in two ways. Firstly, the heuristic information is likely to be evaluated in a biased way. Secondly when information supports the defensive concern, heuristic rather than systematic processing predominates, yet when there is a large gap between actual confidence in the belief and desired defensive confidence, a systematic process is likely to prevail (Chaiken & Giner-Sorolla, 1997). This implies a higher level of motivation and may help explain the lengths to which some with material interests in fossil fuel use have gone to debunk the notion of anthropocentric climate change (Pearse, 2006, Oreskes & Conway, 2010). On the other hand where concern over climate change is high, defensive motivation may drive increased systematic processing in the service of mitigation efforts.

An additional factor in judgement formation is the epistemic authority ascribed to an information source, in terms of expertise, trustworthiness and in comparison to the epistemic authority ascribed to oneself regarding the specific issue (Kruglanski et al., 2005). The 'trustworthiness' aspect is particularly pertinent given the clear

political divide between those with more left-leaning views being more likely to accept the scientific evidence of anthropogenic climate change than those with more conservative views (Whitmarsh, 2011, Leviston & Walker, 2012, Reser et al., 2012b, Hamilton, 2013, Lewandowsky, in press 2013). This could support a cycle of incrementally more fixed opinions as people attribute a higher level of 'trustworthiness' to the views and policies put forward by the political leaders to whom they most relate and with whom they most agree.

Attribution effects on motivation

Within social psychology, *attribution* has two distinct meanings which relate to: (1) explanations of behaviour and (2) inferences or ascriptions, such as intentionality, responsibility or blame (Malle, 1999, Malle, 2011). Both concepts have implications for motivation itself and for this study's methodology. Self-reporting one's views, feelings and actions entails metacognition, or thinking about one's thinking. Thought coding prominent in social psychology research into metacognition relies on four main classifications. Firstly, there is the *target,* being what the thinker perceives their thought to be about. Secondly, there is the thought *valence*, i.e. whether the thought is perceived to say something positive or negative about the *target*. Thirdly there is the *number* of thoughts, specifically whether there are perceived to be many or few. Fourthly and most importantly for this discussion, there is the thought's *origin*, with evidence indicating that people are more likely to act on thoughts they perceive as self-generated., (Petty et al., 2007). It would seem that this fourth classification may be affiliated with SDT's aspect of autonomy, and may also be associated with the human tendency to avoid attributing personal changes in attitude or behaviour to social influences, even where objective evidence shows this to be the cause.

Nisbett and Wilson's (1977) overview of literature on metacognition regarding the human ability to attribute causal reasons for our actions led them to argue that there may be severe limitations to this ability. For example there are studies showing that individuals do not report changing an attitude following persuasion or inducement from others even where they have objectively been recorded as having done so (Nisbett & Wilson, 1977, Nolan et al., 2008). It may be that the individuals

are unaware of the change within themselves and/or that they are unwilling to attribute cause to the influence of others. In either case, Nisbett and Wilson argue that people are more likely to provide a priori reasons for their behaviour than actual introspective responses based on internal knowing. Nisbett and Wilson argued, with some circumstantial evidence, that this lack of self-awareness of the causes of attitude change (or even sometimes of the change occurring) may be the reason for the results of a range of cognitive dissonance studies, rather than cognitive dissonance.

Nisbett and Wilson (1977) further point out that what comes to the human mind is the answer to a question rather than the process for working out the answer, and that when asked to explain the process, people often report the content of the answer one step prior in the process. That is, people confuse the content with the process. Nisbett and Wilson gave the example of asking a friend his mother's maiden name, which he answered. They then asked how he knew the name. He answered that he knew his uncle's last name and that this was the same as his mother's maiden name and therefore he could report his mother's maiden name. But he could not report on how he retrieved the information on his uncle's name. It just came to him. Nisbett and Wilson argue that while the human ability to accurately attribute the causes of behaviour is limited, there are circumstances in which its accuracy is likely improved. These are when there are few potential causes which are perceptually salient or likely to have been remembered, very plausible and have in the past been observed as associated with the outcome. That people may be limited in their ability to explain particular reasons, or motivations for changes to behaviour has implications for this study (and many others), and these are discussed in chapter 3.

The 'value-action gap'

Personal value hierarchies may add to the 'value-action gap'

Along with the links between values and pro-environmental behaviour so far discussed, environmental psychology has investigated the 'value-action gap' also known as the 'attitude-behaviour gap', being situations in which pro-environmental values do not translate into pro-environmental action (Kollmuss & Agyeman, 2002,

Velicer & Prochaska, 2008, Ewert & Galloway, 2009, Kaiser, 2010, Stoddart, 2011, Whitmarsh et al., 2011c). Given that attitudes are more specifically focussed and lack the hierarchical order of values (Schwartz, 1992), it may be that the gap can be at least partly explained where, although strong enough to manifest a pro-environmental attitude, environmental values are lower on a personal value hierarchy than other values. When conflict arises between personal values in a specific situation, an individual is likely to support the higher level value (Stern, 2000), e.g. one may seek a high fuel efficiency vehicle for environmental reasons, but believe that a four-wheel drive is safer for the family and their value of family safety trumps their pro-environmental values.

Reduced sense of pro-environmental duty

Other possible contributors to the attitude-behaviour gap are that one might be concerned about climate change without feeling morally obliged to undertake mitigation actions or that one might accept only what they perceive as their proportional degree of responsibility. The proportionality notion (Haidt, 2012) is seen in the argument that as Australia produces only about 1.4 % of global anthropogenic greenhouse gas emissions, Australian carbon pricing is tokenistic, serving only to reduce the nation's economic capacity (Allen, 2012, Simon from Sydney, 2012). However this use of the proportionality principle does not account for Australia's emissions being generated by only 0.3 per cent of the world population (A.B.S., 2010) nor for greenhouse gas emissions from Australian coal exports used as fuel overseas and appearing not in Australia's greenhouse gas emission accounts but in those of the purchasing countries (Christoff, 2012).

Internal values and external conditions interact in complex ways

Kaiser's (2010) point that attitude-behaviour gaps can only be determined by testing very specific attitudes against non-performance of related very specific actions is consistent with Schwartz's theories (Schwartz, 1973, 1977) and TPB (Ajzen, 1991, 2002). This point, combined with the influence of external conditions on behaviour raises the question of whether the gap concept is useful for theory, research or practical mitigation purposes. Environmental behaviour depends on values, external conditions and their interactions, so that strong feelings of moral obligation

for pro-environmental behaviour are determinant only where conditional 'barriers' are not too great (Corraliza & Berenguer, 2000). For example, Barr and Gilg (2007) found that pro-environmental purchasing was linked to access to personalized open space, e.g. a garden, as well as a sense of moral obligation to act and beliefs about the value of 'green' consumption. Simultaneously, such purchasing was tempered by external conditions like price sensitivity, convenience and demographic factors. Furthermore practical convenience, such as access to a structured kerbside recycling system, was the main determinant of household recycling. Kaiser (2010) argues that the relation between attitude and behaviour is formal rather than specifically causal and that individuals vary greatly in their physical and other capabilities to enact any specific behaviour. Therefore, the inherent methodological difficulties of determining gaps in specific circumstances make it more realistic to view and measure pro-environmentalism across a group of behaviours (Kaiser, 2010). Lertzman (2013) argues that 'the gap' and labelling of populations as 'apathetic' are inaccurate and unhelpful. This thesis agrees, postulating that the single dimension concept of a gap between a particular attitude and a specific behaviour is inadequate for describing lack of pro-environmental behaviour among people with complex lives and many values and attitudes which compete for their time, energy and money. Lertzman points out that psychoanalytic approaches to issues regarding climate change mitigation offer the advantage of experience in dealing with the contradictions, ambivalence, anxieties and guilt that people feel. She encourages practitioners wishing to *'mobilise reparative energies'*, in this case to reduce carbon emissions, to acknowledge and offset such nuanced ambiguities (Lertzman, 2013).

Framing climate change impacts as 'elsewhere' may create action delays

Randall (2009) criticises representations of terrifying climate changes '*located in the future or in places remote from Western audiences'*. This criticism may be less relevant in Australia where 54% of people believe that they already experience effects of climate change compared with 41% in Randall's home of Britain (Reser et al., 2012b), although messaging focussing solely on the future may pose problems. Reser et.al (2012b) found in mid-2010 that 66% of their Australian

survey respondents were 'very' or 'fairly' concerned about climate change and 20% reported at times feeling appreciable distress over climate change. Nevertheless these findings also indicated that Australians, albeit to a lesser degree than Britons, downplayed the proximity of climate change impacts, seeing them as global rather than local and more likely to affect others rather than themselves or people like them, demonstrating the phenomenon of environmental hyperopia, or farsightedness in the face environmental threats.

Such hyperopia is the case in countries around the world, with Wolf and Moser's (2011) overview of qualitative studies into climate change attitudes finding that climate change risks are often seen as threats of the future affecting far-off places and other people. That people need to feel a temporal proximity to an issue in order to consider it important is logical but it delays mitigation action. The *'Who Cares About the Environment?'* series, which has tracked the attitudes of NSW residents to public issues, especially environmental issues, via three-yearly surveys since 1994 (NSW O.E.H., 2013) illustrates the importance of temporal proximity of issue to attitude. Furthermore, '*Who Cares'* survey results show respondent concern tends to be stronger for tangible environmental problems in the form of scarcity and pollution than for the more nebulous, conceptual problem of climate change. Across the six surveys conducted between 1997 to 2012, the issue that gained the highest proportion of respondents regarding it as either the most important or second most important environmental issue was *'water supply/conservation/drought'* nominated by 58% of respondents in 2006 during a long drought which saw, for example, the dams that supply most of Sydney at about only 40% of available storage capacity in Novembers 2005 and 2006 (NSW Government Sydney Catchment Authority, 2012). Similarly in 1997, water pollution was nominated as the most or second most important environmental issue by 56% of that year's survey respondents. In contrast, the highest percentage of respondents to so nominate climate change was 23% in 2009, while in 2012 this proportion was back down to its 2006 level of 12% (NSW O.E.H., 2013).

Reser et.al also tested for levels of distress felt by people regarding their perceptions of the likely impacts of climate change. Groups reporting higher levels of distress

were more likely to be younger, better educated, women, intending to vote Labor or Green, accepting that climate change was at least partly anthropogenic, believing that Australia was now feeling climate change impacts or would do so within 10 years, and more concerned about the condition of the Australian and global environment. They were also more likely to have perceived direct experience of climate change impacts and see their locality as vulnerable. They were less likely to express geographic or temporal distancing of impacts. Not surprisingly, they were also more likely to report climate change as an issue that was personally important and that their concern level had increased over the preceding few years. Importantly, they were more likely to be engaged in pro-environmental behaviours, leading Reser to comment that when distress is moderate, i.e. not clinical, it can enhance salience of the issue and, furthermore that action-taking responses can be psychologically adaptive, promoting feelings of self-efficacy through taking responsibility, making a difference and feeling part of a collective effort (Reser et al., 2012b). The aspect of this Australian finding that those who perceived they had actually been affected were more likely to feel more distress about climate change and more likely to take related actions seems to contradict earlier British (Whitmarsh, 2008) findings that, although flood victims are more likely to see climate change as an issue of personal importance, they are no more knowledgeable, concerned or active on the issue than others. Yet in the Whitmarsh study, those concerned with air pollution were more concerned about climate change than others, leading Whitmarsh to postulate reasons why this was the case. Firstly, she points to previous research indicating that climate change and air pollution are often conceptually conflated by the public, in that climate change is considered to be caused by air pollution. On the other hand, the flood victims did not conceptually link climate change to flooding, often reporting local flooding as due to blocked drains and ditches, road resurfacing and local development. While this list includes likely and practical contributing factors it omits the less tangible concept of changed weather patterns. Secondly, those concerned about air pollution were assessed as having higher pro-environmental values which may have had a mediating effect (Whitmarsh, 2008).

A bird in the hand is literally worth two in the bush

Randall (2009) also questions the use of social marketing techniques that encourage small actions achieving small impacts while not facing up to and delivering the message that those undertaking significant mitigation incur personal losses, such as sacrificing air travel. This is a valid and vexing point because although Randall discusses the case of one person whose sense of moral duty led him to give up flights within Europe, it seems unlikely that many others feel similarly inclined. This raises the issue of people's general aversion to loss (here relating to sacrificing opportunities) and how probabilities of loss are weighted against preparedness to mitigate against them.

According to prospect theory and related research, not surprisingly people tend to underweight outcomes that are merely probable compared with those that are certain (Kahneman & Tversky, 1979). This reinforces the obvious - that those who consider climate change either a remote possibility or no threat are unlikely to take *intentional* mitigation action. However, it appears that there is a more complex, logical hierarchy, in that the pleasure of a gain is stronger than the pleasure of a non-loss and the pain of a loss is stronger than the pain of a non-gain (Idson et al., 2000). Again this is likely to make controversial any suggestions of people sacrificing opportunities currently seen as rights, e.g. air flights, car use or high levels of meat and dairy consumption. Similarly, it may partially explain the negative response to the carbon tax. The loss aversion hierarchy is in line with regulatory focus theory which postulates that people constantly balance their desire for nurturance, growth and goal-attainment – *promotion focus* - versus their desire for security through the meeting of obligations – *prevention focus* - and that individuals tend to have a chronic preference for one or other focus (Idson et al., 2000). This preference is likely to influence mitigation decisions, interacting with other influencing factors such as awareness of environmental consequences, value placed on the biosphere and an individual's sense of moral obligation.

Furthermore, people's aversion to potentially losing objects or money is stronger than their motivation to gain the same objects or amounts, and they typically require double the amount to offset exposure to the potential loss. Interestingly, in what has

been termed *'the endowment effect'* it has been shown that even when endowed (given) objects, people require substantially more money to part with them than they would have been willing to pay to acquire them (Harinck et al., 2007, Tom et al., 2007). This infers political and practical difficulties in expecting people to sacrifice opportunities. However where the stakes are low, individuals are less loss averse because they more easily discount a small loss than a large one, and, due to the hedonic principle in which people maximize pleasure and minimize pain, they are pleased with even a small gain (Harinck et al., 2007). This may help explain the willingness of people to take *low 'behavioural cost'* actions, being those requiring little effort and/or expense (Kaiser, 2010) for pro-environmental reasons, especially where doing so sates their feelings of moral obligation. Loss aversion and the endowment effect would seem likely to reduce people's willingness to sacrifice opportunities they currently have, including Randall's example of air flights. It would seem likely that this would especially be the case among those who are socio-economically advantaged. This is particularly important because, as found by the University of Sydney's Centre for Integrated Sustainability Analysis, households with higher incomes tend to consume more goods and services than those that are less affluent. This results in a general trend of affluent area lifestyles resulting in higher greenhouse gas emissions and other environmental impacts when compared with less affluent areas. For example, high greenhouse emissions activities air travel, construction and renovation tend to be concentrated among high income groups (Australian Conservation Foundation, 2007). There is an additional factor which is likely to amplify the loss aversion effect in regard to climate change mitigation. If the threats posed by climate change were perceived to be imminent and personally threatening an immediate loss, it is likely that there would be more action.

Denial may offer psychological comfort but can lead to passivity

A third possible way of dealing with cognitive dissonance regarding climate change is to implicitly deny the problem or ignore it. This can manifest differently to explicit, vocal rejection of the climate science. Norgaard (2011) suggested both cognitive dissonance and societal denial to explain climate change attitudes in a Norwegian town. Norgaard's sociological investigation found considerable

concern over reduced snowfall and winter length, which threatened traditional activities and tourism, yet virtually no public or social discussion on climate change, despite people being knowledgeable about anthropogenic climate change and very few voicing scepticism about it. Furthermore there was no political or practical mitigation action occurring in the town, surprising given the relatively high education level and high political engagement regarding other issues. In contextualising her study, Norgaard pointed out the Norwegian economy's strong reliance on oil production, Norway in 2009 being the world's fifth largest oil exporting nation (International Energy Agency, 2011, Norgaard, 2011), analogous with Australia's reliance on coal. Norgaard (2011) postulated that internalised social norms strongly influence peoples' topics of conversation and climate change would be considered inappropriate for social situations in which the town's people expected to relax, whereas 'light' topics would be acceptable. In classrooms, teachers did not want to frighten students by discussing climate change beyond the necessities of the curriculum, and climate change was an unsuitable topic for town political meetings which focussed on 'local' issues while climate change was seen as 'global'. In short, there was *no place for discussing climate change* in the small, homogenous and traditional town, the outcome being passive lack of action. Booth (2012) posits several additional causes of passivity including: fatalism; pessimism that one's actions will have little effect; and habituation to 'chronic moral wrongs', especially given the relatively long-term timeframe most people associate with climate change compared with the immediacy of most moral dilemmas. Interestingly, these causes of passivity could reinforce each other – conceptually in a never-ending cycle - with the pessimism feeding the fatalism, feeding the habituation, feeding the pessimism, etc. Nogaard's observations of local versus regional focus align with those of Australian research that relates an example of ways in which 'scalar politics', which invoke the norms of particular regions, can be used to shift responsibility for emissions. In this case, the authors considered how the regional daily newspaper *'Illawarra Mercury'* argued that although a substantial price on carbon was nationally justified, large local employer Port Kembla steelworks should be initially exempted (Waitt et al., 2012).

Making a distinction between denial and disagreement

Weintrobe (2013) posits three main forms of climate change denial: denialism, negation and disavowal. Denialism attempts to undermine belief in climate science. Its major instigators include highly placed and conservative scientists, politicians and powerbrokers, as well as the fossil fuel industries (Pearse, 2006, Oreskes & Conway, 2010, Hamilton, 2013, Weintrobe, 2013). Oreskes and Conway (2010) argue that climate change denialism has utilised techniques and some of the same players involved in undermining evidence of tobacco as harmful to health, garnering attention for climate misinformation, then portraying it as a 'side' in a scientific debate. Weintrobe (2013) views both negation, which asserts that something that is true is not true, and disavowal, which systematically avoids or distorts the truth to reduce its significance, as defences against anxiety. Yet while defence against anxiety may be one reason, there are also likely to be other reasons why people negate or disavow climate change. To those, like the author, who are external to the psychology disciplines, aspects of some psychoanalytic and in-depth psychology literature read as if rejection of anthropogenic climate change and/or taking little mitigation action can *only* be due to some form of psychological denial or defence against distress (Hollander, 2009, Randall, 2009, Lertzman, 2013, Weintrobe, 2013). Yet this seems to ignore the very likely possibility that some people are unable to undertake action for various reasons and that some actually disagree with one or more aspects of the science, its methods, the extent of the problem and/or the most useful responses (Hulme, 2009).

Therefore, following Lewandowsky's (in press 2013) lead, this thesis attempts to distinguish between terms in the following ways. Here, *rejection of science* means outright rejection of the notion of climate change or of its anthropocentric causes, whereas *scepticism* on the basis of evidence and reason could assist understanding and prompt revision of science claims, while *denial* defines a response to anxiety. The practical problem is the difficulty of distinguishing them in the case of any given individual and situation. Denialism, however, referring to an organised campaign disavowing climate change (Weintrobe, 2013) for political, financial or other perceptible gains, is likely to be easier to identify.

The many mitigation barriers include political orientation

More broadly, Gifford's (2011) taxonomy of psychological barriers to climate change mitigation action, *dragons of inaction* is instructive in the extent of its inclusiveness. Its seven major categories are: limited cognition, relating to humans not being as rational as often thought; ideologies such as worldviews; comparisons with others e.g. social norms; sunken behavioural costs, which include spent finances and effort; discredence which can include denial; perceived risks, including financial risks; and limited behaviour such as tokenism. The taxonomy also includes mistrust, reactance and perceived program inadequacy as well as other responses, thus including opinions and concerns resulting from the complex interactions people have with their full range of external conditions.

Indeed, information and views on climate change interact with multiple aspects of individuals, including their values and moral and political orientations – and the external influences that come with those (Hulme, 2009, Hamilton, 2013). Denialism campaigns have considerably politicised the issue of anthropogenic global warming (Oreskes & Conway, 2010, Hamilton, 2013) and they help fuel and cement pre-existing tendencies to deny the existence of the problem or play down its consequences (Hamilton, 2013). Rejection of climate science is more common among political conservatives than among those on the political left (Whitmarsh, 2011, Leviston & Walker, 2012, Reser et al., 2012b, Hamilton, 2013, Lewandowsky, in press 2013). Such rejection is especially high among those who believe in other conspiracy theories such as that NASA faked the moon landing and who reject other science findings such as the link between cancer and smoking (Lewandowsky, in press 2013). However, there are other rejecters of climate science and/or policy who do not hold such views, although some see climate change concern as a quasi-religious cover for the leftist advancement of UN global governance, redistribution of wealth and dismantlement of capitalism (Simon from Sydney, 2012).

Outright rejection of climate science seems relatively rare with, depending on the particular survey, around 5-7% of Australians completely rejecting that climate change is occurring at all (Leviston & Walker, 2012, Reser et al., 2012d). Where

people do think climate change is occurring, there are nuanced views regarding the degree of attribution to human activities – and by extension the degree of personal responsibility one might feel regarding taking action. When Leviston and Walker's (2012) respondents were asked to choose one of four statements best describing their thoughts on climate change, 40.2% selected *I think that climate change is happening, but it's just a natural fluctuation in Earth's temperature* while 50.4% chose *I think that climate change is happening, and I think that humans are largely causing it*. The word *largely* may have been influential here, for the Reser, et al. survey (2012d) which provided more respondent flexibility in answering on the causes of climate change, found that 87% of respondents in 2011 accepted some level of human causality and 83% thought that both natural and human causes were contributing factors. These differences in findings highlight the importance of question wording (Leviston et al., 2011).

Denialism best met with truth and practical mitigation actions

Denialist misinformation campaigns can influence the policy response of governments reliant on voter approval (Pearse, 2006, Oreskes & Conway, 2010, Garnaut, 2011), presenting a stronger threat to citizen activism and political action than to individual mitigation action. This is because individuals often receive co-benefits which motivate actions that happen to reduce greenhouse gases (Kaiser et al., 1999, Whitmarsh, 2009, de Groot & Steg, 2010). Empirical evidence has shown that people tend to retain misinformation even when it has been corrected once, so Lewandowsky (2012) recommends three strategies to counter any widely published denialist misinformation. Firstly, where the supplier of misinformation has a clear motive for purposely spreading it, make this known. Secondly, clearly explain why the information is incorrect and thirdly, if there is a graph that clearly demonstrates the correct information use it (Lewandowsky, 2012, in press 2013). Rebuttals should be targeted to especially reach those not already predisposed to reject climate science to limit the spread of misinformation. Ironically, such strategies seem to echo those used by denialist campaigns (Carter, 2008, Oreskes & Conway, 2010). Care is needed to ensure that rebuttals of misinformation use the most accurate information available and are completely truthful. Simultaneously persuasive and practical are government and business supported actions that reduce emissions

while assisting individuals and organisations to address other concerns. Co-benefits of such actions include saving money through energy efficiency, reducing local air pollution and traffic congestion by providing effective public transport and urban planning and enhancing habitat and local biodiversity through limiting land clearing and planting local species as part of agricultural practice. (Barry et al., 2009, Australian Carbon Traders, 2010, Farrelly, 2012).

Direct utilisation of knowledge for campaigns and programs

Accessibility and convenience important for behaviour change agents and 'targets'

McKenzie–Mohr (2000) observed and rued that those developing pro-environmental behaviour campaigns and programs rarely utilised the beneficial knowledge produced by researchers, and that such knowledge was difficult for practitioners to access. The latter situation seems to be improving through web-based materials and books written for and promoted to a broader, non-academic audience, and sometimes specifically targeting practitioners (e.g. Jackson, 2005b, Goldstein et al., 2007, Crompton, 2008, Cialdini, 2009, Hulme, 2009, Heath & Heath, 2010, McKenzie-Mohr et al., 2011, Duhigg, 2012, Haidt, 2012). These provide information and insight in an easily understood form, often including samples of real-world application. This section outlines examples of knowledge not already covered – from both 'grey' and academic literature – that could be applied almost immediately by practitioners.

Habits, which drive many actions, are comprised of common components. When understood, these components can be used to help change or replace a habitual pattern of behaviour (Verplanken, 2011, Duhigg, 2012). The components are: stable conditions which can act as a behaviour cue or trigger, e.g. a time of day; a routine which becomes automatic and is repeated often; and according to Duhigg, a reward which may become craved as a result of the habit. Analysis of habits that either help or hinder climate change mitigation can provide opportunities for improvements (Verplanken, 2011). Consumers tend to become 'locked into' unsustainable practices by restriction of choice, institutional barriers, access inequalities and the 'architecture' of incentive structures, as well through habit

(Jackson, 2005b). From a policy viewpoint, analysing such architecture and habits can provide benefits in the form of 'nudges'. Coined by Thaler and Sunstein (2008), 'nudge' is the term for government, agencies or businesses designing *'choice architecture'* that encourages users of goods or services to opt for socially and/or environmentally more helpful behaviour. Government has the ability to: utilise incentives such as taxes, subsidies or penalties; facilitate infrastructure such as recycling services and public transport; affect institutional context through market structures and regulations; strengthen social and cultural contexts; regulate and support certain business practices; assist communities to help themselves and; lead by example with its environmental and social practices (Jackson, 2005b).

The success associated with the convenience and regularity of kerbside recycling services in achieving pro-environmental habits (Corraliza & Berenguer, 2000, Barr & Gilg, 2007) implies further potential. Interestingly, understanding habitual behaviours provides clues on using nudges for occasional actions as well as those that become automatic through regular occurrence. Examples include: customers receiving point of sale information on energy efficiency nudging them into making a pro-environmental choice; learner drivers being taught in a way that builds fuel efficient driving habits (which coincide with safer driving habits) from the start without needing to change pre-existing behaviour; and utilising *'habit discontinuity'* opportunities, by providing relevant public transport information when people move house (Verplanken, 2011).

Interestingly, Heath and Heath (2010) argue that a major impediment to behavioural change is people's inertia. They demonstrate that effective organisational or other large scale changes can occur through *'smoothing the path'*, i.e. changing the external conditions to make the change easy for the target audience, thus reinforcing the notion that it is important for *choice architecture* (Thaler & Sunstein, 2008) to make the preferred behaviour easy. Heath and Heath (2010) also point out that it helps to *'script the moves',* by providing clear, simple instructions on the required behaviour. Furthermore, Cialdini (2009) has identified six 'weapons of influence' or principles used by sales professionals and others to encourage an individual's compliance with extrinsic aims.

These principles include reciprocation, being the feeling that we should try to repay what another person has provided for us. There is an intriguing technique associated with reciprocation, the rejection-then-retreat technique, in which someone makes a substantial request, which is denied. The requester then puts forward a *concessional*, less substantial request. The person of whom the request is being made tends to see the concession as a sort of favour and is more inclined to comply with the second request because they feel compelled to reciprocate the favour as much as because the request is easier to meet. The other five principles are: consistency being the wish to be consistent with what we have already done, in line with the Theory of Cognitive Dissonance discussed shortly; social proof, the deciding of what constitutes appropriate behaviour in a situation of uncertainty by observing and following the behaviour of others; authority, being a deep-seated sense of duty to those in authority; liking, being the tendency to comply with the wishes of someone whom one likes; and scarcity, being a tendency for opportunities to seem more valuable when they are limited (Cialdini, 2009). It is noteworthy that governments would seem inherently well-placed to leverage their influence through consistency, reciprocation, social proof, authority and at times during the election cycle, liking. Such principles may be able to assist in developing climate change policies and initiatives.

While consumerism is commonly blamed for driving environmental degradation, Jackson (2005a) argues that the communication functions and personal meanings attached to items mean that simplistic appeals to forego consumption will have little effect. Consumer items are used for social communication functions through 'marking services', enabling one to: show status; indicate sexual availability or interest; identify with a social group; show allegiance to specific ideals and; position oneself within the group. It also allows an individual to differentiate oneself from other social groups and other ideals (Jackson, 2005a). With examples such as a child's teddy bear, a woman's wedding dress and the club shirt of the football fan, Jackson further points out the personal importance that items can have for owners, beyond the items' practical utility.

CBSM or Community-Based Social Marketing relies on five steps (McKenzie-Mohr, 2000, McKenzie-Mohr et al., 2011, McKenzie-Mohr & Schultz, 2014). Firstly, there is careful selection of the behaviour to be targeted, which in addition to other criteria needs to be 'indivisible', in that it must be only one behaviour not multiple behaviours. So McKenzie-Mohr and Schultz for example point out that 'add home insulation' represents several types of actions because insulation may be placed under the floor, or in the walls or in the ceiling. Their advice to program managers is to choose the specific behaviour that offers best return on investment given the location, costs, weather patterns, feasibility, safety issues and so on (McKenzie-Mohr & Schultz, 2014). Narrowing options to this degree would align with the Heath brothers' (2010) advice to give clear, simple instructions for the required action. The second step is identification of the barriers that hinder and benefits that follow from the chosen behaviour. The third step is designing a strategy of behaviour change tools to address barriers and benefits. McKenze-Mohr and Schultz warn that starting with this step, without undertaking steps one and two can seriously reduce program impacts. Fourthly, there should be a small pilot with a community segment, carefully monitored to assist in program refinements and fifthly, there should be evaluation of the program once it is broadly implemented (McKenzie-Mohr & Schultz, 2014).

Fostering and utilising altruistic and pro-environmental values

Through an international investigation into human *goals*, Grouzet et al. (2005) developed a circumplex model with similarities and differences to the *values* model outlined near the beginning of this chapter (Schwartz, 1994, 2006). Like Schwartz's work on values, they found that some goals were relatively consistent with each other whereas other goals were in conflict. Grouzet et al. further found that goal ratings could be categorised according to two dimensions: intrinsic versus extrinsic goals and self-transcendent versus physical self-goals. They remarked that Schwartz's Self-transcendent versus Self-enhancing areas resembled their self-transcendent versus physical dimension. However, they saw little conceptual similarity between their intrinsic versus extrinsic goals and Schwartz's areas of Openness to change versus Conservatism.

Grouzet et al. further noted that Schwartz found that conformity values lie between benevolence and security, while they found such goals were almost directly opposed to the two parallel goals assessed, which were affiliation and safety. They suggested that this was because conformity is a type of extrinsic goal, primarily concerning desire to fit in with others and receive social praise, and pointed out that conformity goals had been found to cluster with other extrinsic goals of image and popularity. Additionally, in Schwartz's model security values slot between conformity–tradition and power, whereas Grouzet et al. found safety as opposing these extrinsic-type pursuits, rather aligning more with physical and intrinsic goals. They suggested that this was because when safety is considered at the level of a personal goal rather than a value, it clusters with other goals aiming to satisfy psychological needs (Grouzet et al., 2005). These similarities and differences between the Schwartz and Grouzet models further imply that the complex explanation of whether, why and how an individual acts on any given value depends on a range of competing and contextual factors.

The importance of framing

Lakoff (2010) argues that humans think via a process that utilizes structures called ''frames'', which are generally unconscious or unnoticed by the thinker. Frames are organised in systems, so that a word typically activates its defining frame and much of that system. Many frame-circuits directly connect with the emotional regions of the brain which in turn play an essential part in thinking. Potential for changing frames is limited. To be accepted by an individual, new language and/or concepts need to make sense - cognitively and emotionally - in relation to the existing system of frames. Changing public discourse requires the development of new or updated framing introduced through means enabling sufficient population reach, sufficient repetition, and sufficient trust in the messengers (Lakoff, 2010).

Adding to calls for nurturing social and cultural values to underpin pro-environmental behaviour (Jackson, 2005b, Jackson, 2005a), Crompton (Crompton, 2008, Crompton, 2010) argues that fostering such values is essential even when appealing to individuals and groups who may seem particularly driven by extrinsic motivations. Evidence indicates that even those strongly influenced by status,

wealth and so on are more likely to exhibit altruism and empathy when reminded of their own altruistic and pro-nature values. Crompton argues for caution in making appeals for behaviour change based on extrinsic values. He points out that campaigns and marketing are inevitably based on values, and it is ethically important to be transparent about those being promoted. Furthermore, neural circuit synapses strengthen the more they are activated. Therefore repeated ideological language strengthens the circuits associated with that ideology in the brains of hearers. Language repeated very often becomes ‘‘normally used’’ language, and unconsciously activates that ideology in people’s minds (Lakoff, 2010). Thus in line with normative models, the more a value is perceived, the more it is normalised. As highlighted by Cialdini (2009), programs may be undermined in the long-term if they reinforce extrinsic values at the expense of intrinsic ones.

‘Sustainability’ as a framework

Sustainability’s common usage can enable transdisciplinarity

Historically, environmental ethics concentrated on conservation of habitat and biodiversity, especially wilderness (Callicott, 1990) and this is still a valid goal of ongoing importance. Pragmatically, however, a really usable environmental ethic also needs to be both comprehensive and integrated – *‘a worldview that includes the human in nature but also affirms the unique values of personhood’* (Ferre, 1993). The notion of sustainability, with its focus on balancing social, environmental and economic values and achieving intra-generational and inter-generational human equity, does this. The term ‘sustainability’ first began to indicate this relatively modern notion at the World Council of Churches’ 1974 conference in Bucharest, where western environmentalists used it to respond to objections by those from the developing-world to western concern about the environment when human poverty and suffering were rife (Dresner, 2002). At this time, the focus was most strongly on social equity, availability of food, environmental protection from pollution, conservation of non-renewable resources unless somehow replaced through technological innovation, and, interestingly, human protection from large natural variations in global climate (Vischer, n.d.).

Now, sustainability is a commonly used concept (B.H.P. Billiton, 2012, Blacktown City Council, 2012, Department of Sustainability Environment Water Population and Communities, 2012, NSW O.E.H., 2012b, Steplight, 2012, University of New England, 2012, University of Western Sydney, 2012, Westpac, 2012). In line with transdisciplinary processes, this common usage can link academic theory and empirical research with the policies, strategies and courses used by Australian public, private and non-government organisations. Yet, while 'sustainability' is a well-used term, the academic literature is agreed that it has been poorly defined, particularly referring to the much repeated 'Our Common Future' definition of sustainable development addressing *'the needs of the present generation without compromising the ability of future generations to meet their own needs'* (World Commission on Environment and Development, 1987). However, despite discussion of the problems associated with the term 'sustainability', there seems no call to either displace or replace it. 'Sustainability' and 'sustainable development' have different meanings, yet the fundamental sense behind them is the same and specific indicators for social, environmental and economic sustainability have improved clarity and effectiveness (Moldan et al., 2012). On the other hand, lack of epistemological consistency across Australian sustainability indicators brings the validity of reporting systems into question (Davidson, 2011) although this does not preclude potential for improvement and useful applicability. For example Todorov and Marinova (2011) consider sustainability as an ever-evolving system and argue for sustainability modelling that allows dynamic representation, including the co-evolution of the sustainability systems and the role of humans as sustainability guardians.

Models align with the pillars of sustainability

Sustainability was chosen as the structure for this thesis for the following reasons. Firstly, the most powerfully explanatory existing theories regarding motivations of pro-environmental behaviour mainly focus on behaviour that is *intentionally* pro-environmental. This includes even those aligned with the broad range of Schwartz-identified human values (Schwartz, 1973, 1977, 1992, 1994, 2006). Even the VBN notion of motivations based on egoistic, altruistic and biospheric values (Stern, 2000, Schultz, 2001, Snelgar, 2006) is limited to pro-environmental behaviour that

is intentionally so. The approach of these models is to support, enhance and build values and intentions for pro-environmental action and they are very useful for doing so. Yet, in line with Stern's (2000) observation and as outlined shortly in Chapter 3, the pilot of this study's Climate Action Scale research tool found that people also often reported taking climate change mitigation actions for reasons unrelated to the environment.

The pragmatic viewpoint of environmental management acknowledges that it is useful to know of all the drivers of pro-environmental action. Purposefully pro-environmental behaviour must be fostered at every level, but in itself, human intention has no effect on climate systems. Our actions do. Therefore a framework was sought to enable exploration and explication of human motivations that (for whatever reason) assist mitigation. It was also noticed that key components of the Self-Determination Theory (SDT) of motivation and values-based theories relating to pro-environmental action align with the three - social, environmental and economic - pillars of sustainability, as summarised shortly in Table 2.2. In short, while motivations that unintentionally led to mitigation actions could not be forced into other frameworks, key aspects of SDT and the values-based models were seen to align with the three pillars of sustainability. Secondly, the empirical findings of the research showed that people's motivations for taking climate change mitigation actions also align with sustainability's three pillars. This became clear during the data-coding process which is described in Chapter 3.

A transdisciplinary approach enabled the utilisation of Goodland and Daly's (1996) definitions of the pillars to organise the values-based theories into a framework. This sustainability framework may assist in decision-making pertaining to the interventions which are often essential for successful improvements in pro-environmental behaviour (Guagnano et al., 1995, Corraliza & Berenguer, 2000, Kaiser & Gutscher, 2003).

It is interesting to note that Goodland and Daly's use of the future tense and conditional mood, implicitly define social, environmental and economic

sustainability as a set of goals. *Social* sustainability would be achieved by systematic community participation and strong civil society, which would require maintenance through shared values, equal rights and community, religious and cultural interactions (Goodland & Daly, 1996). Therefore it links to SDT's assertion that motivation is assisted through respecting an individual's autonomy (Ryan & Deci, 2000b, a), personal norms that ascribe moral obligation to oneself (Schwartz, 1973); subjective norms and behavioural control relating to internal factors (Ajzen, 1991); attitude (Guagnano et al., 1995); attitudinal factors such as values, beliefs and norms, habits, relevant demographics and interpersonal influences (Stern, 2000); decision-maker influences, strategies and outcomes, interpersonal influences and dilemma awareness (Gifford, 2008) and cognitive knowledge (Festinger, 1957).

Environmental sustainability seeks to improve human welfare and social sustainability by protecting the sources of raw materials used for human needs and ensuring that the sinks for human wastes would not be exceeded, thus preventing harm to humans (Goodland & Daly, 1996). Therefore it links to SDT's assertion that motivation is assisted through relatedness, here meaning that people relate specific actions with environmental benefits (Ryan & Deci, 2000b, a); awareness of (environmental) consequences, i.e. AC (Schwartz, 1973); attitude toward mitigation behaviour (Guagnano et al., 1995); attitudinal factors such as values, beliefs and norms pertaining to the environment and/or climate change mitigation (Stern, 2000); geophysical influences, environmental outcomes, dilemma awareness (Gifford, 2008); and any environment-related action that contradicts a specific cognition and causes dissonance feelings (Festinger, 1957).

Economic sustainability seeks to maintain capital, of which there are four kinds, natural, human-made, social and human, and it would internalise environmental costs into the economic system (Goodland & Daly, 1996). Therefore it links to SDT's assertion that motivation is assisted through provision of external conditions that foster its implementation, (Ryan & Deci, 2000b, a); an individual's self-perceived capability to control an action and its outcomes (Schwartz, 1973); subjective norms and behavioural control relating to internal and external factors

(Ajzen, 1991); contextual conditions (Guagnano et al., 1995); personal capabilities and economic and political context (Stern, 2000); financial decision-maker outcomes, technological influences and governance influences e.g. taxes, pricing (Gifford, 2008); campaigns, regulations and policy (Stern, 2000); and external factors that reward or pressure one into taking action inconsistent with belief; and cognitive knowledge (Festinger, 1957). Of course the Self-Determination Theory, the values-based models and the Social Dilemma Model were not developed within the taxonomy of the three pillars. Therefore, some aspects of the models relate to more than one of the pillars. For example, cognitive knowledge is considered to fit within the social pillar as well as in the human capital aspect of the economic pillar. To enhance clarity, the links are shown in Table 2.2.

Table 2.2 Links between SDT, the values-based and Social Dilemma models and social, environmental and economic pillars of sustainability

Goodland & Daly (1996) Definitions of sustainability pillars	Ryan & Deci (2000b) Self-Determination Theory of motivation	Schwartz (1973) Normative explanations of helping	Ajzen (Ajzen, 1991, 2002) TPB regarding specified action in a specified context	Guagnano, et al. (1995) ABC theory re specified action in a specified context	Stern (2000) VBN and other factors affecting behaviour	Gifford (2008) Social Dilemma System Model	Festinger (1957) Cognitive Dissonance from acting contrary to a specific belief
Social sustainability achieved through shared values, equal rights and community, religious and cultural interactions.	Intrinsic and extrinsically motivated goals can be assisted by three factors: (1) autonomy - enabling one's ability to choose.	Sense of moral obligation to take action acquired from social values and internalised to become a personal norm. (This is the first aspect of AR)	Subjective norms underpinned by normative beliefs. Perceived behavioural control underpinned by subjective beliefs about internal control.	Attitude to the specific behaviour.	Attitudinal factors, including Values-Beliefs-Norms, personal capabilities, habits, demographics.	Influences from: decision-makers, technology, interpersonal interactions.	Specific belief & dissonance feelings from acting contrary to belief.
Environmental sustainability protects sources of raw materials and ensures that sinks for human wastes are not exceeded.	(2) relatedness – helping people relate particular actions to an environmental benefit.	Awareness of consequences (AC).	Attitude toward the specific behaviour underpinned by behavioural belief.	Behaviour, being. the specific behaviour in the specific context.	Attitudinal factors	Geophysical influences, environmental outcomes and dilemma awareness.	Specific action that contradicts the specific belief.
Economic sustainability is maintenance of capital.	(3) contextual conditions – providing external conditions that foster the actions.	Capability to control the action and outcomes. (This is the second aspect of AR)	Perceived behavioural control underpinned by subjective beliefs about external factors.	Conditions, which may support or hinder the behaviour.	Economic and political context.	Decision-maker outcomes such as financial, technological influences and governance.	External factors that reward action or penalise for not taking the action.

Each model shown in Table 2.2 has value as a diagnostic tool and/or to assist planning of climate change policies and initiatives. The salience and suitability of each model varies according to the individual situation. In the case of this research, Self-Determination Theory (Ryan & Deci, 2000b, a) and normative explanations of helping (Schwartz, 1973, 1977) provided clear explanation of findings and therefore were chosen as the main theoretical models under discussion.

Values-based theories as applied in practice

The literature provides examples of the values-based theories underpinning research to inform effective policy and programming and three such examples are described below. Combined with segmentation of the target population according to preferred transport mode, The Theory of Planned Behaviour (TPB)NEP was successfully used to develop achievable sustainable transport strategies (Anable, 2005). A separate TPB meta-analysis provided the insight that behaviour was strongly affected by both car use habit and perceived (often lack of) behavioural control over non-car transport, such as public transport (Gardner & Abraham, 2008). Value-Belief-Norm (VBN) has shown explanatory power for actions at a variety of behavioural cost levels. The high behavioural cost action of purchasing a vehicle fuelled in full or in part by biofuels and/or electricity was explained better by VBN than by socio-demographic factors including income, with biospheric values significantly higher among adopters compared with non-adopters and a high correlation between biospheric values, altruistic values and the New Ecological Paradigm (Jansson et al., 2011).

Significantly, the three pillar sustainability framework also applies to the research tasks necessary for producing program-specific communication strategies that are effective. Monroe's (2003) literature review identified a list of such research tasks, which is presented in Table 2.3 alongside the related pillars of sustainability.

Table 2.3 Research tasks necessary for effective program-specific communication strategies

Program development and implementation actions	Most related pillar/s of sustainability
Identify the (required) behaviour and the target audience	Environmental, social
Understand the barriers and benefits that resonate with that audience	Economic, social, economic
Ask people to make a commitment to undertake the Behaviour	Environmental, economic, social
Reduce barriers to the behaviour	Economic, social
Provide vivid, meaningful procedural information about the action	Economic, social, environmental
Remind people of the ways the action conforms to their view of themselves	Social, environmental
Advertise appropriate social norms that complement the behaviour	Social, environmental
Ask people to practice the behaviour with the safety and support of a peer group	Social, environmental
Show people how easy the behaviour is and what the consequences will be	Economic, social, environmental
Offer incentives to enable people to start the behaviour	Economic, environmental
Remind people how satisfying they find participating in the behaviour	Social, environmental
Provide feedback on the progress being made based on the number of people conducting the action	Social
Profile success stories and opinion leaders who have adopted the behaviour	Social, environmental

Source: Adapted from Monroe (2003)

Note that many, but not all, Table 2.3 mentions of the economic pillar relate to maintenance, enhancement and building of human capital. While not all actions are relevant for every migration program, Table 2.3 presents a checklist that can be adapted for purpose.

Local context

Place: Western Sydney

Valerie Brown's (1997) model of integrated local area management assists in conceptualising the links between locality, being a sense of place and the people living there with the problem, existing and potential policies and solutions. Therefore it can be used here to provide a window into the local context in which the research was conducted. Specifically, the model identifies four key dimensions, called the four 'p's, being policy, problem-solving, practice and place To more clearly describe the local context, these will be discussed in a different order. With regard to place, while there is no claim that this predominantly qualitative study statistically represents the demography of its focus area, it is important for readers to gain a sense of Western Sydney and particularly its richness, diversity and scale.

One third of Sydney residents live in Western Sydney, which comprises 14 local government areas (LGAs), and in June 2011 this region had a total population of 1.82 million meaning that one in 11 Australians, including myself, lived in Western Sydney (A.B.S., 2012a, Montoya, 2012, A.B.S., n.d., NSW Department of Premier & Cabinet, n.d.).

Overwhelmingly, research respondents resided in Western Sydney, although a small number were staying in the area for study or family reasons. Narrowing the focus area, the majority of participants resided in the demographically diverse Blacktown, Penrith, Hawkesbury and Hills Shire LGAs along Sydney's western and north-western fringe.

Figure 2.1 Map of Western Sydney, showing location of Blacktown, Penrith, Hawkesbury and Hills Shire local government areas where the majority of research respondents resided.

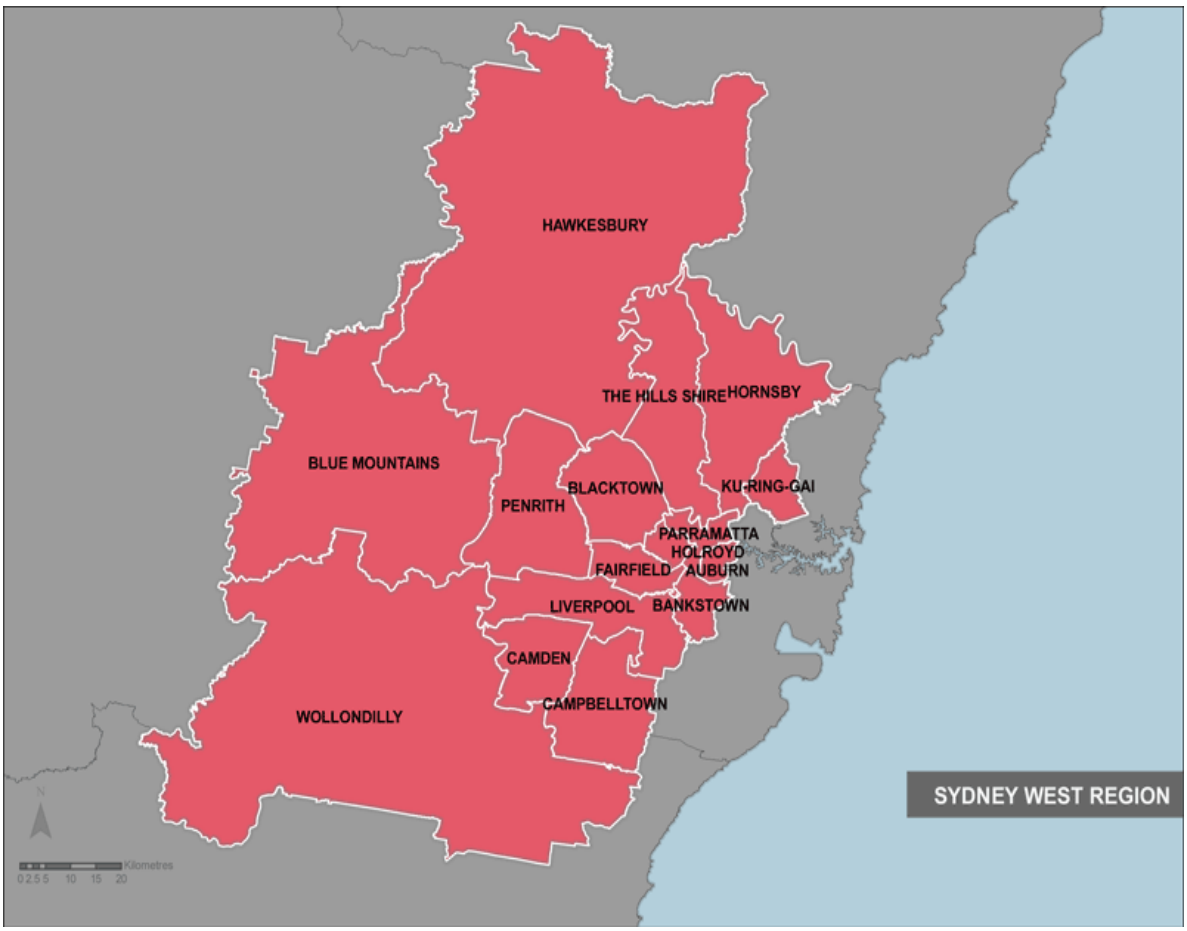


Table 2.4 Diversity of language, population density and socio-economic disadvantage in the main focus local government areas

Statistical areas	Estimated Resident Population	Language other than English spoken at home %	Population density – people per hectare	Index of disadvantage score
Blacktown	312,479	37	13.01	968.5
Hawkesbury	64,234	5	0.22	1,020.3
Penrith	184,681	15	4.57	996.3
The Hills	176,986	29	4.42	1,101.1

Source: Profile id, using ABS 2011 census data

Table 2.4 provides 2011 Census data on the diversity of these areas regarding demography and population density (Profile id, 2013b). Included are relevant Index of Disadvantage scores, derived by the Australian Bureau of Statistics (ABS)

through averaging variables such as income, educational attainment and unemployment. The higher the index figure, the more relative socio-economic advantage is enjoyed by that community, on average. Across all Australian Census collection divisions, index scores are standardised to have a mean of 1,000 and a standard deviation of 100. (A.B.S., 2008b, a).

As shown by Table 2.4, there is considerable socio-economic variation within and between LGAs. For example, in Blacktown LGA, the Index of Disadvantage score for the suburb of Bidwill is 622.7 while the corresponding Index score for the suburb of The Ponds, is 1,124.9. The averaged Blacktown LGA Index score is 968.5 compared with The Hills Shire Index average of 1,101.1 (Profile id, 2013b). Table 2.4 also exhibits large variation in the proportion of migrants from non-English speaking backgrounds, indicated by language spoken at home with 37% of Blacktown residents speaking a language other than English compared with 5% of Hawkesbury residents. Furthermore, while Blacktown houses 13.01 people per hectare; peri-urban Hawkesbury has a population density of only 0.22 per hectare. Study respondents lived in a variety of housing, including privately owned or rented suburban cottages on quarter acre blocks, medium and higher density units, public housing units and houses, rural acreages and 'McMansions' - the colloquial term for large homes built on very small suburban blocks. Being further inland, Western Sydney temperatures are more varied than those on the coast, with Richmond's January mean maximum temperature of 29.9°C and the July mean minimum of 3.6°C (B.O.M., 2013a). These figures pertain only to averages, and more extreme temperatures contribute to the temptation to use air conditioning or heating.

Problem-solving, policy and practice

The study was conducted during a period when local councils in the focus area supported residents to undertake pro-environmental actions, through practices such as giving away locally endemic plants and large numbers of reusable bags during street and community festivals (Greenwood, 2009). Furthermore, it coincided with three programs, each being an endorsed policy of the participating Councils, each seeking to provide a form of localised mitigation solution to the problem of climate change and each dependent on partnerships between organisations. Regarding the

first of these programs, for three years of the study period, the author was employed on 'Regenesis', a Blacktown City Council project in partnership with Liverpool Plains Shire Council which is situated on the north-west slopes of rural NSW. Regenesis planted carbon forests using a diversity of locally native species in both urban Blacktown and rural Liverpool Plains, and involved considerable community engagement in both areas (Blacktown City Council & Liverpool Plains Shire Council, 2010). In the second of these programs, Blacktown Solar City provided home energy audits, ceiling insulation installations and solar PV installations through various incentive and funding models, as well as a business energy efficiency program (Australian Government Solar Cities, n.d.). One in-depth interviewee from this study was a Blacktown Solar City beneficiary and so were several of the survey respondents.

The third of these programs was the home energy audit project known as the Y Green Rouse Hill pilot project. UWS was a project partner, providing support and advice, and undertaking a project evaluation which included the author conducting and analysing interviews with participating householders. This householder-focused section of the evaluation provides an important aspect of the present study, therefore an outline of the project and its evaluation process is presented here. Exemplifying 'open' transdisciplinary inquiry, the UWS involvement in the Y Green project fused academic knowledge with other validated constructions of professional knowledge (Brown, 2010b, Lawrence, 2010). The Y Green Rouse Hill Pilot project sought to develop a model to enable young people to access nationally accredited training in household energy efficiency consultation and to gain work experience in this field. The model was dependent on the relationships of the key partners, being not-for-profit education, training and youth engagement specialist Dusseldorp Skills Forum which introduced the project concept and provided funding and support; householder sustainability specialist Steplight which provided household sustainability consultation software and technical expertise in greenhouse gas emission reduction; The Hills Shire Council which lent local Council credibility to the project and assisted in promotion; the residential developer, Lend Lease – the New Rouse Hill, which promoted the project to new development residents and provided community engagement; Western Sydney

Institute of TAFE which provided training; and UWS which funded and undertook the evaluation. The young participants, supported with training, supervision and mentoring, visited homes in the Rouse Hill area to educate householders on home energy efficiency strategies specifically suitable for their situations. Visits involved a more experienced consultant accompanying another who was being trained. They discussed individual householder energy bills and the scale of potential for financial, energy and greenhouse gas savings should householders make any of a range of specified changes, such as switching off at the powerpoint rather than using standby mode and adjusting the refrigerator or air conditioner temperatures. Students from the environmental studies stream at UWS participated as did TAFE students. The program was free of charge to participating householders.

The project's evaluation included a tally of the changes undertaken by participating households as a result of the program, estimated by Steplight to have delivered a per household average yearly reduction of 1.9 tCO_2e or 15% of greenhouse gases associated with the energy use of the 259 participating households. The evaluation also included semi-structured interviews with participating students and project partners, as well as the 14 in-depth, semi-structured Y Green householder interviews that inform this thesis (Barry et al., 2009). The Y Green householder interviews were purposefully designed by the author to simultaneously gather evaluation data on the Y Green project and elicit respondents' deeper motivations for taking actions that assist in climate change mitigation.

Next, Chapter 3 presents the overall methodology and individual methods used for this study's investigation into the motivations of Western Sydney adults when they take actions that help mitigate climate change.

Chapter 3 The research tools: methodology and methods

You may have heard the world is made up of atoms and molecules, but it's really made up of stories. When you sit with an individual that's been here, you can give quantitative data a qualitative overlay – 16th century British scientist and naturalist, William Turner (Turner, n.d.)

Summary

The study uses a convergent parallel mixed methods design which is qualitative and inductive, and includes the Climate Action Scale (CAS), a new deductive social research instrument specially developed by and for the study to facilitate engagement with respondents. The CAS assists in gauging the commitment of individuals to taking personal actions that facilitate reductions in greenhouse gas emissions and is offered as a tool that other researchers, educators and practitioners may wish to use. The CAS formed the basis for a survey of 300 people. The survey was designed to collect data on whether or not respondents undertook each of the 20 specified Climate Scale actions and their top-of-mind motivations for doing so, thus enabling some quantitative analysis. The only quantitative analysis included in this study arises from the survey data. All other analysis was of a qualitative nature. Additional in-depth data on motivations were gathered through 24 one-hour interviews with respondents who had demonstrated pro-environmental behaviour, and analysis of 30 relevant post-graduate assignments. In depth data on motivations was compared with the motivations discussed by the survey respondents. Each dataset underwent a preliminary theme analysis, with coding from each dataset compared and adjusted to ensure consistency. The SPSS Version 2.0 software package was used to analyse the quantitative data and NVivo was used in the analysis of the student assignments.

Methodological Approach and Design

Study-contextual advantages of combining qualitative and quantitative data

The structure and style of this thesis is qualitative, thematic and inductive, with its arguments and evidence based on data collected through a convergent parallel mixed methods design (Creswell & Plano Clark, 2011). This methodology enables comparisons between datasets, thus providing rigour as well as the flexibility to use different perspectives in investigating individuals' motivations for taking climate change mitigation actions. The methodological approach was also emergent to allow interplay between the qualitative and quantitative methods, with knowledge gathered by each step informing further steps. This emergent approach and the transdisciplinary nature of the inquiry allowed an eclectic mix of data sources to provide richness and depth (Denscombe, 2009, Creswell & Plano Clark, 2011, Denscombe, n.d.).

Results from now-published large scale climate change surveys were not available when the survey was conducted. Therefore their results could not inform the methodology. So for example if designing the survey now, to enable better comparisons, one might utilise questions from the large Australian surveys (Leviston & Walker, 2011a, b, Reser et al., 2012b, Reser et al., 2012c).

The mixed methodology produced four datasets from the following three data collection processes:

1. A survey of 300 Western Sydney adults, using questions based on the Climate Action Scale (CAS), a deductive, measurement instrument developed by the study to help gauge individual commitment to climate change mitigation actions. This survey produced two datasets, being: (a) data on whether or not respondents undertook each of the 20 Climate Scale actions, (e.g. whether or not they line-dried clothes rather than used a dryer) and (b) data on their motivations for doing so, with this motivational data later coded into themes.

2. In-depth interviews with 24 Western Sydney adults who had demonstrated pro-environmental interest or action, with this group including the 14 householders who had taken part in the Y Green Rouse Hill pilot.
3. Thematic analysis of 30 postgraduate student assignments, where the assignment had been designed to simultaneously provide relevant educational outcomes for the students as well as data for this research.

Drawing somewhat from the Grounded Theory tradition, these methods allowed motivational concepts and themes to emerge from the datasets (Strauss & Corbin, 1998) and their utilisation facilitated comparisons between them. The research sought to approach individuals' motivations from three different perspectives. Firstly, it aimed to elicit top-of-mind motives from the CAS survey questions. Secondly, through the interviews and student assignments, it aimed to elicit deeper discussion of personal motivations by asking these respondents to more fully consider why they take or have recently taken the mitigation actions they have. Thirdly, interviewees and postgraduate student respondents were asked to consider which aspects of their earlier lives led them to hold their current attitudes and feelings for the environment. While survey data provided some identification of the internal and external contexts in which individuals' mitigation actions occur, the in-depth data enabled a richer insight. Understanding contexts of action was considered an essential element in investigating and interrogating motivations (Schwartz, 1973, Guagnano et al., 1995, Corraliza & Berenguer, 2000, Stern, 2000, Ajzen, 2002, Chawla & Cushing, 2007, Kaiser, 2010). It should be noted that the survey's lack of 'probing' questions allowed more for discussions of motivations unrelated to the environment or climate change, i.e. ones that unintentionally assist in mitigation. In contrast, the interviews and student assignments had a much stronger focus on motivations that were pro-environmental in intent.

Throughout the thesis, the in-depth interviewees and post-graduate students who provided their assignments for analysis are collectively termed 'in-depth respondents' and the data they provided is collectively termed 'in-depth datasets'.

Methods

Development of the Climate Action Scale

It was decided that a conceptual instrument, which ranked tangible personal mitigation actions from the easiest to do to the most difficult to do, would be useful for engaging with research participants. Existing behaviour-focused scales which seek to measure the environmental commitment of individual respondents do so by listing a range of pro-environmental actions that individuals *might* take and asking respondents to state which of these they *do* take. While this approach was considered appropriate, existing scales of general environmental attitudes and behaviour did not provide the focus on climate change mitigation actions necessary for this study. Therefore, a new instrument, the CAS was purposefully designed to:

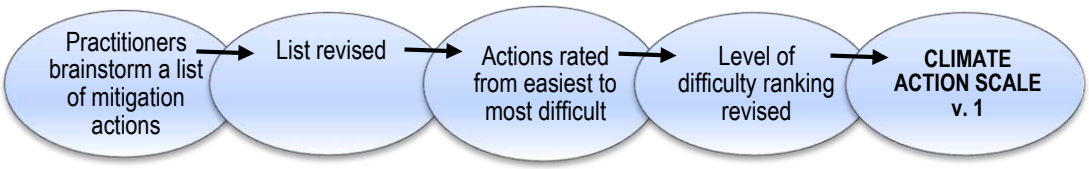
1. Inform development of the short survey questionnaire;
2. Engage survey and interview respondents by providing a 'conversation-starter' that focussed on tangible, specific actions;
3. Provide respondents with a list of actions they may aspire to if they wished to improve their mitigation behaviour;
4. Provide quantitative data for comparison with the qualitative data and where appropriate with relevant findings from the three-yearly NSW *'Who Cares about the Environment?'* tracking survey (NSW O.E.H., 2013); and
5. Facilitate comparison with other research into environmentally-related behaviour.

Based on the logic behind existing scales for measuring commitment to pro-environmental behaviour, it was expected that ranking mitigation actions with incrementally higher behavioural costs would sort those less dedicated to taking actions from those more dedicated to doing so (Kaiser et al., 1999, Kaiser et al., 2003, Kaiser & Fuhrer, 2003, Kaiser & Wilson, 2004, Kaiser et al., 2007, Kaiser et al., 2008, Kaiser, 2010). In line with this literature, it was assumed that only the very dedicated would undertake the actions with the highest behavioural costs. Development of the CAS acknowledged that the reliability of such scales is predicated on their ability to *consistently* capture and gauge the phenomena being explored (O'Leary, 2004) - which in this case was the commitment of individuals

to actions which assisted in greenhouse gas emission reductions. However, behavioural costs requisite in achieving or realising specific actions, or as Kaiser et al. (2008) term them 'realisation costs' may vary between individuals and according to context. So for example, those living in houses would find it easier to compost at home than those living in units or apartments. Therefore the reliability of the CAS was seen to depend on achieving strong consensus on the relevance of the specified mitigation actions included in the scale, the level of difficulty of each and their appropriateness of each action for the context of Western Sydney.

Methods used for the development of the Climate Action Scale version 1 (CAS v.1) combined aspects of the Delphi Method (Schmidt, 1997, Okoli, 2003) and 1920s work on scale development (Allport & Hartman, 1925, Thurstone, 1928, 1929a, b, Thurstone & Chave, 1929, Thurstone, 1931). An iterative process was used to create a numerical base line for describing the distribution of mitigation actions along a continuum from easiest to undertake to most difficult to undertake. Figure 3.1 outlines the process of developing the CAS v.1.

Figure 3.1 Process used for developing the Climate Action Scale v.1



1. Brainstorm

Twelve sustainability experts and/or practitioners, including academics, local government employees and consultants who lived and/or worked in Western Sydney brainstormed actions which Western Sydney residents could realistically take to help mitigate climate change. APPENDIX A shows the resulting list, with most actions focussed on reducing greenhouse gas emissions, rather than sequestration.

2. List revised

The Scale was developed to be as inclusive and relevant to potential respondents as possible. Of the 98 actions suggested, 83 were selected as those that could be undertaken by most adults in the community. For example, actions relying on the respondent working in paid employment or raising children were purposely avoided, as these could not reasonably be answered by those not working or without children. Therefore, the action '*Arrange a "walking school bus" for your child's school'* was deleted. Through the iterative revisions, the Scale was deliberately tailored to include only actions that people could undertake at home, when making purchasing decisions and regarding personal transport - as nearly every adult participates in these areas of life. Refer to APPENDIX B for the revised list.

3. Actions rated from easiest to most difficult

The revised list of 83 actions was sent to a panel of seven practitioners chosen for their sustainability expertise and/or their understanding of Western Sydney communities. They rated each action's ease/difficulty on a 10 point scale with 1 indicating that it was a very easy action to undertake and 10 indicating that it would be very difficult to undertake. Ratings were reviewed. As the CAS reliability was dependent on a strong consensus on the level of difficulty of each action, actions with rating variances of 4 or higher were deleted. Also deleted were obscure actions advised by one or more of the panel as irrelevant to most people or would not be easily understood. The averaged ratings for remaining actions were used to rank the actions from the easiest to undertake to the most difficult to undertake.

4. Ranking revised

The panel rated the refined list, this time using a more defined five–point Likert scale where the scale numbers were allocated thus: 1 = Really easy – anyone could do it; 2 = A bit harder; 3 = You would need to put in some effort; 4 = Difficult to do – it would take real effort; and 5 = So difficult that only the most dedicated would do it. Ratings were reviewed and refined by deleting actions with ratings variances of 4 or higher and any remaining obscure actions. The average rating for each action became a numerical point score allocated to that action to indicate its level of difficulty. The aim was that when a survey respondent reported undertaking

an action, they received the action's corresponding point score. A respondent's totalled point scores (indicating the overall level of difficulty of the actions they took) would indicate their Climate Action Score. These Climate Action Scores could be compared with each other and used for analysis and triangulation with qualitative findings. The list of actions was re-worded to become a list of 44 closed yes/no questions. Each question was listed along with its point score as shown at APPENDIX C.

5. A need to trial the scale

The panel's two ratings rounds showed a pattern. There was strongest agreement on actions considered very easy and strong agreement on actions considered very difficult but considerable disagreement on the large number of actions that fell between these, meaning that – at this stage – the CAS appeared reliable only at the very low and very high behavioural cost ends. It was thought that this might reflect differences in individual conditions and contexts such that an action considered difficult by one person, could be relatively easy for someone else. In response, it was decided to trial the Scale with a broader group.

6. Amendments made in response to scale trial results

The Scale was trialled with the 14 householders taking part in the 2009 Y Green evaluation (Barry et al., 2009), one non-Y Green interviewee and 25 post-graduate students, all of whom provided valuable feedback. Trial results showed that, as expected, almost no-one undertook the very difficult actions 39-44 (at APPENDIX C). However, there was no other consistent pattern. Had the scale been reliable, most of the 40 people would have answered 'yes' to undertaking the easier actions and the frequency of 'yes' answers would have progressively reduced as the list advanced into increasingly difficult actions. But this was not the case. Indeed, seven problems were identified, indicating that the scale required heavy revision. Table 3.1 outlines the identified problems along with the strategies used to address them.

Table 3.1 Problems identified during the Climate Action Scale trial and the strategies used to overcome them

Scale Problems	Strategies used to overcome the problems
The scale had too many questions – it was too long.	The scale was pared back to 20 questions.
Some of the questions had too little relevance for too many people (e.g. avoiding the use of polystyrene and concrete).	Such questions were deleted as part of the paring process.
Several actions were simply not do-able by people living in units (e.g. keeping chooks and composting).	Such questions were deleted as part of the paring process.
The mere fact that something was 'easy to do', did not necessarily mean that people would do it (e.g. putting a 'no junk mail' sticker on the letterbox or being vegetarian).	Although having a 'no junk mail' sticker had been allocated the lowest degree-of-difficulty score of 1.0, only one of the 40 answered 'yes'. Therefore the question appeared not to be a reliable measure and was deleted. With its higher score of 2.3 for degree-of-difficulty, the vegetarian question remained.
Some respondents stated a preference for questions that were *absolute* e.g. 'Do you *always* use the home recycling bin for the recyclables that the council system allows?' Others thought it would be more reflective of reality to word questions to elicit *usual practice*, e.g. 'Do you *usually* use the home recycling bin for the recyclables that the council system allows?'	A scale of ecological behaviour is effective only in measuring the tendency of an individual to undertake actions. Things outside their control may affect whether or not they undertake the action in a given situation, e.g. although someone usually rides their bike, if it rains, they are more likely to use their car that day **(Kaiser et al., 1999)**. Questions were amended to include a relative term like 'regularly' or 'usually'.
Some questions did not appear to help measure commitment to mitigating climate change, e.g. 18 of the 40 stated that they always participate in Earth Hour but some respondents were cynical about the tokenistic nature of switching off lights for one hour in a year, calling into question the usefulness of this action as a measure.	Such questions were considered unreliable and deleted as part of the paring process.
Some questions were double-barrelled, in that a respondent could answer yes to the first half but no to the second half of the same question. This problem related to questions which sought to find out if a respondent undertook the action *for the purpose of mitigating climate change*. However, in many cases people take actions that happen to have a mitigation effect for some other purpose.	It was decided to use a two-step process. In conducting the survey, respondents clearly in a hurry, were asked only the first question – i.e. whether or not they usually took the action, providing quantitative data. Respondents that seemed willing to spend a little more time were also asked why they undertook each action, resulting in additional qualitative data.

In line with previous findings (Kaiser et al., 1999, Stern, 2000, Whitmarsh, 2009), the trial indicated that *people's actions were motivated by a range of factors, often unrelated to climate change.* These early results made it clear that mitigation itself may not be a primary motivator. Therefore, the study's research question was amended from '*What motivates adults in Western Sydney to undertake actions **to** help mitigate climate change?'* to become, '*What motivates adults in Western Sydney to undertake actions **that** help mitigate climate change?*' This amendment removed the implicit assumption of climate change as a motivator and pragmatically sought the motivations for mitigation action*, regardless* of whether or not they were related to climate change. After the paring process, 20 questions remained. Where appropriate these were reworded. They were listed from easiest to undertake to most difficult, according to the point scores previously allocated from the panel's averaged ratings. APPENDIX D shows the post-trial CAS v.1 within the Survey Schedule.

Balancing the problems of self-reports with the need to use them

In practicality, there is little option when investigating personal climate change mitigation behaviours other than seeking self-reports, because mitigation relies on a range of actions rather than one specific behaviour which may more feasibly be observed or monitored, e.g. through electricity bills. Yet self-reports can be particularly fallible data sources, with evidence that quite different findings can result from variations in wording of questions that seek the same information, question order, context and whether questions offer multiple choice answers or seek respondent-generated answers (Schwartz, 1999). Schwartz argued that social research respondents pragmatically determine the meaning of questions and follow the rules of cooperative conversation that occur in everyday life. Therefore respondents would generally try to be informative, truthful, relevant and clear. A risk posed by the tendency to aim for relevance may be that respondents influenced by the context of research on climate change and/or the environment might tend to over-report motivations related to climate change or the environment. However, the survey pilot indicated that this seemed not to be the case. As discussed later in this chapter, during the pilot many of the motivations reported for taking actions

that assist in climate change mitigation were unrelated to climate change or to the environment.

Previous environmental behaviour studies that attempt to triangulate self-reports with others' observations have focussed only on students and their roommates or spouses. These did not provide dependability nor did they identify definite patterns of agreement or disagreement between the reports of the students and those of their spouses and roommates (Chao & Lam, 2011, Lam & Cheng, 2002). Additionally, such studies would be impractical across general populations without funding for substantial incentives which was not available for this research.

As outlined below, the design of this study attempted to minimise the problems known to beset reliance on self-reports. During environment-related social research, respondents tend to exaggerate their pro-environment behaviours (Tarrant & Cordell, 1997, Gatersleben et al., 2002, Chao & Lam, 2011). The risk faced by this study was the potential for exaggeration of pro-environmental behaviour to affect survey respondents' Climate Action Scores. This was ameliorated as much as possible in the analysis through comparison with other studies.

Other risks were those related to misattributed motivations, especially the tendency to avoid attributing a change in one's attitude or behaviour to social influence (Nisbett & Wilson, 1977, Nolan et al., 2008). People have a particular blind spot regarding normative influence. It was considered that the risk of this for the present study was reduced by three factors. Firstly, this study did not focus specifically on *change* – rather it looked at motivation. Secondly it was noted that in the studies reviewed by Nisbett and Wilson and even in the Nolan et al. study, such misattribution seemed to occur immediately after the change itself or soon after it was drawn to the attention of the individual, i.e there was a short time frame involved. Therefore, in regard to this study, it was considered that the risk of under-reporting of normative influence would more likely occur in the survey and that the in-depth discussion with its prompts for consideration of longer-term past influences may offset this. Thirdly, the previous research findings (Nisbett &

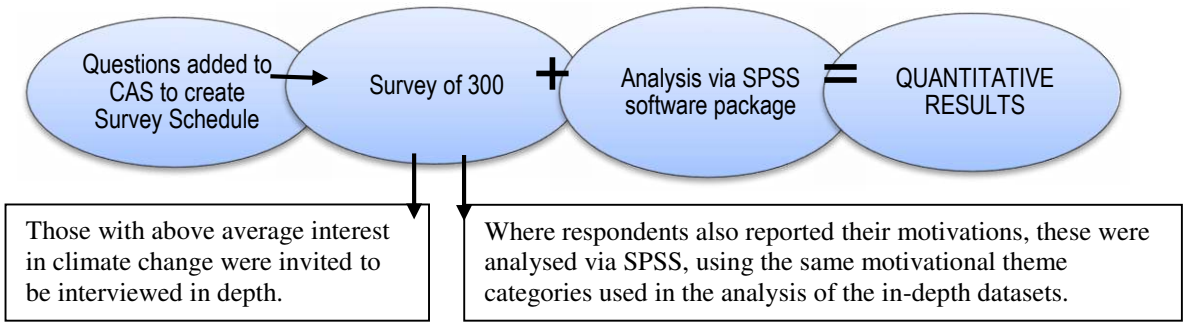
Wilson, 1977, Nolan et al., 2008) focused on the times when normative influence was shown to be influential but not reported. This does not mean that the reasons actually reported were any less important. Indeed, Nolan et al. argue that those most likely to undertake pro-environmental actions are already doing so. In the parlance of Rogers (Rogers, 1962, Rogers, 1983, Rogers, 2003) these would be the innovators and early adopters. Nolan et al. argue that the advantage of normative influence is its ability to appeal to an additional 'audience', who in the parlance of Rogers are the late majority. Multiple motivations for pro-environmental action are common (Kaiser & Shimoda, 1999, Stern, 2000, Whitmarsh, 2009). A priori reasons are likely to be important when developing programs that enable people to take actions that assist in mitigating climate change – at the very least so individuals can justify their actions. For example, this may be particularly necessary where one of the adults in a household needs to outline advantages of mitigation actions to others in the household as part of negotiated joint decision-making (Fonseca et al., 2012, Treas & Tai, 2012, Himmelweit et al., 2013).

Conducting the survey of 300 and analysis of survey dataset

The methodology was largely qualitative, taking a grounded theory approach to analysis and coding, as outlined later in this chapter. The aim of the survey was to provide a level of quantitative analysis feasible for an unfunded project. There is no claim that the associated quantitative findings are comparable in terms of robustness with the much larger surveys that were conducted at about the same time or since (Nisbet & Myers, 2007, Brechin & Bhandari, 2011, Krosnick & MacInnes, 2011, Leiserowitz et al., 2011, Leviston & Walker, 2011a, b, Reser et al., 2012b, Reser et al., 2012c). Each of these other surveys yielded between 1,000 and 5,000 responses. The Survey Schedule (APPENDIX D) included the CAS v.1 and additional questions seeking to identify the relative importance of both climate change and the environment to each respondent and to gather demographic data in formats that could be compared with their Climate Actions Scores, using the social sciences statistical software package SPSS. In some cases, survey respondents were willing to discuss their motivations for undertaking the specified mitigation actions and their answers provided qualitative data hand-noted by the researchers at the time of the survey. New survey respondents were sought until *'saturation'*, in the

qualitative Grounded Theory sense, had been attained, *'saturation'* being the point at which no new motivations or contexts were being described (Strauss & Corbin, 1998). It was clear that this had occurred by the time the survey respondent sample had reached 300 adults aged 18 years or more. Figure 3.2 outlines the survey process.

Figure 3.2 Using Climate Action Scale v.1 as the basis of the survey of 300.



To encourage participation by younger men and women, a young woman and young man were recruited and trained to also conduct the surveys. The majority of surveys took place in public venues between September 2009 and March 2010, at locally high profile shopping centres and community festivals. In total, the author conducted approximately half of the surveys. The other researchers conducted most other surveys between them. The sample included 11 UWS postgraduate students undertaking the 'Perspectives of Sustainable Development' unit in 2010 and four in the 2012 class. These students self-administered their surveys while researchers administered all other surveys and completed the schedules. With the aim of sampling the broadest possible cross section, researchers displayed the following incentives: reusable shopping and 'chiller' bags, 'scratchie' lottery tickets, socks, pens, native plant seedlings and cold bottles of water - popular at one outdoor venue when the temperature reached 44°C - with incentive retail prices ranging from $1.00 (AUD) to $2.49 (AUD). Respondents could select their 'prize' from those on offer upon completing the survey. Survey respondents were self-selected and many seemed to be attracted by the incentives rather than the topic. The survey was designed to take no more than five minutes, as it was assumed that many potential

respondents would be reluctant to participate for longer and this assumption was borne out in the field.

Survey data analysis included both quantitative and qualitative aspects, with quantitative data analysed using the software package, SPSS Version 20.00. Frequency of reports for undertaking the specified actions and the Climate Action Scores were used as the dependent variables. Reported motivations that had been hand-noted by the survey researchers underwent a preliminary theme analysis to manually code the motivational themes into categories. Similar preliminary theme analyses were applied to the interview and student assignment data, and coding from each dataset was compared and adjusted to ensure consistency.

Amending the Climate Action Scale in line with the empirical data

In line with Thurstone's technique for testing a measurement instrument with the broader population (Allport & Hartman, 1925, Thurstone, 1928) the survey results provided robust, authentic data for further refining the CAS. This involved re-ordering the actions in line with the respondent frequencies of undertaking them. As summarised in Tables 3.2 and 3.3, CAS v.1 was amended to create Climate Action Scale version 2 (CASv.2). Table 3.2's Column A indicates the ranking order of CAS v.1 actions. Column B shows the actions. Column C shows the survey frequency of 'yes' answers for each action, and the percentage of respondents represented. Column D shows the ranking revised in order of the frequency of yes answers. Column E shows each action's point scores – attributed earlier by the panel of sustainability practitioners. These point scores were also amended in line with the survey's empirical findings.

Table 3.3 shows CASv.2 with the action ranking revised in accordance with the actual frequency of reports and point scores revised to reflect the percentage of survey respondents who reported NOT taking that action. So, for example, a respondent would now receive the point score of 4.7 for regularly using the recycling bin as 4.7 was the percentage of respondents who reported that they did *not* take this action.

Table 3.2 Frequency of taking Climate Scale actions using CAS v.1 post-survey rank and the action's CAS v.1 point score

A v.1 rank	B Climate Action Scale v. 1 action	C Frequency of Yes N=300	D Post- survey rank	E Point score
1	Do you usually hang clothes out to dry instead of using the dryer?	279 93%	2	1.2
2	Do you regularly use the household recycling bin?	286 95.3%	1	1.3
3	Wherever possible have you replaced your light globes with compact fluorescent globes?	254 84.7%	4	1.3
4	Have you consciously set out to run a car that is fuel efficient?	147 49%	14	1.3
5	Do you usually make a conscious effort to keep your showers short?	224 74.7%	7	1.5
6	Do you usually buy recycled paper? Eg copy paper, paper towels, toilet paper?	155 51.7%	12	1.5
7	Do you buy greenpower?	59 19.7%	16	1.6
8	Have you taken any particular action to help you learn more about climate change?	160 53.3%	11	1.7
9	Do you put on a jumper first rather than turn on the hearer or light the fire?	266 88.7%	3	1.8
10	Do you try to use rechargeable batteries rather than disposable ones?	196 65.3%	9	1.8
11	Do you discuss climate change with others?	163 54.3%	10	1.8
12	Do you usually use reusable shopping bags?	218 72.7%	8	1.8
13	Do you try to limit your use of air conditioning? Eg Only use it when the temperature is extreme?	249 83%	5	2.0
14	Do you have a solar hot water system? (Heat pump also scores yes)	53 17.7%	17	2.0
15	When buying an appliance do you consciously try to choose the one with the highest star rating?	239 79.7%	6	2.2
16	When shopping do you usually try to choose items with less packaging?	151 50.3%	13	2.2
17	Are you vegetarian?	19 6.3%	18	2.3
18	Do you have solar panels that produce electricity (not just for hot water)	17 5.7%	19	2.8
19	Have you become carbon neutral – calculated your carbon footprint and offset emissions	4 1.3%	20	3.7
20	Do you choose not to run a car at all?	64 21.3%	15	4.8

Table 3.3 Climate Action Scale Version 2

Action ranking amended in line with the frequency of survey reports for each action taken, and the CAS v.2 point score, which represents the percentage of survey respondents who did not take that action.

Amended rank	Climate Action Scale v. 2	v.2 score
Of 20	20 actions	
1	Do you regularly use the household recycling bin?	4.7
2	Do you usually hang clothes out to dry instead of using the dryer?	7.0
3	Do you put on a jumper first rather than turn on the hearer or light the fire?	11.3
4	Wherever possible have you replaced your light globes with compact fluorescent globes?	15.3
5	Do you try to limit your use of air conditioning? Eg Only use it when the temperature is extreme?	17
6	When buying an appliance do you consciously try to choose the one with the highest star rating?	20.3
7	Do you usually make a conscious effort to keep your showers short?	25.3
8	Do you usually use reusable shopping bags?	27.3
9	Do you try to use rechargeable batteries rather than disposable ones?	34.7
10	Do you discuss climate change with others?	45.7
11	Have you taken any particular action to help you learn more about climate change?	46.7
12	Do you usually buy recycled paper? Eg copy paper, paper towels, toilet paper?	48.3
13	When shopping, do you usually try to choose items with less packaging?	49.7
14	Have you consciously set out to run a car that is fuel efficient?	51.0
15	Do you choose not to run a car at all?	78.7
16	Do you buy greenpower?	80.3
17	Do you have a solar hot water system? (Heat pump also scores yes)	82.3
18	Are you vegetarian?	93.7
19	Do you have solar panels that produce electricity (not just for hot water)	94.3
20	Have you become carbon neutral – calculated your carbon footprint and offset emissions	98.7

The significant difference between the expert panel's ease-difficulty ranking of actions and that demonstrated by the survey responses is visually demonstrated by Figures 3.3 and 3.4 below. Figure 3.3 shows the survey frequencies for taking each of the Climate Scale actions, with the actions ranked in the survey (CAS v.1) order.

Figure 3.3 Frequency of Climate Scale action-taking in the CAS v.1 ranking order, shown as a percentage of survey respondents

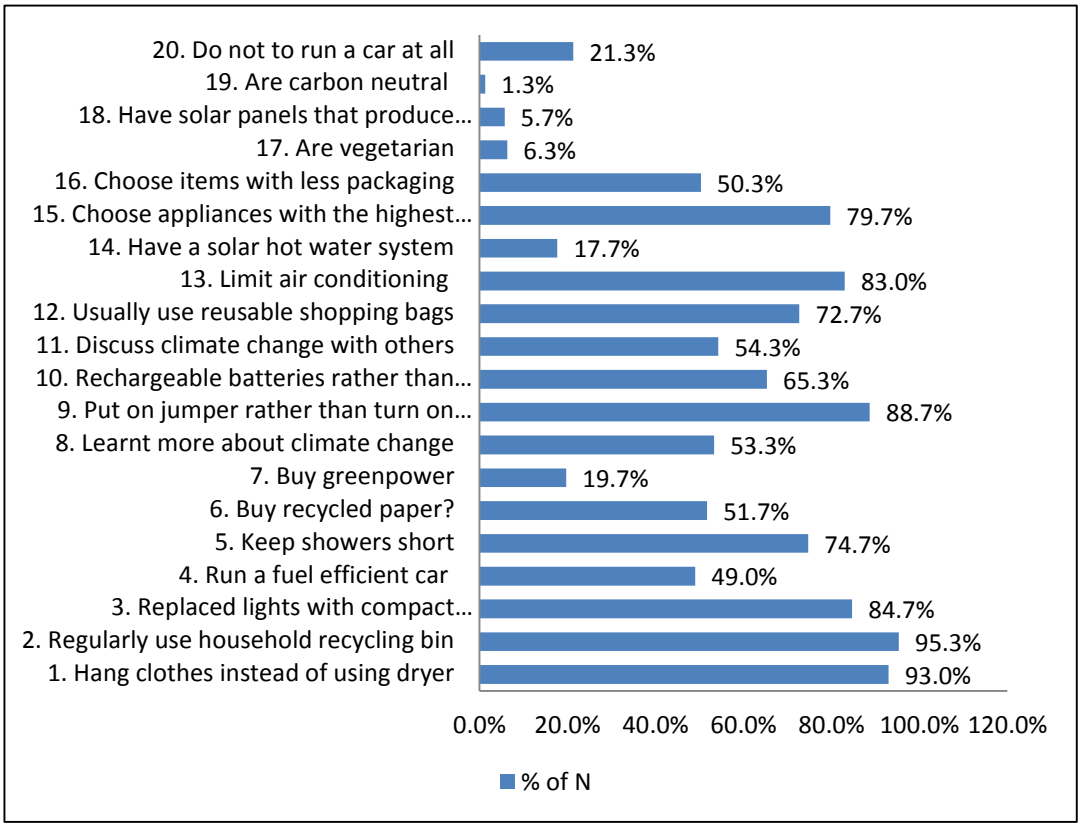
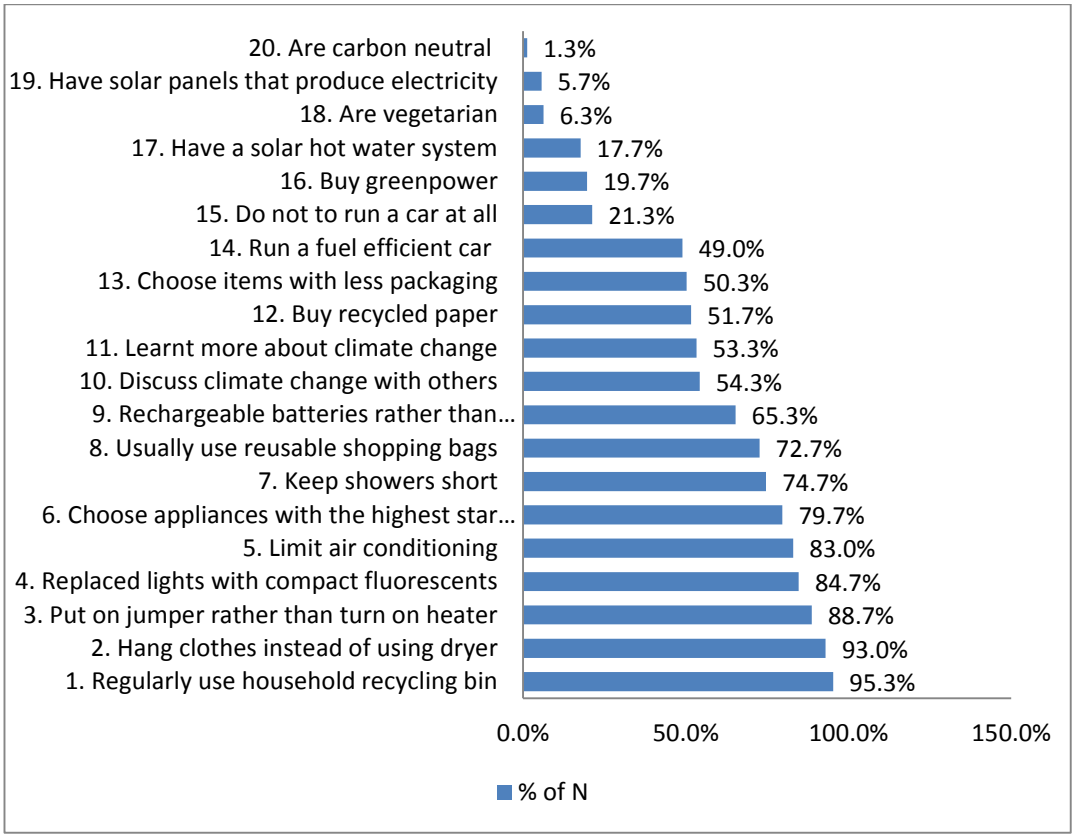


Figure 3.3 shows the more ad hoc frequency pattern of the CAS v.1 ranking order. Figure 3.4 shows the actions re-ordered according to the empirical reports of action taking, i.e. in the CAS v.2 order. The difference between the ease-difficulty rankings of the expert panel and the survey respondents is thought to have been caused by subjective influences of the personal situations of expert panel members. All panel members conducted busy, professional lives in well-paid roles, situations likely to give them personal priorities and levels of disposable incomes not necessarily typical of the broader community. So, for example, the expert panel thought the hardest mitigation action in Western Sydney would be not to run a car

at all, yet more than 20% of respondents did not run a car. The differences between ease-difficulty highlight the necessity of social research, as even professionals and academics close to a community may not be able to accurately express general views or capabilities.

Figure 3.4 Frequency of Climate Scale action-taking in CAS v.2 ranking order, shown as a percentage of survey respondents



Having been empirically informed, CASv.2 point scores were used for the SPSS analysis which produced the survey results discussed in Chapters 4, 5, 6 and 7.

Availability of CAS v2 for future use

The survey experience demonstrated that the CAS fulfilled the research aims for which it was developed. That is, it informed development of the survey questionnaire, engaged survey and interview respondents with a 'conversation-starter', offered respondents a list of actions that could improve the mitigation effects of their behaviour, and as detailed in Chapters 4, 5 and 6 provided

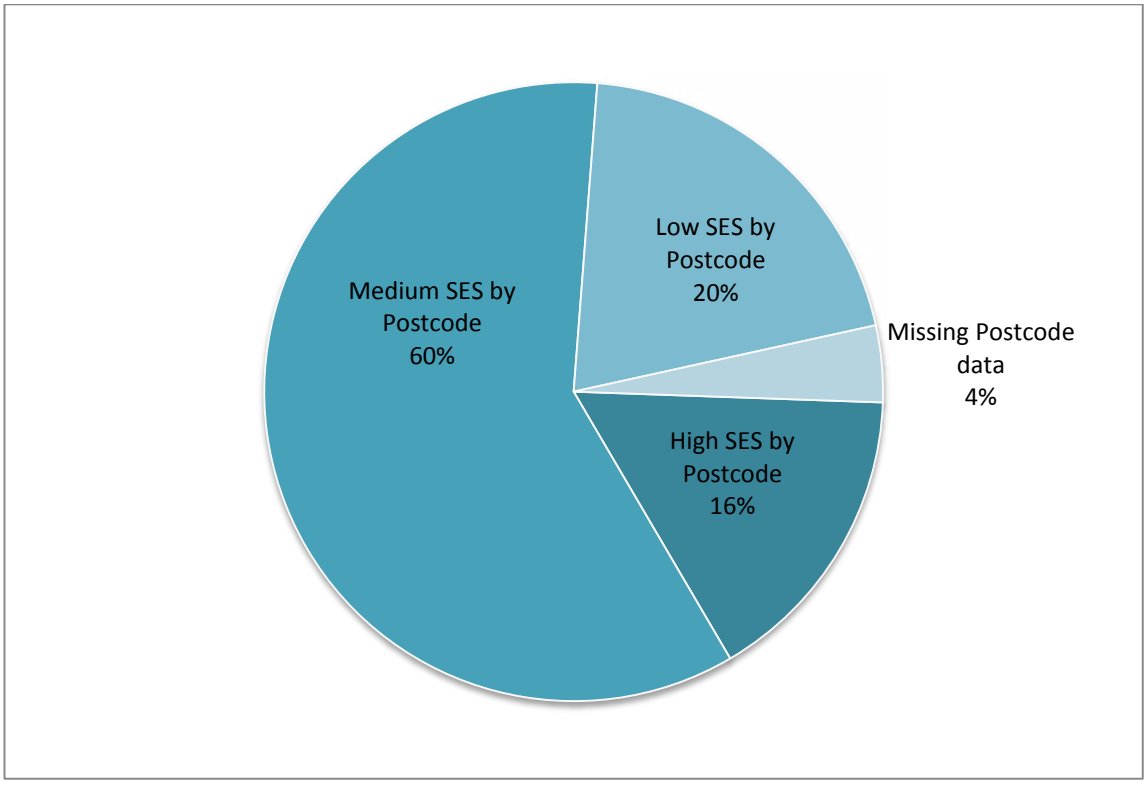
quantitative data for comparison with this study's qualitative data. As outlined later in this chapter, the CAS also proved useful in sparking engagement and discussion with the postgraduate students who provided their assignments for analysis by this study. For these reasons researchers, educators and practitioners with a practical use for CAS v.2 are encouraged to utilise it, adapting it where appropriate. Indeed, it would be interesting for CAS v.2 to be used in different contexts and for findings to be compared with those presented above.

Survey sample confidence levels and limitations

The survey sampling method was purposefully chosen to facilitate broad participation, including from those attracted to the incentives displayed as well as those with interest in the environment and/or climate change. Research sample size calculator G*Power (Faul et al., 2007) was used to ensure that sample sizes for each statistical test undertaken (as outlined in Chapters 4, 5 and 6) provided a confidence level of 95%. Where such points of comparison exist, there is also triangulation with relevant findings from the three-yearly NSW *'Who Cares about the Environment?'* tracking survey. Where direct comparison is made between findings from *Who Cares?* and findings from this study's survey, the 2009 *Who Cares* findings are used. This is because the 2009 data collection period more closely matches that of this study than the data collection period for the 2012 *Who Cares?* survey.

Readers considering any transferability of results to other contexts may wish to note, for comparison with those contexts, the following demographic details regarding survey respondents. The UWS system of rating socio-economic status was applied to survey respondents. This system uses the Index of Education and Occupation (IEO) from 2006 census data on education levels and occupation-related skills of 15 – 64 year olds averaged by postcode (A.B.S., 2008b). UWS rates the two middle quartiles of IEO postcode scores as 'medium', the top quartile as 'high' the lowest quartile as 'low'. Figure 3.5 shows the survey respondents according to the UWS system of rating socio-economic status.

Figure 3.5 Proportions of survey residing in postcode areas of high, medium or low socio-economic status in line with the UWS system of rating SES



There was some skewing of the sample, notably its inclusion of 57% women compared with 43% men; over representation of 18-25 years and under representation of those aged over 66 years, and unusually high educational levels, compared with the general population of Greater Western Sydney, (Profile id, 2012a). Refer to APPENDIX E for details of the demographic profile of survey respondents.

Conduct and analysis of the 24 in-depth interviews

While the 5-minute survey collected valuable data on motives, the venues were busy, public locations and the circumstances were not conducive to deeper contemplation. In contrast, the one hour in-depth interviews specifically sought to reveal underlying personal motivations of those willing to undertake mitigation behaviours that required more effort and/or higher expense, i.e. action with higher 'behavioural costs' (Kaiser, 2010). Interviews enabled focus on 'bright spots', i.e. currently existing examples of the desirable behaviour (Heath & Heath, 2010). There were two distinct processes for recruiting interviewees. The first purposefully

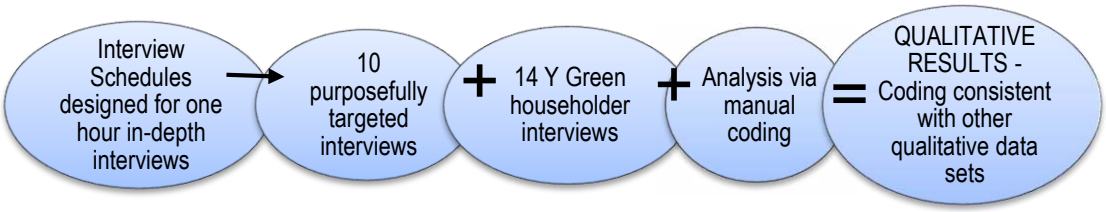
targeted survey respondents expressing concern regarding climate change, and other community members who demonstrated environmental protection and/or climate change mitigation actions. Ten such purposefully targeted interviews were conducted.

The second recruitment process targeted Rouse Hill-Kellyville area householders who had participated in the Y Green Rouse Hill Pilot sustainability audit program outlined in Chapter 2. Y Green householder interviews were designed to simultaneously inform both the evaluation of the Y Green pilot project and this study. The author's sole role on the Y Green project was to design, conduct and analyse in-depth interviews with participating householders for the evaluation. Findings from these householder interviews provided one aspect of the UWS evaluation of the pilot (Barry et al., 2009). The author worked only on the evaluation and not on the Y Green project itself, so author bias relating to the Y Green project is unlikely. A limitation of the Y Green evaluation and the present study is that neither tested for any householder participant attitude changes before and after the audit. This limitation is justifiable as adding any type of testing, questioning or upfront interviewing would have required a higher level of commitment from householders, which would have almost certainly reduced the numbers of householders willing to take part.

The Rouse Hill-Kellyville area is socio-economically advantaged, with the 2011 Census analysis showing the Index of disadvantage score for Rouse Hill as 1,108.8 and for Kellyville for 1,107.9 (Profile id, 2013b). That the Y Green Rouse Hill pilot project and its householder-related findings are confined to such an area means a lack of directly comparable data from lower socio-economic areas. However, as socio-economically advantaged areas show higher patterns of consumption and related greenhouse gas emissions, Rouse Hill and Kellyville provide an appropriate area of in-depth focus. Participating householders were invited to take part simultaneously in the UWS evaluation of the pilot and in the study being discussed, via an interview that addressed both. Interviewed householders had demonstrated commitment to mitigation actions in that although the sustainability audit and advice was free of charge, householders implemented and financed follow up

mitigation actions. A preliminary phone call determined that the 14 householders interviewed had done this. Figure 3.6 summarises the interview processes.

Figure 3.6 Process used for the conduct and analysis of the interviews



Interviews were face-to-face and semi-structured, using an Interview Schedule (APPENDIX F) to ensure all prompting questions were covered. The discussions were flexible and conversational to help build rapport between researcher and interviewee (O'Leary, 2004). All interviews were conducted by the author and, with consent from participants, were voice recorded. The Y Green participant Interview Schedule (APPENDIX G) included additional questions to elicit information for the UWS evaluation, *Y Green Review of Rouse Hill Pilot* (Barry et al., 2009). Interviewees chose the location and time of their interview. In line with the approved human research ethics process, interviewees were provided with a letter outlining the aim of the research (APPENDIX H) and gave written consent to participation in the interviews via a form (at APPENDIX I).

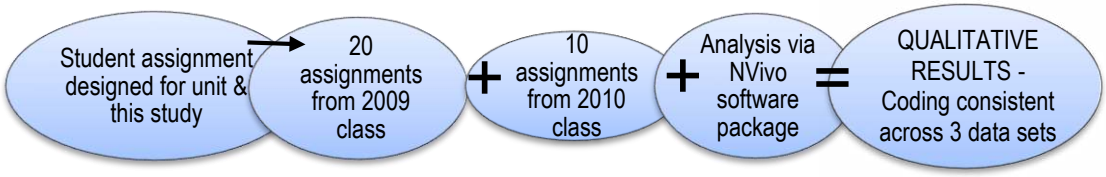
Collection and analysis of the 30 post-graduate student assignments

The UWS postgraduate unit *'Perspectives of Sustainable Development'* provides a contextual overview of sustainable development and its history and encourages students to consider sustainability in relation to how they actually live. It attracts adults of various ages. Some hold undergraduate degrees, while others have demonstrated life experience plus a technical qualification. While some of the students have a pre-existing interest in sustainability issues and opt for the unit, for others it is compulsory within their relevant course structure. The unit can be confronting and transformative, with some students reporting that it led them to consciously live more sustainably while some, who had not earlier considered such options, change to sustainability-focussed careers. It was thought that this student

cohort would be ideal for revealing deeper reasons why people undertake personal mitigation actions.

In each of the years 2009, 2010 and 2012 the author attended one of the workshops for the UWS postgraduate unit *'Perspectives of Sustainable Development'* as a guest-presenter. On each occasion, the author presented an outline of this study and the then-current findings. Furthermore, each group of students self-administered the CAS and in collaboration with the unit coordinator, Associate Professor Brent Powis (now adjunct), the author designed an assignment that would both provide appropriate educational outcomes for the students and data for this study. The 2009 visit resulted in 25 students participating in the CAS trial, of whom 20 also agreed to make the related assignment available for analysis. The timing of the CAS and survey schedule development allowed ten of the 2010 students to undertake the survey and this ten also provided their assignments for analysis. Students in the 2012 class participated only in the survey. Figure 3.7 outlines the collection and analysis for the student assignment dataset.

Figure 3.7 Process used for the collection and analysis of the student assignments



In line with ethics protocol, the researcher had no part in academically marking the assignments, a task undertaken through a separate process. The 2010 assignment (APPENDIX J) called for the students to undertake the survey (APPENDIX D), then select three actions they answered with a 'yes' and three actions they answered with a 'no' and discuss their motivations for either undertaking or not undertaking the actions. The 2009 assignment followed the same process but used the trial version of the scale. As the assignment data was available electronically, NVivo 10 was used to undertake the preliminary round of coding motivational categories

and these were checked against the other datasets to ensure consistency. The 30 assignments were analysed together.

Saturation, coding and descriptor terms selected to explain findings

Once the frequency pattern of motivations across all data sets was continually repeated and it was difficult to identify additional motivational categories or relationships, the samples were large enough to create a thorough database of motivations, or 'saturation' (Strauss & Corbin, 1998, Kemper et al., 2003). Results of each dataset were kept separate and used for 'between-methods' triangulation (Flick et al., 2012) to ascertain similarities and differences.

The research aim of producing knowledge directly useful to practitioners and policy-makers guided the coding process. All coding was undertaken by the author, in iterative steps. In line with grounded theory (Strauss & Corbin, 1998), coding categories were derived entirely from the data. The process was conducted in the following way. Firstly, the motivations given during the survey were coded, providing initial categories that were highly specific to enable nuanced distinctions. Secondly, each of the in-depth datasets were separately coded and kept distinct. This step used the classifications that had been given to the survey data, with the addition of classifications where none suitable already existed. Thirdly, all coded datasets were then checked to ensure that responses were accurately coded and classifications had been used consistently across the datasets. Fourthly, those of the 40 resulting classifications that showed very strong similarities were collapsed, resulting in a total of 33 subgroups of motivation.

By the end of the coding process, it was clear that motivations identified by the research aligned with the three sustainability pillars. This was an entirely unexpected result. Adoption of the three sustainability pillars as a framework for the findings was triggered by this alignment combined with the finding that unintentional mitigation was not unusual, and the lack of an existing conceptual model that adequately included motivations whether or not they were pro-environmental in intent.

Significant result differences were noticed between the survey data and the in-depth data. On the other hand, no significant result differences were found between in-depth datasets, i.e. the interview and student assignment datasets. However, there was a nuanced difference - a slight tendency for Y Green interviewees to provide more pragmatic answers than other interviewees and assignment students, even when prompted for deeper influences. This seemed most likely due to Y Green interviewees' involvement within the context of an evaluation of the practical home sustainability audit program. In the context of research to directly inform policy and practice, influences and/or biases from participation in schemes such as Y Green were seen as research opportunities rather than matters of concern. In any event, the tendency was minimal.

In line with grounded theory, there was no pre-decided structure for describing results. There was no clear alignment between the research's resulting classifications of motivations with any existing model of motivation such as Self-Determination Theory or model of action such as the Theory of Planned Behaviour. This seems to be because these psychology discipline models were developed to explain actions where the actor *intends* the outcome under study – which was not exclusively the case here. While sustainability's three pillars were suitable for categorising the motivations themselves, they were not suitable for describing the different levels of prominence of environmental, social and economic types of motivation across the datasets. In the absence of an existing theory of motivation that allows for motives whether or not the actor *intends* the outcome under study, 'outer',' middle' and 'deepest' 'layers of motivation' were selected as terms to assist in describing the dataset variations in types of motivation.

The term 'top-of-mind' was borrowed from the marketing field where it describes the ability of consumers to name particular brands without prompting. This was considered conceptually similar to survey respondents providing their motivations for taking particular actions without prompts. Motivations collected during the survey were termed 'outer layer motivations'. Dataset differences regarding prominence of motivation types were considered to be due to the level of discussion allowed by the varying dataset methods. The survey allowed for short discussions

only while the interviews and assignments enabled longer, more considered discussions. 'Middle' and 'deepest' layers delineate the different temporal focus between in-depth respondents' current i.e. 'middle layer' motivations for taking mitigation actions and the 'deepest' layer longer-term influences, including those from childhood. These terms are used as descriptors only and have no psychological theoretical basis.

Findings are presented and discussed in the next three chapters, with Chapter 4 focusing on social motivations, Chapter 5 focusing on environmental motivations and Chapter 6 focusing on economic motivations.

Advantages and limitations of the combination of methods

The study's combination of methods offered different perspectives on the motivations of Western Sydney adults when they take actions that assist in greenhouse gas emission reductions. Each method produced both advantages and limitations in the data collected and in the ability for its findings to be compared with those of the other datasets.

These advantages and limitations are more specifically outlined below:

- The survey provided top-of-mind motivations from a range of respondents, including those attracted primarily to the incentives on offer and who may not have participated based solely on their interest in the topic. The sample was not statistically representative of Western Sydney. While the survey sample of 300 was large enough to conduct some quantitative analysis with statistical reliability, smaller numbers in some demographic groups (such as those aged over 66 years) resulted in the testing of demographic variables being limited to that reported in later chapters.
- The in-depth data from purposefully targeted interviewees, Y Green householders and postgraduate student assignments provide insight into underlying motivations of those who have demonstrated pro-environmental action and/or concern regarding climate change. However it cannot be

assumed that such data is reflective of those who have not demonstrated such action of concern.

- Interviews from participating Y Green Rouse Hill pilot householders provided data on individuals' responses to an existing program as well as respondent self-reflections on their motivations for taking actions that assist in greenhouse gas emission reductions. While Y Green householder data are restricted to an area of relative affluence, because such areas show higher than average patterns of consumption and related greenhouse gas emissions, the Rouse Hill pilot area was considered an ideal site for in-depth focus.
- There is inconsistency regarding the in-depth dataset respondents who also undertook the survey. Therefore, the potential for comparing individuals' survey responses and their in-depth responses was limited. Due to timing factors, the 14 Y Green householders, one non-Y Green interviewee and 25 post-graduate students trialled the Climate Action Scale. They did not participate in the survey. Later, when the Scale had been revised and incorporated into the survey, the remaining 14 assignment students and interviewees took part in the survey. The final version of the survey had a total of 300 respondents, 14 of whom were also in-depth respondents.

In all, the research methodology was qualitative in nature, seeking to provide nuanced insight into the motivations of people living in Western Sydney when they take steps that assist in climate change mitigation. As pointed out by Wolf and Moser (2011) qualitative studies that focus on a specific region provide additional insight to the quantitative data collected by large survey programs, which are less able to gain deeper understanding. However, the limitations in regional focus and respondent numbers mean that the ability to generalise from findings has commensurate limitations.

Next, Chapter 4 is the first of three chapters that present and discuss the research results, each chapter being aligned to a sustainability pillar. Chapter 4 begins with an initial overview of the findings. It then focuses on the results that describe and/or imply environmental motivations.

Chapter 4 Results: Environmental motivations

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect – Aldo Leopold (Leopold, 1949)

Summary

Chapter 4 is the first of three chapters that present and discuss the research results, and therefore it begins with an overview of the findings. An individual often has multiple motivations for one action. Motivations for taking actions that assist in climate change mitigation can be categorised as environmental, social or economic, and three layers of motivation were identified, these being outer, middle and deepest. The survey results demonstrated the Climate Action Scale to be a reliable gauge of personal commitment to taking mitigation actions, with Climate Action scores tending to be higher where ratings of the importance of climate change and/or the environment were higher. Reported frequencies of action-taking generally aligned with those of comparable actions listed in the *'Who Cares About the Environment in 2009?'* survey, although there was a trend of slightly higher frequencies for taking Climate Scale actions which may be due the survey's inclusion of Perspectives of Sustainable Development students and purposefully targeted interviewees, representing a combined 8% of the survey sample. Survey respondents with higher levels of education, were more likely than others to achieve higher Climate Action Scale scores. All survey and in-depth respondents were familiar with the term 'climate change' and had some understanding of the concept.

Of the total 2,124 motivations described by survey respondents as their reasons for taking specific Climate Scale actions, 39% were environmental category motivators, climate change itself represented only one in twenty outer layer motivators of mitigation action and survey respondents consistently rated the environment as an issue of higher importance than climate change. The research's mixed methodology proved successful in providing insight into both top-of-mind and deeper motivations for actions that assist in climate change mitigation. In cases

where in-depth respondents also participated in the survey, differences between their top-of-mind survey responses and in-depth discussions also provided support for the notion of motivational layering. The majority of in-depth respondents seemed to have weak anthropocentric environmental ethics (Norton, 2005).

Overview of findings

An introductory note

Respondent quotes are shown in italics. Quotes from survey respondents are short and are identified as being from the survey dataset. In-depth respondent quotes tend to be longer and followed by code names indicating dataset context: 'PT' indicates a purposefully targeted interviewee, 'YG' a Y Green sustainability audit interviewee and 'S' a postgraduate student assignment. Where gender, age grouping and respondent's first language is known, it is included, but to ensure anonymity such details were not recorded for student assignment respondents.

An individual often has multiple motivations for one action

Results showing that individuals tend to have multiple reasons for taking climate change mitigation actions and that these reasons are often unrelated to climate change echo Whitmarsh's (2009) UK findings. Across all datasets it was common for respondents to give multiple reasons for undertaking any one specific action, and these reasons or motivations varied widely. With regard only to the survey, of the 300 respondents, 229 gave one or more reasons for undertaking one or more of the 20 Climate Scale actions, with 71 survey respondents not providing a motivation for any of the actions they reported taking. In total 2,124 individual reports of motivation were given by survey respondents. This figure provides considerable insight into why people individually undertook the Climate Scale actions, although the data is not as robust as would have been the case had all respondents provided their motivation/s for every Climate Scale action they took. The 2,124 motivations reported were coded into 33 subgroups for analysis purposes.

Specific motivations are social, environmental or economic

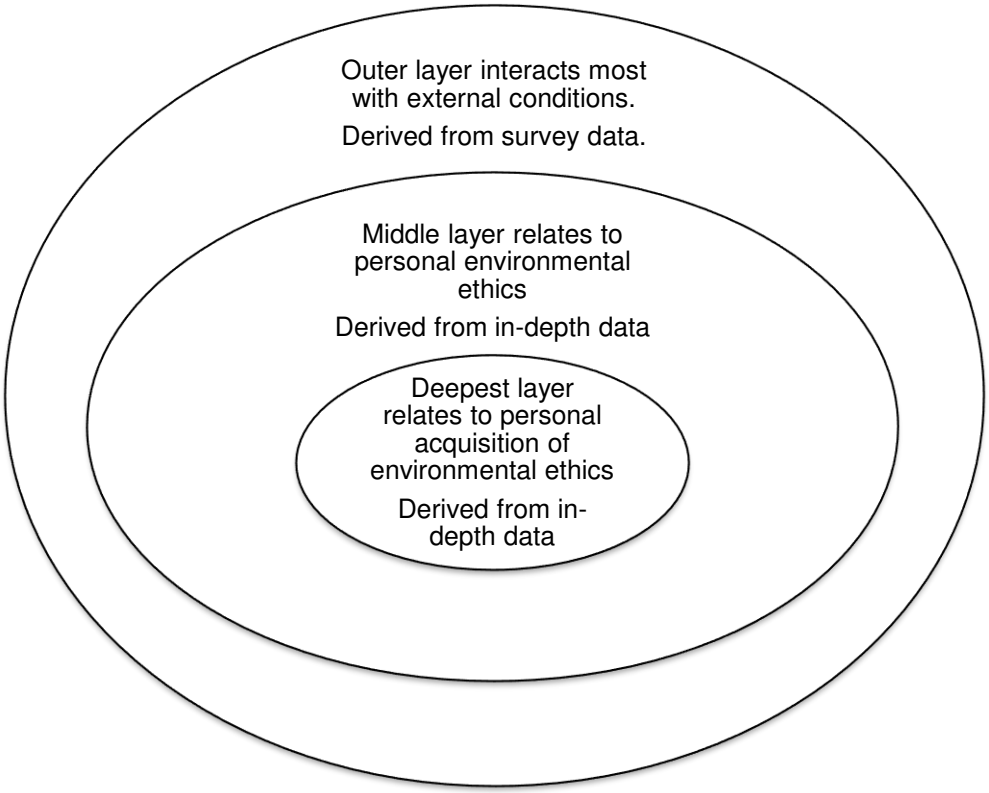
Coding of motivations that emerged from each of the in-depth datasets showed that they too could be coded into the 33 survey-identified subgroups. Additionally all motivations from all datasets and therefore the 33 subgroups could be further classified into three major categories, being environmental, social or economic, in line with sustainability's three pillars. This was surprising, as the modern meaning of sustainability is seemingly unrelated to personal motivations, the concept having been initially proposed to facilitate inter-generational and intra-generational equity, and the term sustainability commonly implying policies and systems (Goodland & Daly, 1996, Dresner, 2002, Todorov & Marinova, 2011, Vischer, n.d.). While there is now a plethora of material available to individuals on sustainable living, these materials are focussed specifically on environmental sustainability, appealing to individuals with a pro-environmental interest. In contrast, the research findings indicated that *all* motivations for taking mitigation actions, whether or not environment-focussed, fitted into the three pillars. This provides a useful and apt taxonomy framework due to the broad usage of the sustainability model.

Motivations appear to be layered

Although all qualitative datasets included motivations from the social, environmental and economic categories, the prominence of each category differed according to the dataset in a way that implies that motivations for taking climate change mitigation action are layered. Of course, as the methodology set out to gather top-of-mind and 'deeper' motivations, a layering effect was expected. However that there were differences between the layers in the proportionate influence of social, environmental and economic motivations was an unexpected insight. Three layers of motivation were identified: a top-of-mind 'outer layer', most clearly seen in the survey data but not exclusive to it; a 'middle layer' expressed by in-depth respondents through discussions of their personal ethics relating to climate change and the environment; and the 'deepest layer' gathered from in-depth respondent discussions of the factors that influenced their personal ethics relating to climate change and the environment. While this thesis presents and discusses the layers from outside in, i.e. starting with the outer layer, then the middle and lastly the deepest layer, the layers were actually developed in the reverse

order, over time. Indeed the layers are temporal. The outer layer relates to an immediate present in everyday situations. The middle layer similarly relates to the present; however it is comprised of respondents' environment-related feelings, attitudes and interactions in settings where they had more time to reflect and consider their personal drivers in some depth. The deepest layer relates to the past, being comprised of the influences that shaped the respondents' environment-related feelings, attitudes and interactions. It emerged that these influences largely occurred in childhood. The three layers are represented in Figure 4.1.

Figure 4.1 The three layers of motivation and their data sources



While all three layers included representation from social, environmental and economic motivational categories, the pattern of influence varied. Outer layer findings are comprised of the top-of-mind motivations described by survey respondents for taking the Climate Scale actions. As the outer layer was derived from the survey data, it is the only layer that underwent any quantitative analysis. Therefore only the outer layer can be described in terms of percentage representation of the major motivational categories. In the outer layer just over 40%

of survey-reported motivations were economic, slightly less than 40% were environmental and a little less than 20% were social. This contrasts with the middle and deepest layers which were derived from the in-depth data. The middle layer was influenced most strongly by a conflation of environmental and social motivators, with economic drivers being less influential. The deepest layer was overwhelmingly influenced by social motivations, with environmental drivers secondary and economic motivations least influential.

This chapter and the remaining chapters 5, 6 and 7 report *survey* results using the numerical terms indicated above and there is qualitative comparison of these with the in-depth data findings. Nevertheless, the findings of Nisbett and Wilson (1977) and Nolan et al. (2008) regarding under-reporting of normative influences on one's changed attitude or behaviour raise the question of whether and to what extent any such under-reporting occurred in the research. This possibility is specifically addressed in chapters 5 and 7.

Economic dominance in outer layer

That economic motivations dominate the outer layer seems most likely to be because outer layer drivers are the ones that interact most closely with external conditions. Therefore issues such as cost and convenience of action are primary. This would support the argument that external conditions need to be considered alongside values and attitudes (Guagnano et al., 1995, Stern, 2000, Uzzell & Räthzel, 2009, Whitmarsh, 2009, Whitmarsh et al., 2011b). Furthermore, it fits with the notion that actions are dependent on complex interactions between internal personal values and external contextual conditions (Corraliza & Berenguer, 2000).

Climate Action Scale demonstrated as reliable

The survey experience demonstrated the Climate Action Scale (CAS) to be an effective instrument for engaging with the public and the postgraduate students. Furthermore the survey results indicate the CAS was also reliable as a gauge of personal commitment to taking mitigation actions. This is evidenced by CAS score comparisons with attitudes to climate change and the environment. There was

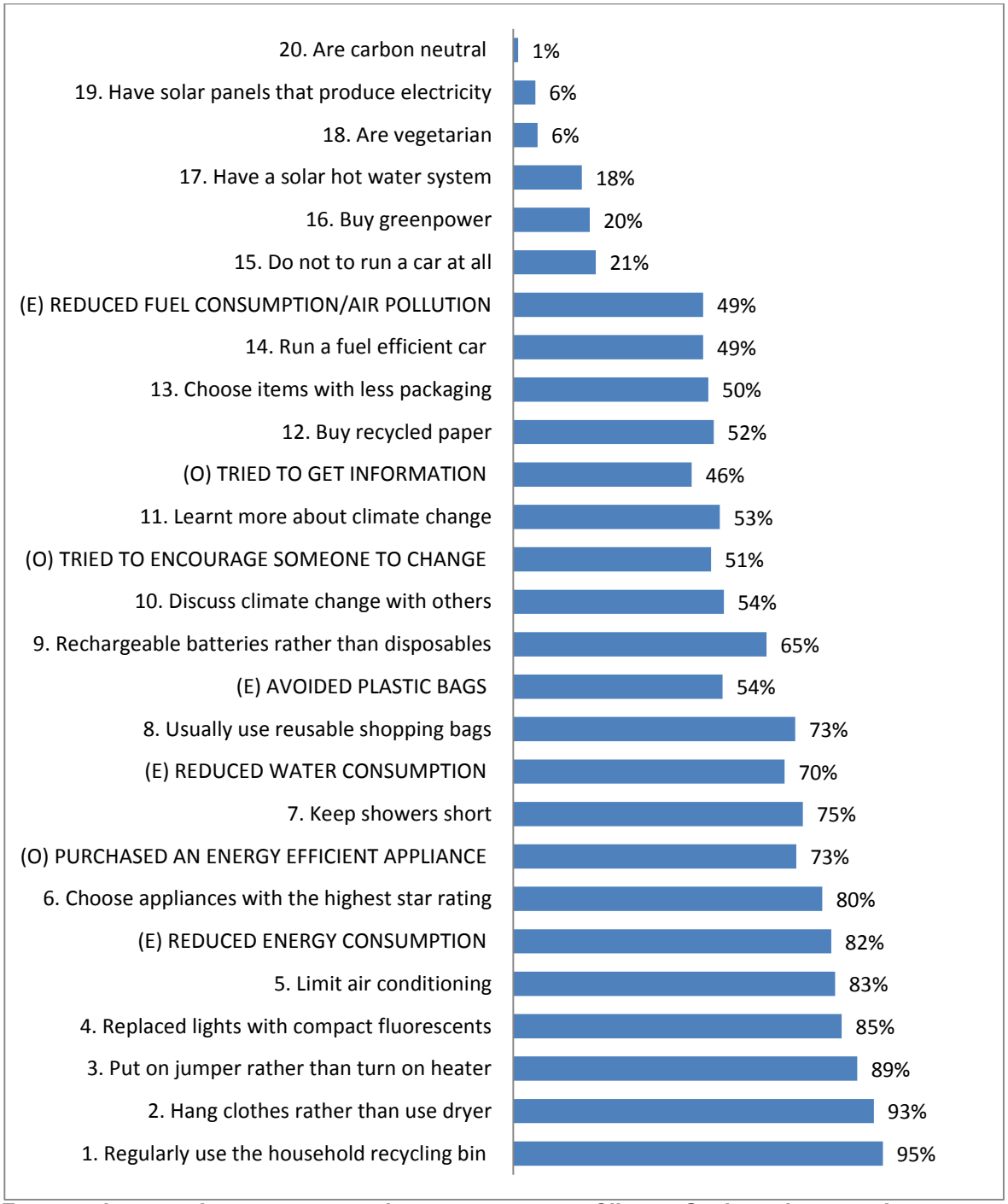
relatively strong evidence of a positive association between CAS scores and attitude to climate change, with scores tending to be higher where ratings of the importance of climate change were higher. (Gamma = 0.269, p = 0. 001). Similarly, there was relatively strong evidence of a positive association between CAS scores and attitude to the environment, with scores tending to be higher where ratings on the importance of the environment were higher (Gamma = 0.280, p = 0.002). That these Gamma coefficients of < 0.300 indicate fairly weak associations is thought to be due to the high frequency of motivations that were unrelated to the environment and/or climate change.

Enhancing credibility, the CAS survey frequencies of action-taking generally align with those of comparable actions listed in the *'Who Cares About the Environment in 2009?'* survey, which had 2,003 respondents. Although the *'Who Cares?'* series includes a 2012 survey, this particular comparison uses 2009 survey findings because the data was collected closer to the time of CAS survey (NSW D.E.C.C.W., 2010, NSW O.E.H., 2013). While the CAS survey focused on specific actions that can assist in climate change mitigation, *'Who Cares?'* sought broader information on environmental attitudes and actions. Not all Climate Scale actions had a corresponding *'Who Cares?'* question and vice versa. However, there was enough commonality between questions relating to seven specific actions to allow comparison. Figure 4.2 shows the frequency with which respondents reported undertaking each Climate Scale action, along with *'Who Cares?'* data for the seven comparable actions. For easier comparison, all findings are shown as percentages of their respective sets of respondents. One sub-set of the relevant *'Who Cares?'* questions focused on 'everyday' actions which respondents reported undertaking *'often'*, similar to the Climate Scale wording of actions being undertaken *'usually'* or *'regularly'*. The other relevant sub-set of *'Who Cares?'* questions focused on 'occasional' actions, with questions asking if respondents had undertaken these actions in the preceding 12 months.

While findings from the two surveys is generally aligned, Figure 4.2 shows a trend of slightly higher positive responses for CAS survey actions than for the *'Who Cares?'* actions, which may be partly explained by CAS survey sample skewing

through inclusion of Perspectives of Sustainable Development students and purposefully targeted interviewees, representing a combined 8% of the CAS survey sample.

Figure 4.2 Frequency comparisons Climate Scale actions and comparable 'Who Cares About the Environment in 2009?' actions (NSW D.E.C.C.W., 2010)



Frequencies are shown as respondent percentages. Climate Scale actions are in sentence case. *'Who Cares?'* actions are in capitals, preceded by (E) for 'everyday' actions frequently undertaken by respondents or (O) for 'occasional' actions taken by respondents in the preceding 12 months

Both the Climate Scale action *'run a fuel efficient car'* and the *'Who Cares?'* action *'reduced fuel consumption/air pollution'* had a 49% positive response rate. Climate Scale actions *'limit air conditioning'* with 83% participation and '*replaced lights with compact fluorescents'* with 85% participation compare well with the *'Who Cares?'* action *'reduced energy consumption'* with 82%. The 5% discrepancy between Climate Scale action *'keep showers short'* and the *'Who Cares?'* action *'reduced water consumption'* may have been partly influenced by CAS responses from the 13 residents reliant on tank water. The CAS action *'discuss climate change with others'* with 54% compares well with the *'Who Cares?'* action *'tried to encourage someone to change an activity or practice that was harmful to the environment'* with 51%.

Climate Action Scale positive responses were roughly 7% higher for '*choose appliances with the highest star rating'* compared with the *'Who Cares?'* action *'purchased an energy efficient appliance'* and there was a similar difference between Climate Scale action *'learnt more about climate change'* and the *'Who Cares?'* action *'tried to get information on an environmental topic or issue'*. It is thought that these discrepancies may be due to the *'Who Cares'* requirement for respondents to have undertaken these 'occasional' actions *within the past year,* while the Climate Scale questions had no time restriction so more people are likely to have provided positive responses. The outlying discrepancy of 19%, between the CAS *'usually use reusable shopping bags'* and the *'Who Cares?'* action *'avoided plastic bags to carry shopping home'* may have been influenced by the difference in question wording and/or by the widespread practice of Western Sydney councils giving reusable bags away for several years preceding the CAS survey.

Demographic influences

Higher education levels linked with higher Climate Action scores

Climate Action Scores were derived from the sum of the point scores allocated to survey respondents for the Climate Scale actions they reported taking. These scores showed considerable variance. Compared with the highest potential score of 932.3, the top actual score was 691.2 and the lowest score was 38.3. For analysis purposes,

scores were concatenated into 'low', 'medium' and 'high' variables, distributed at 33.33 and 66.66 percentiles. Scores less than 258.5 were designated as 'low'; scores of 258.5 – 357.8 were designated as 'medium'; and scores greater than 357.8 were designated as 'high'.

There was fairly strong evidence that CAS survey respondents with high levels of education, being a diploma, degree or higher degree, were more likely than others to achieve high scores (Gamma = 0.265, $p < 0.001$). This is in line with the 2012 *'Who Cares?'* findings that those with higher educational levels are more likely than others to take pro-environmental actions. Yet intriguingly, the 2009 *'Who Cares?'* survey found no correlation between education level and pro-environmental action. There was no evidence of gender or age differences in whether respondents reached high, medium or low CAS scores. This finding may be due to the sample size because it contrasts with both 2009 and 2012 '*Who Cares?'* findings that women were more likely than men to undertake everyday pro-environmental actions and that everyday pro-environmental behaviours increase with age, until the age of 65 years when this trend plateaus (NSW D.E.C.C.W., 2010, NSW O.E.H., 2013). Related CAS statistical information and cross tabulations are shown at APPENDIX K.

Outer layer environmental category motivations

Everyone had heard of climate change

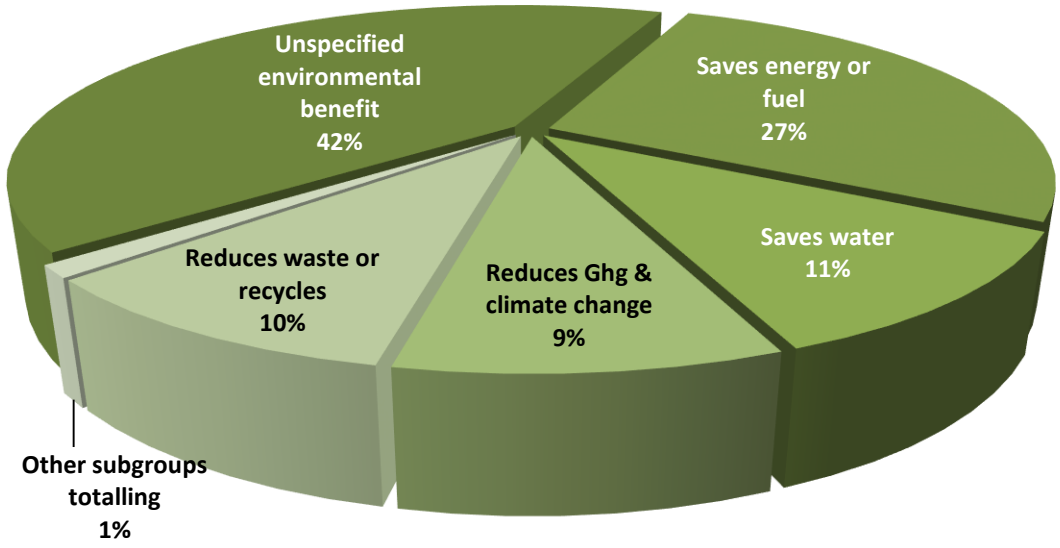
Given the media, government and societal discussions about climate change, it was not surprising that all survey and in-depth respondents were familiar with the term and had some understanding of the concept. Importantly, reflecting the findings of Reser (2012b) very few respondents voiced outright rejection of warnings regarding anthropogenic climate change. Rather, where people had doubts, they were more likely to question the 'direness' of the hazards involved. In any given case, it is difficult to know whether such doubts are valid opinions and/or exemplify disavowal (Weintrobe, 2013) by diminishing the significance of threat to calm anxiety. Furthermore, several survey respondents and a small number of in-depth respondents considered perceived gaps between government rhetoric and mitigation action as evidence that the climate change situation was *'not as bad as*

portrayed - otherwise we would be doing more'. However, it should be noted that data collection occurred prior to the 2010 Federal election, the subsequent introduction of the Clean Energy Futures Legislation and public discourse and politicisation of the 'carbon tax', all outlined in Chapter 1.

Unspecified environmental benefits dominate outer layer environmental category

Outer layer motivations are indicated by survey respondent motivations for taking the Climate Scale actions. Of the total 2,124 motivations described by survey respondents as their reasons for taking specific Climate Scale actions, 825 were *environmental category motivators.* Figure 4.3 presents these *environmental* motivators according to subgroups discerned from the data. While some respondents provided up to three motivators for taking any specific action, not all respondents reported motivators for all or any of the actions they took, therefore the percentages are indicative, rather than absolute. This is also the case for similar outer layer social and economic motivation pie charts in Chapters 5 and 6 and for the pie chart of total outer layer motivations shown in Chapter 7.

Figure 4.3 Environmental subgroups shown as percentages of outer layer environmental motivations



The outer layer environmental motivation subgroup was dominated by non-specific environmental motivators, such as *'it's environmentally friendly'* and *'helps the environment*'. Such motivators were categorised under the label '*unspecified environmental benefit'*. Taking actions for such reasons indicates at least a general awareness of the consequences (AC) of acting or of not acting, some degree of self-perceived moral obligation to act as well as the ability to act and control the outcome (Schwartz, 1973, 1977). Representing 42% of outer layer *environmental* motivations the '*unspecified environmental benefit'* subgroup was the most frequently mentioned *environmental* motivator of recycling, utilising reusable shopping bags and rechargeable batteries, choosing to buy recycled paper products, consciously running a fuel efficient car, not running a car at all, buying greenpower, installing a solar hot water system (equal with the subgroup *'reducing greenhouse gas emissions and climate change'*), installing solar photovoltaic (PV) panels and becoming carbon neutral. That the '*unspecified environmental benefit'* subgroup motivated such a long list of actions with varying levels of behaviour cost may imply that *'the environment'* is a more effective motivator than *'climate change'*. This notion is discussed further throughout the chapter. The prevalence of '*unspecified environmental benefit'* responses also raises the question of whether these tended to be top-of-mind answers that belied deeper understanding or concern, and this question is considered in the presentation of middle layer findings, later in the chapter.

Saves energy or fuel is second top outer layer environmental motivator

The second-top subgroup of outer layer environmental motivators, *'saves energy or fuel'*, includes drivers such as *'to reduce energy use'*, *'to use less electricity'*, *'to save fuel'* and *'saves petrol'*. Implicit in such statements may have been the knowledge that electricity and petrol are largely produced from fossil fuels and limiting their use reduces greenhouse gas emissions. However, the language and immediate focus was *saving power and fuel*. While definitely implicit is the fact that such reductions also save the respondent money, this subgroup is comprised of the motivators stated as reductions in the actual resource, being electricity or fuel. Motivations expressed in ways that made money-saving the focus, e.g. *'to save money by saving electricity'*, are presented in Chapter 6. Representing 27% of outer

layer *environmental* motivators, *'saves energy or fuel'* was the main *environmental* motivator of hanging clothes on the line rather than using a dryer, putting on a jumper rather than turning on a heater, replacing light globes with energy efficient globes, limiting air conditioning and selecting appliances with a high energy star rating,

Water scarcity drives action

The third top outer layer *environmental* subgroup, *'saves water'* relates almost exclusively to the action of keeping showers short. On one hand this is a logical outcome because keeping showers short was the only Climate Scale action with a direct implication for water use. On the other hand, however, this represents a high frequency of motivational reports for just one action, reflecting both the importance of water and the value with which it is held in the community. This accords with the 2007 *'Who Cares?'* supplementary water and climate change survey finding of water being considered as the top or second top environmental issue facing NSW (NSW D.E.C.C.W., 2009). In the present study, to highlight the potent effect of direct reliance on a scarce resource, the subgroups *'saves water'* and *'save water, tank water reliance'* have been kept distinct. Thirteen respondents specifically reported their household reliance on tank water as their first and often only mentioned reason for short showers, highlighting the motivational power attached to essential resources that are both scarce and under direct control, as is the water in one's household tank. When tanks run short of water, those reliant on them need to truck it in, at some expense. Reductions in water use led to lower water bills also for the additional 71 respondents motivated by saving water whose homes were linked to the piped water system. Therefore, saving money is implicit in saving water. It is also likely that water-saving among the tank-reliant and those connected to the water system was additionally influenced by the drought of the preceding few years and the daily publicity regarding the water levels of dams that service Sydney, which in Novembers 2005 and 2006 hovered at 40% of available storage capacity, although by November 2009 around the time of the survey, this had increased to 56% (NSW Government Sydney Catchment Authority, 2012).

While acknowledging the importance of water-saving, comparing the 84 whose short showers were motivated by water-saving, against the two motivated by reduced greenhouse emissions, reinforces the notion that immediate, tangible environmental problems motivate action far more than the distant concept of climate change. This supports Garnaut's (2008) observation that the insidious rather than confrontational nature of anthropogenic climate change is challenging; adds credence to Randall's (2009) criticisms of 'locating' information about threats of climate change in distant places and/or the future; and reflects the finding by the *'Who Cares About the Environment in 2012?'* survey (NSW O.E.H., 2013) that people tend to attribute more importance to the immediately critical issue of water than to climate change. '*Saving water'* represented 9% and when combined with *'save water, tank water reliance'* comprised 11% of outer layer *environmental* motivators.

Climate change itself was fourth outer layer environmental motivator

The fourth top outer layer environmental motivational subgroup was *'reduces greenhouse gas emissions and climate change'*. It was comprised of responses that explicitly referred to climate change or greenhouse gases, examples being *'it reduces greenhouse gases'* and *'I'm concerned about climate change'*. Representing slightly more than 9% of *environmental* motivations, *'reduces greenhouse gas emissions and climate change'* was the most frequently mentioned *environmental* motivator of discussing climate change with others, learning about climate change and installing a solar hot water system (equal with the subgroup *'unspecified environmental benefit'*). That climate change is a less motivator of mitigation actions than so many other drivers is a central theme of this thesis. Therefore this finding is discussed in detail shortly.

Waste avoidance and resource recovery are motivators in themselves

The fifth and sixth environmental motivation subgroups were the waste-related *'reduces waste'* and *'to re-use, close the loop'*. Interestingly, these motivators of waste avoidance and resource recovery are in line with the first and second preferences of the waste hierarchy established by the *NSW Waste Avoidance and Resource Recovery Act 2001*. The subgroup *'reduces waste'* is comprised of

responses such as *'reduces the need for landfill'*, while the *'to re-use, close the loop'* subgroup is comprised of responses indicating a drive to re-use something or make an unwanted item available for recycling to enable it to be re-used. The *'reduces waste'* sub-group was the most frequent driver of trying to choose items with less packaging when shopping. Combined, *'reduces waste'* and *'to re-use, close the loop'* represented 10% of *environmental* motivators. Of the remaining three subgroups, the motivations *'saves trees'* and *'reduces air pollution or exhaust fumes'* are self-evident. However *'reduces food miles'* is usually discussed in relation to resources used for refrigeration and transport and the associated greenhouse gas emissions, so it is more likely to be an indicator of climate change mitigation as a motivator. In all, these three subgroups represent only slightly more than 1% of *environmental* motivators.

Only one in twenty motivations relate directly to climate change

When economic and social motivations are also included, data for the outer layer of motivation shows that only one in twenty of the 2,124 drivers reported for taking a Climate Scale action explicitly referred to the concepts of climate change or greenhouse gas reductions. This was the case even when subgroups *'reduces greenhouse gas emissions and climate change'* and *'to influence others to mitigate'* (a social category subgroup, discussed in Chapter 5) were combined. The frequency with which survey respondents mentioned climate change as a motivator of Climate Scale actions varied across groups. Not surprisingly, comparison by gender, education level, age and inclusion in the Perspectives of Sustainable Development classes showed that the students were more likely than others to explicitly mention climate change mitigation as a motivator. This is likely to have resulted from influences from their own study and the discussion and presentation on this research that took place immediately prior to the students completing the survey form. Even so, only 36% of the motivations reported by the students directly referenced climate change. This compares with 16% of motivations mentioned by those with a higher degree which was the next most likely group to explicitly report climate change as a motivator, and the overall survey respondent average of motivations specific to climate change being 5%. The finding that mitigation actions are motivated by drivers other than concern over climate change was not

unexpected and is in line with Whitmarsh's (2009) findings. Yet the extent of influence of drivers unrelated to climate change highlights the need to understand these motivators so that they can be leveraged to increase mitigation. While the social motivators that emerged are discussed in Chapter 5 and those that are economic are discussed in Chapter 6, this chapter focuses on environmental drivers and, where appropriate, on the differences in attitude exhibited by respondents toward *'the environment'* and *'climate change'*.

The environment is more important than climate change

Allowing survey respondents to describe their motivations in their own words offered the advantage of insight into the concepts and terms they felt comfortable using. This led to the observation that where pro-environmental *intent* (Stern, 2000) was a motivator, the term '*the environment'* was far more frequently stated as a driver of action than was any term specific to climate change and this provides some supporting evidence for previous international research (Brechin & Bhandari, 2011). In addition, survey respondents consistently rated the environment as an issue of higher importance than climate change. This can be seen in Table 4.1 which shows the importance ratings for the environment and climate change.

Table 4.1 Compares the survey results for ratings of importance for the issues of the environment and climate change. Each is shown as a percentage.

		Of no or little importance	Important %	Very important %	Total %
The Environment is	% within row	11	22	67	100
Climate Change is	% within row	26	20	54	100

It was also noted that, at the upper end of the importance ratings, while 85% of those who considered climate change very important also saw the environment as very important, only 68% of those who saw the environment as very important also considered climate change very important. Cross-tabulations demonstrating this are shown at APPENDIX L. The differences between attitude to climate change and to the environment are intriguing and are further discussed in the middle layer of

environmental motivators. Here it is noted that had *only* the survey been conducted, without the interviews and analysis of student assignments, the layers and the differences between them would not have been identified. The in-depth data collection methods enabled inclusion of the findings presented below.

Middle layer: concern is for the environment rather than climate change

Motivations can be hidden in the deeper layers

The 2010 Perspectives of Sustainable Development class and most of the purposefully targeted interviewees also undertook the CAS survey. However due to ethical considerations, names were not recorded for the student survey sheets; therefore their assignments cannot be directly matched with their survey responses for comparison. However, this is possible for the interviewees. Among the purposefully targeted interviewees who also participated in the survey, motivations reported in the survey and discussed in the interviews showed both consistency and difference, but not actual contradiction. For example, every one of these interviewees reported *'saves money'* at least twice as one of their motivations for taking the Climate Scale actions, yet there was limited interview discussion on saving money as a motivation. This difference supports the notion of motivational layering.

Furthermore, conversations with these purposefully targeted interviewees revealed a wealth of specific knowledge, concerns and feelings regarding the environment, almost always including a strong sense of moral obligation to act pro-environmentally. Yet these findings lay hidden beneath survey-recorded motivations which due to their vagueness fitted into the *'unspecified environmental benefit'* subgroup. Only one of these interviewees, PT7 did not report an *'unspecified environmental benefit'* at least once as a motivation for any of the Climate Scale actions he took. That most of the interviewees reported an *'unspecified environmental benefit'* as a motivator at least once, with PT2 reporting it eleven times, PT6 reporting it ten times and PT3 reporting it eight times, implies

that it may also have hidden much more specific drivers for other survey respondents, although the extent of this is unknown.

Exemplifying a difference between survey-recorded motivations and those discussed in depth, PT1's most mentioned motivations for Climate Scale actions were *'saves money'*. Yet this belied the interview recording of PT1's activities to *'live more sustainably'* and undertake postgraduate studies, to increase knowledge and her chances of working in climate change mitigation, being the area of her *'passion'*.

> *So I consciously moved to a place that was on water tanks and I've got the biocycle which means the sewerage is treated onsite and onto my garden. I would like to go solar eventually, like in the next five years. And I'm really aware of making my consumer choices count, like the food and buying the hybrid. And also shifting my work from being an educator, as a teacher in the classroom at a sort of co-ordinator level to seeing that my impact as an educator can be more far-reaching through skilling up – PT1 female, <36 years, first language English.*

PT1 was unusual in the lengths to which she had planned her moves to more sustainable living. Intriguingly, despite this, she achieved a medium CAS score, rather than a high one and this was largely due to several actions not undertaken due to their cost. In contrast, PT6 showed more consistency across her survey and interview, and her CAS score was high. PT6's most mentioned motivations for Climate Scale actions were counted in the *'unspecified environmental benefits'* subgroup. In line with her care for the environment, PT6's interview was notable for its frustration that other people did not care to the extent that she did. While a Western Sydney resident, PT6 was a parking officer for an inner city council, and she perceived herself as an 'on-the-street' kind of educator.

> *My passion for the environment comes partly from my background in the Philippines but also because of what I see here every day. In my job I walk*

around the street all day, I see a lot of people... They think they can just drop things, rubbish on the ground. When I say 'you can't do that', they just say 'get f-d'. ... I saw a lady the other day drop a cigarette butt. I asked her to pick it please. She said, 'Who the hell are you?' I said, 'First, I work for Council. Second that's littering. Third I'm authorised to fine you if necessary. Fourth, it's really bad for the environment when the cigarette butts go down the drain into the waterways'. People have got to care. – PT 6, female >36 years, first language Tagalog

This quote from PT6 also exemplifies the tendency of respondents with lower levels of education to focus on a specific environmental issue of importance to them, rather than on climate change – despite knowing that climate change was the research focus. While conversation specific to climate change was encouraged, the interview format allowed for broader discussions relating to environmental ethics, attitudes and practices. Similarly, PT8 who had the lowest CAS score of this group focused strongly on an issue not specifically related to climate change mitigation.

I've run the washing machine grey water across the backyard – mainly because it wasn't working properly and the water had to go somewhere. And then I found that it was really good for the lawn. But I'd like to extend that water saving ... – PT8, female, ≥36 years, first language English

In contrast, all those with a diploma, degree or higher degree showed a stronger focus on climate change mitigation, and while they also discussed other aspects of the environment it was to a lesser extent. This was exemplified by PT2, whose Climate Action score was high.

I read up a lot about climate change on the internet so I can do more. ... I have PV because it's economical and environmentally responsible. I walk to work and I only use the car on occasions when I really need it – PT2, male, ≥36 years, first language English.

This research did not specifically seek to ascertain underlying causes of the differences in importance attributed to the environment and climate change and this may be an interesting area for future investigation. However, one respondent, PT3, whose Climate Action score was high, explicitly discussed different attitudes toward the environment and climate change.

> *I guess I do keep climate change and environment quite separate. I guess I relate more to our environment because you can see it and we interact with it whereas climate is much more ephemeral, a more invisible thing. It affects us and that sort of thing but our effects on the environment and protection of the environment can be much more tangible so I've grown up with much more understanding of the environment and its protection than the climate change stuff – PT3*

This observation from degree-educated PT3 raises three issues. Firstly, it makes sense that the environment, perceived tangibly, literally real and indeed our world, is viewed as more important and more worthy of care than the abstract notion of climate change, which may signal that climate change, and even the climate, are unlikely to ever gain the affect associated with nature. Secondly, it raises the consideration that those who are more highly educated are more experienced in discussing conceptual notions like climate change, and therefore are perhaps more capable of doing so and therefore more likely to do so. Thirdly, that affect for the environment is generally higher than concern regarding climate change presents a lesser problem for mitigation actions that have other environmental, social or economic co-benefits which may attract the participation of people. However, it poses a considerable problem for major social and economic changes with a singular focus on climate change mitigation, such as the pricing of carbon emissions.

Nevertheless, the great majority of in-depth respondents implicitly indicated their awareness of consequences regarding environmental degradation and most were concerned about anthropogenic climate change, seamlessly adding it to their list of

perceived threats to the environment. However among interviewees, there were three exceptions to this trend. All three showed some degree of rejection of the climate science. Two of these are discussed later in this chapter while the case of PT7, who had a low CAS score, is discussed here. It is perhaps noteworthy that he was the only purposefully targeted interviewee without a diploma, degree or higher degree to specifically discuss climate change mitigation. Trade qualified PT7 who lived in a semi-rural area had taken a very pragmatic approach to doubts he held about climate change rhetoric.

> *I'm on a climate change committee with the NSW Farmers' Association. I don't believe a lot of the science that the government is promoting because it's false science. So I wanted to get right involved in it to find out whether it's true or not. So I wanted to be on the committee to get a better understanding so that now I can sort the garbage from the facts – PT7, male, >36 years, first language English*

PT7 exemplified genuine scepticism here, seemingly more related to the politics of his situation as a farmer than to rejection of climate science per se. Indeed he was open and willing to learn more about the actual science. Intriguingly, PT7 was one of only a handful of in-depth respondents to refer to the politics that surround climate change.

Even the environment is largely seen as conceptual

While climate change was perhaps seen as a *more abstract concept* than the environment, in-depth datasets revealed that even the environment was largely seen in a conceptual way. The middle layer of environmental category motivations was characterised as much by what did *not* emerge as it was by what did emerge. Regarding *intent* for pro-environmental actions and those specific to climate change mitigation, once the strong underlying human-focus of motivation was filtered out, *there was little in-depth focus directly on the environment, ecosystems or the biosphere,* despite the interview questions and student assignment being worded such that they enabled respondent discussion of feelings of direct care or obligation

to the environment. Indeed, there was a paucity of in-depth data directly focused on the environment because most in-depth respondents focussed on the social reasons underlying their willingness to take pro-environmental actions. This anthropocentrism is a major finding from the in-depth data. Arguably, in a different cultural setting, for example among indigenous people living traditional or semi-traditional lives and perhaps among others whose lives in an everyday sense are more closely aligned with nature, this aspect of the findings would have been very different. As anthropocentrism is inherently social, findings related to it are detailed in Chapter 5.

Deepest layer: nostalgia for times of weaker anthropocentrism

Ironically the two main rejecters of science seemed more biocentric

In line with the Australian literature (Leviston & Walker, 2012, Reser et al., 2012d, NSW O.E.H., 2013), a small minority of in-depth respondents voiced doubts about the degree of threat from climate change. Intriguingly, YG12 and PT9 who most strongly and clearly expressed doubts or rejections of climate science warnings, also described enjoyable childhood experiences in nature without the associated social and/or religious referencing typically discussed by others and outlined in Chapter 5. Indeed, these respondents appeared to be more biocentric, feeling a sense of moral obligation directly *to* the environment rather than mediated by cultural influences and social interactions. They did speak of family members but in ways that were related to the present, with virtually no reference to past social factors. YG12 was nostalgic for the healthy environment she now perceived as lost.

> *I grew up in the country and … enjoyed the countryside and when you go now you see the trees cut down and… them pumping sewage into the rivers. You know, we grew up swimming in the river and fishing. Go back to Goondiwindi and the waterholes you can't swim in them and we had platypus but I think it's a sad life for young kids these days. – YG 12, Female, ≥36 years, first language English*

YG 12 had described the concept of human-induced climate change as *'a load of rubbish'* yet her affinity for nature provoked pro-environmental *intent* leading to mitigation *impact* unrelated to climate change (Stern, 2000, Whitmarsh, 2009). She was one of the few in-respondents who purchased Greepower, a decision which she explained thus: *'Drive up the Putty Road to Singleton and see the mounds of stuff from the coal. It's disgusting. It's just terrible. ... And we have so much sunshine and wind'*.

This sense of disgust seemed to echo the feelings of PT9.

> *I don't like seeing the environment devastated, hurt and uncared for. I was brought up on a suburban block but we had bush behind us and I spent every spare minute in the bush .... And that's probably influenced me. ... Obviously we all want fresh air and safe and happy homes for the other critters and birds. When it comes to climate change there are specific things you can do for that. I've more been a person who cares for the environment and that's where my big push is rather than climate change. I wonder about climate change actually... I just don't think it's really proven to be how things are. There are a lot of people who are sceptical of it and that just plants the seed. ... I've seen weather patterns come and go in big time cycles. ... so who's to say that what's going on is not something that's happened before and will happen again? – PT9, Female, ≥36 years, first language: English*

In the case of PT9, biocentrism and the long-term view this engenders may have been a factor in her doubts regarding the existence or threat of anthropogenic climate change. Furthermore, she highlights the natural ability of doubts to circulate, indicating the need for clear, specific, truthful and verifiable information to be easily accessible for people to counter any misinformation, as argued by Lewandowsky (2012). In any case, doubts regarding climate change did not prevent PT9 adding, at considerable cost, a solar hot water system to her home. Again, consistent with Whitmarsh's (2009) findings, the deepest layer environmental motivation results show that *both concern for climate change or*

doubts about it have little effect on whether or not mitigation actions are taken. There is no way of ascertaining whether or not views such as those of PT7, YG12 and PT9 are a form of disavowal to reduce anxiety (Weintrobe, 2013) but they are valid, especially in the face of the uncertainties that characterise the concept of climate change (Garnaut, 2008, Hulme, 2009). Particularly for some who are biocentric, it may be that the personal distress caused by the idea of major disruption to nature is better avoided by playing down the risks (Garnaut, 2008, Marshall, 2009, Randall, 2013, Weintrobe, 2013). On the other hand, it may be that some who are biocentric feel that nature will adapt to any climatic changes and their value system may more easily discount threats to human systems and comforts.

It was more common for people to seek weak anthropocentrism

With the exception of those who discussed the war-torn environments they grew up in and S21 whose Polish childhood was spent in the shadow of the Chernobyl nuclear disaster, in-depth respondent discussions of childhood experiences of the environment were positive. Several held nostalgic memories of a youth characterised by a more direct relationship with nature, including their food production, and they were trying to continue or revive such a relationship today. These respondents engendered Norton's (2005) *weak anthropocentrism*. YG9 exemplifies this:

> *Since the industrial revolution we have damaged the world so much. I think of my Mum's, think of a time before when you go to a farm and it will grow everything still now. They live in the countryside in Taiwan. When I go home, everything is organic. They grow rice and most vegetables and most food. They hardly need to buy anything. Which was how it was when I was young. I grew up in the country and we just go and pick whatever when we were thirsty or hungry. My grandmother grew rice so every year we hardly bought anything. And my mum has the chooks. So they just go to the market to buy fish. The way I grew up has definitely affected my thinking. And now I pass this on to my girls, so we can do a lot of things that we don't need to buy or whatever – YG9, female, ≥36 years, first language Mandarin*

Interestingly, S18 was the only respondent who discussed the cultural changes which she perceived as catalytic for increased consumerist patterns.

> *When I was young, every home had a vegetable patch. My father grew plums, peaches in three different varieties, grapes, passionfruit, oranges, lemons, and strawberries in tubs. Growing underneath the fruit trees were all our family's vegetable needs. ... We always had half a dozen chooks in a ramshackle chook pen down the back for eggs. ... All this in the quarter acre block... I don't remember exactly what the catalyst to when my life changed was. When we stopped growing our own food, the chooks disappeared. It was around the time mum went to work and it was no longer cool to have chooks in the backyard. The television played American shows and everyone wanted to shop in supermarkets and water was no longer rationed. It didn't take long before we developed habitual behaviours where we make little or no conscious decision about turning off the lights or flushing the toilet. I want to rekindle those earlier days. I have just purchased solar energy, I am building a vegetable garden and have even considered a chook or two ... I want to be environmentally responsible and demonstrate to my children environmentally responsible behaviours – S18*

S18 seemed to be creatively building an updated version of the life she felt was environmentally responsible, through on-site solar electricity generation and food production. Interestingly, like YG9 it was also important for her to pass on these values and related knowledge to her children.

Next, Chapter 5 details the research findings related to social motivations. It begins with the outside layer of social motivators, informed by survey data. Then Chapter 5 details the in-depth social drivers that lie in the middle and deepest layers of motivation.

Chapter 5 Results: Social motivations

The ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard – Gaylord Nelson (Nelson, n.d.)

Summary

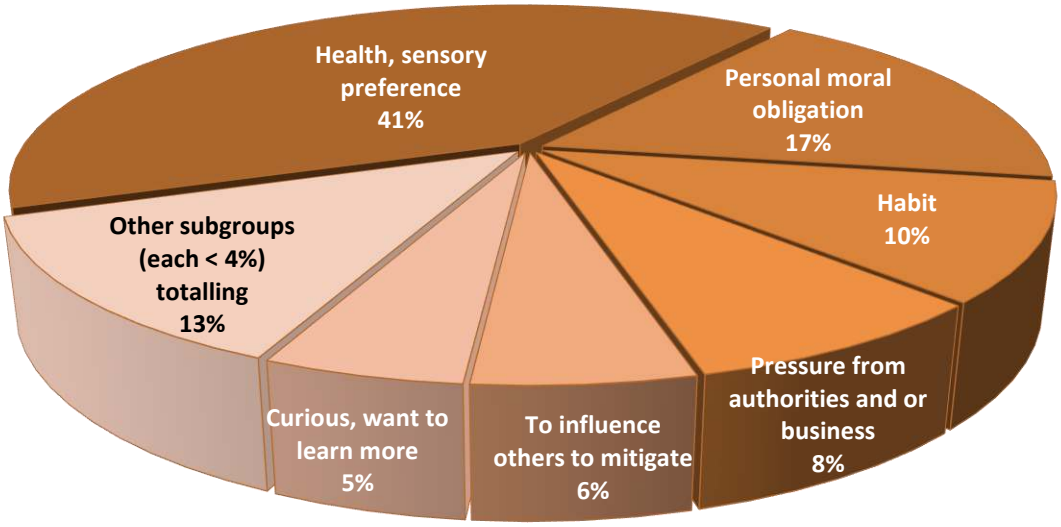
Of the total 2,124 motivations reported, 19% were social category motivators. In contrast to its low level of frequency in the outer layer, a sense of moral obligation to act pro-environmentally was commonly exhibited by in-depth respondents and was a frequent middle layer motivation. As an individual can only feel morally obliged to act when they know the reason to act, feeling a sense of moral obligation indicates an awareness of consequences. Moral obligation for the environment is largely anthropocentric and future focused, with most in-depth respondents feeling a pro-environmental moral obligation to future generations of the in-group. This future focus seems likely to add to inertia and delay regarding mitigation action. A significant subset of in-depth respondent also felt a theocentric obligation to God. The extent of influence of normative behaviour was unclear. The deepest layer of motivation revealed that moral obligation was born of childhood social learning. Childhood play in natural settings seemed to enhance pro-environmentalism. The most pro-environmental in-depth respondents exhibited the combination of referring to religion, whether or not they had a faith, and childhood enjoyment in nature. Self-efficacy or feelings of capability and being able to control outcomes were also seen to play a major role in motivating actions. It was postulated that the multiple values held by individuals create both challenges to mitigation and opportunities for mitigation rather than a value-action gap.

Outer layer social category motivations

Health and sensory preferences dominate outer layer social category

Outer layer motivations are indicated by survey respondent motivations for taking the Climate Scale actions. Of the total 2,124 motivations reported, 395 or 19% were *social category motivators.* Figure 5.1 presents these *social* motivators according to subgroups discerned from the data.

Figure 5.1 Social subgroups shown as percentages of outer layer* social *motivations



The top outer layer *social* motivational subgroup was *'health and sensory preference'* representing 41% of *social* motivations, and by far the most frequently mentioned *social* motivator of hanging clothes on the line rather than using a dryer, putting on a jumper rather than turning on a heater, limiting air conditioning and avoiding packaging. Respondents often reported a preference for the feel and/or smell of line-dried clothes and perceived the outcome as healthier. Some respondents perceived putting on a jumper as healthier than using a heater. Some did not like air conditioning, some thought it unnecessary and others perceived it as unhealthy. Respondents who proactively avoided packaging, saying they *'disliked'* or *'hated'* packaging were also included in this subgroup. An additional eight respondents had a health motivation or general preference not to run a car, implying that there may be further opportunities for combining personal health and pro-environmental outcomes through 'walkable' neighbourhood initiatives (Giles-Corti & Donovan, 2002, Pikora et al., 2003, Haines et al., 2009, Giles-Corti et al., 2013).

Sense of personal moral obligation second top outer layer social motivator

The second-top outer layer *social* motivational subgroup was *'personal moral obligation'* to take the specific Climate Scale action, thus indicating the first aspect of an ascription of responsibility to self or AR (Schwartz, 1973). This was the most common reason for discussing climate change with others and learning more about climate change. Reports of a sense of personal moral obligation to act are important and interesting, not least because they demonstrate *intent* (Stern, 2000, Whitmarsh, 2009). Such intent indicates awareness of consequences, or AC and is more common for pro-environmentalism than specifically for climate change mitigation, as discussed in Chapter 5. The considerable body of literature regarding the influence of values and personal norms on pro-environmental behaviour (Schwartz, 1973, 1977, Dietz, 2005, Kalof & Satterfield, 2005, Whitmarsh, 2009, de Groot & Steg, 2010) implies that personal norms underlying a sense of moral obligation to act are major motivators. Yet this research found that in the outer layer of motivation, the *'personal moral obligation'* subgroup represented only 17% of *social* motivators. It is postulated that the paucity of this subgroup may at least partially be the result of the intertwinement of a personal sense of responsibility to act and the awareness of consequences (AC) of acting. That is, one can only feel *morally obliged* to act when aware of the consequences or reason to do so (Stern, 2000). So perhaps where survey respondents were motivated by environmental protection, their sense of personal responsibility was *implicit*, seeming to them self-evident, thus rarely stated. Indeed, this would align with in-depth findings discussed later in this chapter. Nevertheless, it is notable that *'personal moral obligation'* was relatively rare as a top-of-mind reason for acting.

It is important to note that the Schwartz (1973) notion of AR is underpinned by a personal norm characterised by an *intense* feeling of moral obligation to act, this feeling being so intense that its violation results in guilt, self-deprecation and loss of self-esteem. Only small numbers of survey respondents indicated such feelings. However, some survey respondents exhibited environmental ethics as part of their self-identity through responses such as '*because I'm a greenie'* when asked why they took specific actions. Mainly occurring at the lower behavioural cost end of

the scale, such responses demonstrate a combination of a sense of moral obligation to act and awareness of consequences (AC). These responses are also in line with the theory of cognitive dissonance assertion (Festinger, 1957) and empirical evidence (Goldstein et al., 2007, Cialdini, 2009) that people like their behaviours to be consistent with their beliefs and vice versa. Across all datasets, some respondents reported *'feeling guilty'* when they did not take a specified action. Interestingly, guilt was most often mentioned in relation to lower behaviour cost actions, for example not putting recyclables in the recycling bin or forgetting to take reusable bags on a shopping trip, presumably because people felt these were things they *could* do easily and had little excuse for not doing. This would align with both cognitive dissonance theory (Festinger, 1957, Festinger & Carlsmith, 1959) and Cialdini's (2009) argument that small, low behaviour cost actions tend to build an individual's sense of commitment to the values underlying such actions. Indeed, *'it's something I can do'* and *'it's a contribution I can make'* were fairly frequent reasons, relating to a sense of moral obligation, for undertaking lower behavioural cost actions.

However the phrase used most commonly to express personal moral obligation was *'because it's the right thing to do'.* Significantly, across all datasets, respondents expressed a wish to be *'doing the right thing'*. For example, it was frequent among Y Green interviewee reasons for undertaking the home sustainability audit. Some Y Green interviewees felt that participating in the audit was itself *'the right thing to do'*; others stated that they *'wanted to check that we were doing the right thing'* regarding sustainability practice; and several stated both. In the context of this research, *'the right thing to do'* may have two meanings. For example, respondents who stated that using the recycling bin *'is the right thing to do'* may have meant because it is correct use of the waste collection system and as responsible citizens they dutifully comply. On the other hand it may have meant that recycling helped them to fulfil their feelings of moral obligation to undertake environmental protection. Both survey respondents and Y Green interviewees seemed to use it to express both meanings, sometimes simultaneously.

Habit also important for frequent low behavioural cost mitigation

The third top outer layer *social* motivational subgroup, *'habit'* represented only about 10% of social motivations, yet this belies the fact that the Climate Action Scale questions consciously embedded the notion of habit, to avoid the use of absolutes, as discussed in Chapter 3. Habit was implicit in some questions, such as; *'Do you try to limit your use of air conditioning? E.g. only use it when the temperature is extreme?'* And *'Are you vegetarian?'* In other questions it was explicit, e.g. '*Do you **usually** hang clothes on the line rather than use a dryer?'* And '*Do you **regularly** use the household recycling bin for recyclable waste*?' See APPENDIX D for further examples.

Interestingly, a number of respondents indicated that the relevant habit had been formed in childhood, through statements such as *'I've always hung the clothes on the line. I grew up doing that at home'*. Habit was seen to be strongest at the lower behavioural cost end of the Climate Action Scale. This is because the automatic nature of habit and the frequency of repetition (Verplanken, 2011) drives recurring everyday behaviours. Furthermore, it occurs mainly where autonomous motivation and external conditions support the behaviour - a feature virtually definitive of low behavioural cost actions. *'Habit'* was the most common social category motivator for *recycling* and for *keeping showers short*. Like a number of motivations emerging from the data, habit can advance or hinder mitigation. Across all datasets, there was recognition of over-consumption as a habit and in some cases, interviewee and student respondents reported breaking this habit, usually in response to straitened financial circumstances rather than environmental concerns. While habit discontinuity sparked by life changes, such as moving house or starting a family provide opportunities to improve pro-environmental behaviour (Verplanken, 2011), they can also have the opposite effect. For example PT8 stopped composting to allow the compost heap to grow over in readiness for a house move but then fell into the habit of not composting despite the move being delayed for several years.

Nudges to external conditions sometimes grudgingly accepted

The fourth outer layer *social* motivational subgroup, representing about 8% of survey dataset *social* motivations, was the perception of *'pressure from authorities and or business'*. Some referred to systems of what Thaler and Sunstein term the 'choice architecture' (2008) used by councils to limit householder waste disposal options and maximise recycling through the kerbside collection system. Examples included councils issuing larger bins for recycling and smaller ones for landfill waste, combined with sanctions for *'contaminating'* the recycling bins with unsuitable items. Those mentioning such practices indicated annoyance but grudgingly accepted the system. Likewise, the Aldi supermarket chain policy of not providing plastic bags at the checkout motivated some survey respondents to take their own bags when shopping.

Influencing others and mitigating for others

Interestingly, the remaining eight social outer layer motivational subgroups, totalling just over 23% of outer layer *social* motivators, were focused on the influence that respondents could have on others and/or for others. Three of these subgroups related exclusively to the two actions of discussing climate change with others and learning more about climate change. One was the neutral *'curious, want to learn more'* subgroup representing 5% of outer layer *social* motivators. In a finding that might be expected from previously published research (Leviston & Walker, 2012, Reser et al., 2012b), the other two were the competing subgroups *'to influence others to mitigate'* with closer to 6% and *'rejection of climate change science'* with 2% of survey dataset *social* motivators.

Normative influences may be undetected, implicit or hidden in deeper layers

With the exception of the handful of survey respondents who mentioned habits formed through family influences in their childhood, the only outer layer motivators explicitly stated in ways to indicate normative influence were extrinsic rather than intrinsic or autonomous motivations (Ryan & Deci, 2000b, a). These motivators were *'pressure from authorities and/or business',* representing 8% of outer layer social motivators, and *'peer pressure to undertake action'* comprised of reports of

pressure from family members and/or friends, which represented 3.5% of outer layer social motivators and is included in the Figure 5.1 pie chart's 'other' category. On the face of it, this may support previous findings on the tendency not to attribute changes in one's own behaviour or attitude to the influence of other people (Nisbett & Wilson, 1977, Nolan et al., 2008). A caveat here is that the present study is not ideal for testing support for such findings because it does not focus on change. However, as discussed shortly while there was certainly no under-reporting of social influences for the middle and deepest layer, these influences were reported in ways indicating that temporal factors may be at play in the under-reporting of normative influence.

Middle layer: moral obligation to care for environment

Awareness of consequences and sense of moral obligation are interdependent

The middle layer of motivations for taking actions that assist in mitigating climate change emerged from in-depth respondents' current reflections on their environment-related feelings, ethics, attitudes and interactions. In contrast to the outer layer findings, a sense of personal moral obligation was a much-discussed motivator in the middle and deepest layers of motivation. In one respect, this contrast between datasets is not surprising. The 5-minute survey sought top-of-mind motivations while in-depth respondents were selected because of their demonstrated interest in climate change and/or the environment, and questions were framed to explore individuals' feelings of moral obligation (See APPENDICES D, F and G.) Indeed, it is likely that the in-depth findings will be skewed toward those with a sense of pro-environmental moral obligation. Nevertheless the degree of bias may be relatively weak as, like survey respondents, all 54 in-depth respondents also discussed taking actions that happen to mitigate climate change, but driven by financial benefit, convenience and other motives unrelated to moral obligation focused on climate change or the environment. The remainder of this chapter discusses the findings on why in-depth respondents took actions that were *intentionally* pro-environmental. In some cases the intent was specific to climate change mitigation while in other cases there was a different pro-environmental intent. Significantly however, in both circumstances the *underlying intent was pro-*

social, as will be discussed. This trend of feeling a moral duty was present in all in-depth datasets, including the Y Green project householder data despite it being reasonable for home sustainability audits to be motivated purely by the potential for savings on energy and water bills. It may be that Y Green participants motivated solely or largely by financial benefit declined to be interviewed and/or that interviewees felt compelled to make moral assertions. However, it seems that any influence from the latter would be slight, given the honesty about additional motives for taking climate change mitigation actions, such as personal financial benefit.

Interestingly, just as Reser (2012b) had found, some respondents indicated that they saw *participation in the research itself* as a moral responsibility, a notion exhibited through statements such *'participating in talking with you is the right thing to do'* and *'being interviewed is something I can do to help'*. This trend was strongest among the Y Green householder interviewees with the majority making such statements. This may imply that, in line with one of Cialdini's (2009) six compliance principles, the Y Green cohort felt a sense of reciprocal obligation, due to receiving the benefit of the free home sustainability audit. The possibility that those who receive such a benefit are more driven to take additional helpful actions may warrant further investigation.

Moral obligation for the environment has an anthropocentric future focus

The very rare expressions of attitudes indicating biocentrism, such as discussions of a direct moral responsibility to the environment or to other species, were discussed in Chapter 4. Overwhelmingly, the in-depth datasets revealed anthropocentric environmental ethics, more reflective of Norton's (2005) observation that *because* environmental ethics are developed by people, they are inherently anthropocentric, than of Callicott's (2005) view of a widely held moral feeling about the intrinsic value of nature. Middle layer findings revealed that the personal norms driving feelings of moral obligation to take action were human-focussed, in that moral responsibility *for* the environment was actually *to* other humans. Significantly, a commonly discussed motivator of mitigation and pro-environmental action was human dependency on natural resources and the need to

protect the climate and resources for the future, which is in line with sustainability tenets (Goodland & Daly, 1996, Dresner, 2002, Vischer, n.d.).

> *So if we have rights we have some responsibility as well. So if we have the right to catch fish, we have the responsibility to take care of the ocean as well. .... So you have to think if I have everything today, is there anything left for tomorrow? It's not rocket science and it's not really religious. It's common sense. – YG14, Male, ≥36 years, first language Urdu*

Here, YG14 succinctly described a reciprocity between humans and nature that accords with Norton's (2005) *'weak anthropocentrism'*. Almost all in-depth respondents specifically expressed being motivated to act by feelings of moral obligation or responsibility for *'future of progeny'* and *'future generations'* in contrast to these motivators only representing 3.8% of outer layer *social* drivers, indicating that these are rarely top-of-mind motivators. Middle layer examples include quotes from PT5 and PT2 below.

> *I am scared about climate change and how it will affect food and resources. We need to allow future generations to grow food to survive. – PT5, Female, ≥36 years, first language Spanish.*

> *Even though I'm an atheist, I have a very strong moral conviction that we must leave the planet in a much better position for the next generation and we can call that our 'inter-generational legacy' – PT2, Male, ≥36 years, first language English.*

This middle layer finding of a moral obligation for future generations aligns with *'concern for future generations'* being the most commonly selected of six options offered as possible motives when *'Who Cares'* survey respondents stated that they were concerned about the environment (NSW O.E.H., 2013).

Reserving concern for the future in-group adds to inertia and delay

It is revealing that in-depth respondents more frequently mentioned their moral obligation to personal progeny than to broader 'future generations', supporting the notion that the closer the potential victim, the higher the level of care and obligation, in line with the Value-Belief-Norm theory and perhaps a function of evolutionary survival processes (Stern, 2000, Haidt, 2012, Wilson, 2012). In a particularly interesting example, YG7's beliefs 'placed' him in a position to directly benefit from his actions, fuelling the most substantial of the sustainability upgrades undertaken by a Y Green interviewee.

> *Well, it depends on your philosophy. Yes it's for my children and people of that generation but when I come back, and I believe in karma so what I do now, I reap the benefits a little bit down the line so that's a bit of it as well.- YG7, Male, ≥36 years, first language English*

Significantly, these comments imply that moral obligation for taking actions that help to mitigate climate change is focused on the future, i.e. it seeks to provide for inter-generational equity rather than intra-generational equity. Explicit references to progeny clearly identify an in-group. Similarly, references to *'future generations'* seem to imply *future generations of people like us,* so also imply an out-group, being those not like us. This highlights the problem that when those negatively impacted by environmental problems are out-groups, there may be little incentive for taking action. This pattern of thinking may contribute to delays, as evidenced by the Lowy Institute poll in which 45% of respondents felt that because global warming effects will be gradual, we should deal with it gradually (Hanson, 2012). Only two in-depth respondents voiced concerns over current impacts on humans, a concern because environmental ethics were seen to be overwhelmingly anthropocentric and narrowed further by stronger care for the in-group. YG14, originally from Karachi, recognised the ability of climate change to affect everyone and this was his main motivation for taking mitigation actions, while S9 provided current examples of the way in which extreme weather exacerbated by climate change was delaying social progress in his homeland, Vietnam. These two respondents felt that they had first-hand knowledge of current impacts of climate

change – especially devastating for those more vulnerable due to poverty and poor infrastructure. This aligns with Reser's (2012b) finding that those who perceived having experienced climate change impacts and considered their own locality as vulnerable were more likely to both report higher levels of concern regarding climate change and more likely to be undertaking pro-environmental actions. Furthermore, it adds credence to criticisms raised by Randall (2009) of public campaigns 'locating' climate change in the future and places exotic to the target audience.

The more that people see climate change as a problem of the future the less urgency and immediate impetus for undertaking high behavioural cost actions (Lowe et al., 2006). Lacking recognition of the current impacts of climate change on people across the world may indicate too little mainstream awareness and/or more disturbingly be because moral obligation is reserved for future generations of the in-group (Haidt, 2012, Wilson, 2012). The combination of framing climate change as a problem of the future and not recognising current perils for out-groups could create ongoing mitigation delay, making worse the climate change impacts on those most vulnerable to them.

A significant subset also feels a theocentric obligation to God

A significant sub-set of in-depth respondents indicated that, in addition to their responsibility for the future for other humans, they had a theocentric obligation to God to care for the environment. In short, the middle layer showed that pro-environmental actions and attitudes had a strong pro-social and cultural underpinning. This finding supports Schwartz's placement of '*equality'* and '*social justice'* values with '*unity with nature'* and '*protecting the environment'* closely together in the 'universalism' value type – one of 10 value types in the human values taxonomy (Schwartz, 1973, 1992, 1994). It should be noted that while those who mentioned their religion as a guiding influence are termed 'religious' in this thesis and those who did not are termed 'non-religious', it may be that religious beliefs were also held by some respondents who did not articulate them. Eleven of the 54 in-depth respondents formed the 'religious' subgroup and most but not all were first or second generation migrants to Australia. The religious

subgroup included Christian, Muslim, Hindu and Zoroastrian faiths. With only one exception, they developed their religious feelings and practice as an embedded part of their upbringing, strongly linking them to their family relationships and/or their ethnic culture. Echoing discussions of Christianity by Hoffman and Sandelands (2005) and Sherkat and Ellison (2007) and a discussion of Islam by Al-Damkhi (2008), most of the religious respondents expressed belief that God required human responsibility for environmental protection. The essence of the obligation varied significantly, from a responsibility to accept humanity's existence as part of nature, to a responsibility for stewardship fostered through acknowledgement and gratitude for nature's beauty and benefits to humankind.

> *The environment is often mentioned in the Quran where ... the views are that we humans are a part of nature and must act in such way rather than feel superior – S29*

The inclusiveness of humanity in nature described above by S29 contrasts with the responsibility to care for the gifts of nature that God has bestowed on humanity, as described below by PT3.

> *I believe in God. I believe that He created this world for us to live in and He asked us to take responsibility of it. Coming back to Genesis, where he gave us the critters and the plants and said: 'Use it. Use it responsibly' - PT3, Male, <36 years, first language English.*

Despite the contrast, it could reasonably be expected that the holders of these beliefs would both feel compelled to provide environmental protection where they could and they both indicated that this was the case. As all religious respondents also felt a sense of moral obligation to future generations, the religious sub-set was exclusive only in referencing God and drawing on scriptures to explain the nature-related obligations of humanity to God.

Extent of influence of normative behaviour unclear

Research on normative behaviour (Cialdini, 2003, Goldstein et al., 2008) indicates that the behaviour or reported behaviour of friends, acquaintances and others seen as peers or *like us* can be influential. This tendency was exemplified by PT4 who was nudged to remember to take his reusable bags when shopping by noticing that *'everyone'* took their reusable bags and that plastic bags were '*frowned on'* by shopkeepers and shoppers in his local area in the Blue Mountains. So, in this example, there was the normative action of taking reusable bags and the potential reproach for not taking them. When asked if he found this attitude annoying, he answered, '*No, I get more annoyed with myself if I forget to take the bags'*. In this case the underlying values of the Blue Mountains' shoppers and shopkeepers were similar to those of PT4, at least in relation to shopping bags, so he felt no animosity. PT4 was rare in reporting that his actions were directly influenced by the behaviour of others, which may indicate support for previous research showing that people tend to underestimate the influence of others' behaviour on their own behaviour (Nisbett & Wilson, 1977, Goldstein et al., 2007, Nolan et al., 2008).

Nudges can be effective at different levels

In most parts of Australia, plastic bags are available at retail checkouts, so utilisation of reusable shopping bags generally relies on individual awareness of environmental consequences (AC) and a sense of moral obligation. However, YG2 discussed needing to adjust to the South Australian Government ban on disposable plastic shopping bags, which came into force several days into YG2's three week family holiday in that state.

> *The first time we shopped, I did get plastic bags, which wasn't too bad because I said 'well, we'll use these for our rubbish any way'...but we didn't really need or use them. So the next time I thought 'I'll buy new green bags' – but that's kind of silly because if you buy bags every time you go shopping that's consuming as well. So every time I went shopping after that I had these two bags and tried to fit everything in them. ... So we had to think about that because it's not ok to say oh well we'll use plastic bags because we're on*

holidays because it's not an option there – YG2, female, ≥ 36 years, first language English.

YG2's comments imply that without the ban, the family was likely to have used plastic bags during the vacation, ironic because their usual home practice was to utilise reusable bags. However on holiday the reusable shopping bags were used for the easy packing and storing of the children's clothes and toys. The situation demonstrated the importance of regular cues and routines for habit continuity (Duhigg, 2012) and also the importance of *systems* for such habits, here exemplified by the need for the reusable bags to be freely available for shopping use. Interestingly, all datasets provided examples of both 'nudgers' who were being influenced and 'nudgees', who were aiming to influence. PT4, one of only four in-depth respondents whose discussions on climate change related to current impacts, focussed on environmental beauty.

I discuss climate change with others because it's good to share the values of what we have at the moment and how it might change over time, so for example, when we went to the Great Barrier Reef, it wasn't as colourful as we thought and we weren't sure whether that was because of the (unrealistically) pretty pictures on the postcards or because of climate change affecting the processes of the ocean – PT4, Male, ≤36 years, first language English.

S17 also perceived a role for himself in sharing his knowledge of environmental issues including global warming.

I like to discuss environmental news and issues such as climate change and global warming with my friends… (to) present the environmental problems that face us today. This is a good method to deliver this important environment message – S17

While PT1 similarly wanted to discuss climate change as an issue of importance, she implied that she did not necessarily expect agreement and welcomed debate as an entrée to further discussion.

> *I discuss climate change with others because that's my passion and I also tell people that's where I'm working and studying. It can be a bit of bait to start up a bit of a debate or whatever. It's a way in to get to talk about it a little bit – PT1, Female, <36 years, first language English.*

Research and piloting nudge programs essential

A small minority of respondents resented being 'nudged' to act by peers or authorities. Such resentment supports the notion that pro-environmental actions may be more successfully achieved by autonomous motivation than by extrinsic motivation (Pelletier et al., 1998, Pelletier et al., 1999, Darner, 2009, Black, 2010, Darner, 2012) and highlights the potential danger of 'nudging'. The extent to which any particular nudge can push people to change behaviour without building counterproductive resentment may be a difficult judgment and programs being developed to rely on nudges may benefit from consultative research and testing prior to implementation. Additionally, there may be scope for future research regarding whether or not cultural differences, and perhaps other demographic differences, influence the degree of acceptance of nudges. The potential for their being such differences was raised by the contrast between Anglo-Australian interviewee praise for the voluntary nature of the Y Green lack of pressure on householders to undertake mitigation changes compared with Taiwanese-born YG9's dissatisfaction that the project did not *'put more obligation on people, more reinforcement. ... They didn't pressure me enough'*. The Anglo-Australian attitude supported findings that intrinsic motivation is more potent alone than in combination with extrinsic motivation (Pelletier & Sharp, 2008) while YG9's attitude supports the use of extrinsic motivation to help boost intrinsic motivation (Tabernero & Hernández, 2012). The contrast may reflect the differences between the individualism of WEIRD cultures and the collectivism of non-WEIRD cultures (Haidt, 2012). On the other hand, it may just be that YG9 had stronger underlying concerns regarding climate change than did the others and wanted more external

support, instruction and social proof to turn her autonomous motivation into action. Further specific research in this area may be instructive, especially where a particular program is being developed for set target groups. Depending on circumstances, it can be important for nudge programs to build in aspects that provide security for participants and validly encourage their trust. As the Y Green program involved trained sustainability auditors going into people's homes and viewing and discussing their energy and water bills, householder trust was vital. The majority of Y Green interviewees stated that their involvement was at least partly motivated by the knowledge that the local Hills Shire Council was a project partner. Some were pleased that they could contact council if there were any problems (which turned out not to be necessary) and others inferred that Council involvement would preclude any hard selling techniques. Interestingly, Council was raised in the esteem of some (Barry et al., 2009).

Perceived value-action gaps a cause for concern

In all datasets there were some respondents concerned about gaps between values, attitudes and actual behaviour. Several specifically voiced frustration at government rhetoric not followed by action, although it should be noted that all in-depth data collection occurred prior to the July 2011 announcement of the Clean Energy Futures 'carbon tax' legislation. Nevertheless, gaps between government rhetoric on the threats of climate change and mitigation activity can raise and/or exacerbate doubt about the existence of climate change and/or the seriousness of its threats, as demonstrated below by YG10.

> *I find it very confusing – the information that's out there, the debate that goes on. I know I'm not alone. It's just very confusing and I suppose I'm a bit both ways about it too. ... I find it really bizarre. I mean, if we really are facing a crisis, what the hell are we doing? – YG10, Female, ≥36 years, first language English.*

Here YG10 exhibits the human preference for consistency between values and action (Festinger, 1957, Cialdini, 2003) highlighting the importance of those in

authority using that authority to take leadership stances with visible and effective action in line with rhetoric on the threats of climate change. Such stances that do not waiver would seem well-positioned to provide the kind of social proof needed for continuing, large-scale climate change mitigation action (Cialdini, 2009). Intriguingly, despite the confusion and doubts voiced by YG10, as owner of a rental property she had specifically gone to additional lengths to install a hot water system that was solar-powered, as well as awnings and other attributes that would reduce electricity use, even though she did not directly benefit from the resulting savings as electricity bills were a tenant responsibility. So it would seem that YG10 did feel some degree of moral obligation to act.

Deepest layer: moral obligation born of social guiding influences

Childhood social learning forms moral obligation to act

The deepest layer of motivations for taking actions that assist in mitigating climate change emerged from in-depth respondent discussions of the processes through which they developed their environmental values and personal norms regarding environment-related behaviour. While the middle layer described and discussed various forms and aspects of the pro-environmental moral obligation that was felt by all 54 in-depth respondents, the deepest layer revealed the origins of these feelings of obligation. Overwhelmingly the sense of moral obligation was socially acquired, most commonly in childhood. The deepest layer of social category motivations was found to include childhood sub-layers of family, religious and cultural norms; enjoyable and usually social experiences in nature; and very occasionally, an epiphany. However, while all expressed their version of how they acquired their family, religious and/or cultural norms in childhood, only some exhibited one or more of the other sub-layers. The finding that the sense of moral obligation was developed through childhood family, religious and other social influences, and in some cases enjoyable and usually social experiences in nature supports previous findings (Chawla, 1988, 1998). In line with normative explanations of helping, deepest and middle layers of motivation indicated that as individuals became aware of the environmental consequences (AC) of specific human actions at various times in their lives, their underlying sense of moral obligation to respond was activated (Schwartz, 1973, 1977).

Childhood play in natural settings enhances pro-environmentalism

In contrast to the notion of rural childhoods creating more pro-environmental adults (Hinds & Sparks, 2008, Muller, 2009), many of the most mitigation conscious and environmentally active of the in-depth respondents were raised in suburban and urban areas. However, in line with the notion of childhood play in nature predicting later pro-environmentalism, these respondents each spoke of their greatly enjoyed childhood experiences in natural areas, variously located on the edge of Sydney Harbour, in suburban bushland tracts, National Parks on Sydney's fringes and occasionally in a rural area. So the contrast between findings and the literature may be at least partly due to Australia's suburbs often including tracts of bushland, perhaps in contrast to overseas experience. Significantly, most respondents who described their enjoyment of nature in childhood emphasised the social nature of the activities and this aspect seemed to make the activities more enjoyable and memorable. PT2's comment below exemplifies those who discussed the enjoyment of playing with friends in nature.

> *As a young boy growing up in the early '60s in suburban Melbourne, I gained a lot of enjoyment playing in ... bushland areas with my friends and in the boy Scouts, appreciating the joys of the bushland – PT2.*

On the other hand, there were also those who emphasised their enjoyment of family-related experiences in natural settings, as exemplified below by S26.

> *I have fond memories of my father taking me out in the rain to watch bullfrogs lay their eggs or post rain to smell the fragrance of the bush in Royal National Park – S26.*

Both cases indicate a strong social element to the activity which seemed to enhance *the experience.*

Pro-environmentalism can also be acquired later

Despite lacking enjoyment of nature in childhood, PT 5's underlying sense of pro-social moral obligation led her to make pro-environmental changes whenever she acquired more awareness regarding environmental damage and actions that could prevent it. It seemed that PT5's personal norms requiring relevant action was born of her staunch Catholicism developed in childhood. The second aspect of her ascription of responsibility to self (AR), being the belief that she was capable of controlling the action and its outcomes, was encouraged by a friend.

> *The Father came to give a speech to the women and he said that women have to change things because we have the responsibility of the children, of the husband, of the household. If we were more conscious of that we could make a difference. ... I'm always thinking, 'what little thing could make a difference?' ... I became interested in (environmental issues) many years ago from a friend (who) made me aware that I could put the drain thing in the kitchen sink to stop all the bits from going into the waterways. ... That sparked me to do more.... My friend pointed out that things going down the drain affected the environment and all the fish. Really, I wasn't conscious of it before. I grew up in the city and I didn't really feel close to nature – PT5, Female, ≥36 years, first language Spanish.*

PT5 was very concerned about climate change and pro-actively did everything she could to reduce her carbon footprint. She demonstrates 'catalyst behaviour' in which one pro-environmental action sparked by her friend's *'scripting of the moves'* (Heath & Heath, 2010) *'spills over' to encourage pro-environmental behaviour in other areas* (Whitmarsh & O'Neill, 2010) exemplifying the situation of someone taking a small pro-environmental action, then seeing themselves as someone who is pro-environmental, and thus becomes so (Cialdini, 2009). Similarly lacking a childhood love of nature, YG7 began to change behaviour in direct response to media information about climate change and its implications.

In my childhood it was very much just a consumer thing, use and abuse – but not realising we were abusing. That's the difference. Now, with the publicity … I started to realise that I'm dirtying my own backyard, so we have to make some changes – YG7, Male, ≥36 years, first language English.

These comments from PT5 and YG7 attest to the importance of awareness of environmental consequences, and by extension, to the importance of continuing to make available the latest information, on climate change, its impacts and the currently available and near-future options for increasing mitigation efforts.

Referring to religion plus enjoyment in nature a winning combination

Respondents that mentioned their enjoyment of nature as a child or youth who also referenced religion in their life narratives – *whether or not they were still believers or practisers of religion* – were by far the largest group to exhibit a strong commitment to climate change mitigation. The 'religion-referencing' sub-set of in-depth respondents is defined to include anyone who referenced religion. It includes the 11 in the 'religious' subgroup, as well as six Christian apostates, YG9 who described her family background as *'not religious'* and PT2 whose self-described atheism inherently referenced religion by stating non-belief in God. That a sense of moral obligation to take pro-environmental actions seemed linked to religious referencing, even where individuals were not religious or no longer practising, may be significant given the trend shown by Census data of declining religious membership (A.B.S., 2012b, Profile id, 2012b, Zwartz, 2012, Profile id, 2013a). This flags an area worthy of further investigation and may even warrant consideration of secular alternatives such as ethics education for the upcoming generation. Most in the 'religion-referencing' subgroup were Australian born and WEIRD (Haidt, 2012) and their love of nature focused on the individual joy they derived in contrast to Taiwanese-born YG9 focus on practical benefits of readily available fresh produce from her rural, farmland upbringing. Again it is not known whether or not the contrast is a reflection of the differences between WEIRD and non-WEIRD cultures (Haidt, 2012). Three urban-raised, WEIRD and Australian born respondents discussed their affinity with nature as a 'connectedness' or 'spiritual' concept. In line with the Victorian study by Snell and Simmonds (2012),

they implied for themselves increased psychological well-being, pro-environmental behaviour, a desire to protect environments and they each discussed vivid and enjoyable memories of being in nature as children. It is difficult to know whether or not it was coincidental that the three were Catholic apostates. PT1 linked her past Catholicism with her present feelings of spiritual connection to nature.

> *I would have called myself a Catholic when I was growing up. Now I would be more plugged into a spiritual awareness, that's greater than just one religion.... Whether you want to call it 'soul' or higher part of myself or whatever part of divinity that is part of me, I feel connected to that and that does feed into and inform the reasons why I do what I do and I also feel that when I leave this planet that there's a bigger cycle and a bigger thing at play. ...That theory of deep ecology really resonates with me, that connection between self and the natural world, I think one mirrors the other. So we are sort of destroying ourselves in destroying the world around us – PT1, female, <36 years, first language English.*

In contrast, while PT4 acknowledged gaining benefit from being in nature and feeling connected with the surrounds, he did not see himself as 'spiritually connected' to the surrounds.

> *Going into the bush, especially for a couple of nights, is important for a sense of being. ... I suppose it's just about being a bit more connected and centred... But I wouldn't classify myself as spiritually connected. ... It's being connected with your surrounds and realising that you're a part of the wider scheme – PT4, Male <36 years, first language English.*

Where PT1 was comfortable with terms *'soul'* and *'divinity'*, PT4 seems less so, although he may well be using *'connectedness'* to evoke the same feeling. Below PT10 uses the term *'spirituality'* to describe a similar concept.

The Catholic Church helped me be a more spiritual person. I was very religious up until I was about 15 and started thinking about women's issues. ... But I found being in the Church very spiritual. I would go up to the Church and just sit, even as a teenager. Spirituality was encouraged. Mum would light candles and had pictures of saints. ... Sometimes if I go and sit in nature - even just down at the river here, I can get that same feeling that I used to get in Church – PT10, Female, >36 years, first language English.

Interestingly, the religious-referencing group of in-depth respondents was the group that most clearly exhibited the temporal nature of motivational layering. For example, S1's *'beginning of awareness ... of the human/earth dynamic*' was sparked in the early 1970's when he read *The Population Bomb* (Ehrlich, 1968) which predicted a bleak future from human over-population. Sometime later, S1 underwent an epiphany - one of two very similar life-changing moments described by male, Australian-born postgraduate students.

I went bush with a few mates, drinking, carousing and shooting rabbits whenever I could. On a late sunny afternoon I spotted a kangaroo standing within a copse of gum trees. I aimed the rifle and shot! When I went over to inspect the kill I discovered a newly born and distressed joey in its pouch. Now I had to kill it too. I had such a sense of disgust and loathing of myself. I have never killed anything (with the exception of the odd fly or mosquito) since. This singular incident, above all, led me to think about my responsibility to nature – S1.

S1's epiphany was undoubtedly powerful; however it was not experienced in isolation, the sense of moral obligation having been primed through his early Catholic upbringing and the beginnings of his awareness of environmental consequences or AC having been sparked by *The Population Bomb* (Ehrlich, 1968). Indeed, the epiphany aspect of the shooting incident was S1's sudden and guilt-ridden awareness of the second necessary aspect of ascription of responsibility to self (AR), the belief in his capability of controlling an action and its outcomes. This

was abundantly clear. He shot the kangaroo, he caused the problem and he was capable of not repeating such an action. From this deeply felt epiphany, S1 formed an intrinsic pro-environmental motivation, which was re-kindled years later by the AC acquired through the *'Perspectives of Sustainable Development'* unit, to motivate further actions. These further actions achieved an additional 10 'yes' answers on the trial version of the Climate Action Scale and included joining a group to prevent electricity privatisation, for fear that it would lock NSW into 25 year contracts with coal-fired generator companies beholden only to shareholders, exemplifying the citizen activism called for by Booth (2012). S1's experience is in line with previous findings that autonomous motivation combined with stronger perceptions of self-efficacy increases pro-environmental action (Black, 2010, Tabernero & Hernández, 2011, 2012).

Self-efficacy or capability and control plays a major role

As shown below, the differing responses of PT10 and YG11 to information on environmental destruction demonstrate the importance of self-belief in one's own capability of controlling an action and its outcomes, a tenet not only of normative explanations of helping but also of the Theory of Planned Behaviour (Schwartz, 1973, Ajzen, 1991). Built over the years, PT10's strong sense of personal agency motivated action, in line with the view that unsupervised childhood play in nature assists in building self-confidence (Louv, 2009, Nature Deficit Disorder, 2010). Actively engaging in nature seems to provide individuals with a more experiential, tangible understanding of consequences rather than a mere AC. When minimally supervised it also allows for the building of one's sense of self-efficacy. Below, PT10 exemplifies the importance of feelings of self-efficacy and the effects they can have.

> *I grew up in the city and used to love to visit the area around Mrs Macquarie's chair (on the edge of Sydney Harbour) ...It used to just be trees and rocks and grass, sort of wild then. ... You'd probably get into trouble now. It's a very different area now. .... Lots of kids with no shoes on, big groups of kids just roaming around together. I was probably allowed to roam from about the age of eight ... (Then years later) I was still at school, just,*

and a girlfriend and I went down for the Franklin Dam protest. We were camping. For me it was really exciting because my family was never politically active ... so that was really good for me to see. I came back and I'd be running stalls for the Wilderness Society and getting involved in marches and in the Nuclear Disarmament Party… The Franklin how wild and wonderful was it?! I would never have gotten to see anything like that near where I lived .... We were outraged that they wanted to change that... And it did make me think that you can change (affect) things - that was a very successful campaign – PT10, Female, ≥36 years, first language English.

Now a teacher, PT10 runs a hands-on, lunch-time environmental club for the students and advocates strongly for school-based sustainability measures despite considerable obstacles. In contrast, YG11 engendered two of the causes of passivity described by Booth (2012) – pessimism that her efforts will have little effect and fatalism – thus forming a value-action gap.

I can't read anything about the destruction of the rainforests because I get too upset. And what's happening to the Amazon and the animals losing their habitat like the poor orang-utans and I can't take it in because it's too distressing and there's nothing that will stop it. So sometimes I tend to put the blinkers on because I'm powerless to do anything. I do what I can but I can't do much – YG11, Female, >36 years, first language English.

As with other in-depth respondents, YG11's attitudes and actions seemed to be the result of earlier life experiences and a sense of powerlessness and fatalism were the major themes of her discussion.

Multiple values create challenges and opportunities rather than a gap

Findings imply that just as personal values unrelated with climate change sometimes sparked actions that happened to assist mitigation, so too personal values sometimes undermined mitigation in the actions they sparked. For example, YG7's teenage son staunchly believed that climate change was an elaborate hoax, yet went

to great lengths to arrange appropriate 'Earth Hour' activities and promote them, perhaps motivated by the expectation of peer approval. Likewise, YG6 thought that there was a conspiracy to ensure that scientists sceptical of anthropogenic climate change were under-represented by the media, yet felt society needed to '*do something about climate change'* and had willingly undertaken low behaviour cost actions. Across all three motivational layers, the value-action gap was repeatedly shown to be created by external conditions outside individual control and/or personal values unrelated to climate change winning in an internal competition against mitigation values. This is evidenced by the following (paraphrased) examples.

I would like be more environmentally friendly but:

- *I need a big car to transport my large family – PT8 exemplifying the value of caring for her family.*
- *I need to catch a plane home every couple of years to see my family – S15, a migrant - exemplifying the value of wanting time with her family*
- *There is no public transport in my area – S24 – exemplifying a conditional barrier.*
- *I rent this place so cannot add solar hot water or PV systems – PT10 – exemplifying a situational constraint.*
- *I cannot yet afford a hybrid car - S11 – exemplifying the conditional barrier of financial lack and/or valuing more highly other goods or services when selecting how to spend within a budget.*

The last of these examples demonstrates that determining a value-action gap for any specific situation is subjective and methodologically difficult (Kaiser, 2010). Whether or not an individual undertakes a specific mitigation action *at any given time* is dependent on interactions between: internally – their level of autonomous motivation (Deci & Ryan, 2000) including any sense of moral obligation and subjective capability to undertake the action and control its outcomes (Schwartz,

1973, 1977, Ajzen, 1991, Kaiser, 2010), and the priority of the relevant value compared with the rest of their hierarchy of competing values; and externally – the actual conditions creating the barrier.

While other social motivations, such as peer pressure and 'nudges' from authorities have some influence, the strongest, recurring *social* motivation arising from in-depth data was an individual's sense of moral obligation to act to protect the environment for future generations of people. However, as useful as an individual's sense of AR is, this study supports previous arguments that too-heavy reliance on individuals' AR for mitigation actions will not create the level of emission reduction required to avoid dangerous changes to the climate system (Uzzell & Räthzel, 2009, Butler, 2010, Shove, 2010, 2011, Booth, 2012, Randall, 2013). Another intriguing aspect of the social category in-depth data were the explicit and implicit mentions of childhood normative influences on current personal attitudes and behaviours related to the environment. This group and the few survey respondents who discussed acquiring lifelong habits through their childhood family's normative practices provide contrast with the lack of self-awareness of normative influences on energy-saving behaviour observed by Nolan et al. (2008). Further research would be needed to discern which of the following factors could have caused these different outcomes:

- Not exclusively but in the main, this study's respondents were discussing the past and/or childhood experiences that they thought sparked their current environmental attitudes and behaviours when they mentioned normative influences, so there was often a clear temporal gap, whereas those in the energy-saving experiment were discussing very recent behaviour.
- Influences on this study's respondents came largely from their families and sometimes from other trusted sources such as friends, whereas the influences on those in the energy-saving experiment came from credible and authoritative second-hand reports of the behaviour of presumably unknown other community members.

Next, Chapter 6 is the last of the three chapters that present and discuss the research results. Chapter 6 focuses on economic motivations for taking actions that assist in mitigating climate change. It begins with the outer layer of economic motivators informed by the survey results and then details the in-depth findings on the economic drivers that lie in the middle and deepest layers of motivation.

Chapter 6 Results: Economic motivations

It is vain to talk of the interest of the community, without understanding what is the interest of the individual - Jeremy Bentham (Bentham, 1780)

Summary

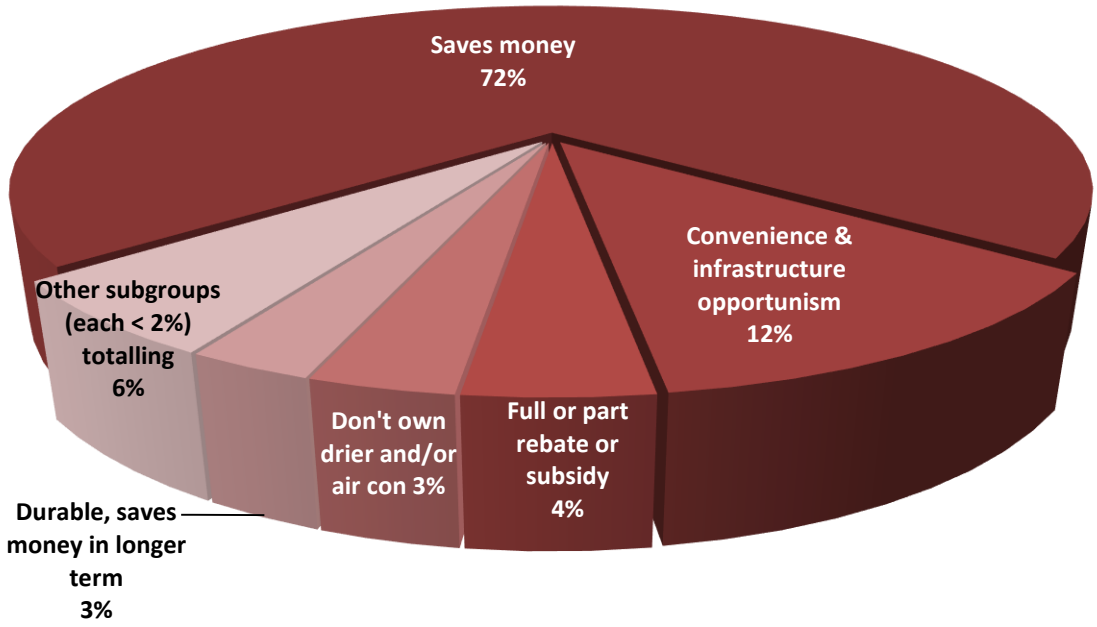
The third of three chapters that present and discuss the research findings, Chapter 6 provides the results on *economic* motivations. Although most forms of capital discussed in the chapter obviously fit the category, two may be more contentious. Results relating to practical and educative programs that assisted respondents to take mitigation actions are included because they are seen as investments in human capital. Convenience and time-saving motivations are included because they support an individual's own human capital, with the effort, energy and time saved able to be spent on other pursuits. The alternative of including convenience and time-saving as values in the *social* category was dismissed because these notions do not meet Schwartz's definition of values nor do they match any values in Schwartz's (1994) value structure prototype. Of the total 2,124 motivations described by survey respondents as their reasons for taking specific Climate Scale actions, 42% were *economic category motivators.* Saving money was the dominant single outer layer economic motivator. External conditions were found to influence and interact with the outer layer of motivation. Similarly, where external interventions tailored energy-saving information specifically for people and their circumstances, these interventions were successful in producing mitigation that otherwise would not have occurred. These instances highlighted the necessary role played by an individual's capability to take an action and control its outcome, in line with Schwartz's normative explanations of helping theory. Furthermore, they provide examples of ways in which interventions can assist individuals to act on their autonomous motivation, sense of moral obligation and awareness of environmental consequences. Even among some of the most climate change concerned respondents, financial concerns were prioritised over mitigation actions.

Outer layer economic motivations: saving money, and convenience

Saves money motivation dominates outer layer economic category

Outer layer motivations are indicated by survey respondent motivations for taking the Climate Scale actions. Of the total 2,124 motivations described by survey respondents as their reasons for taking specific Climate Scale actions, 904 were *economic category motivators.* Figure 6.1 presents these economic motivators according to subgroups discerned from the data.

Figure 6.1 Economic subgroups shown as percentages of outer layer* economic *motivations



The *'saves money'* subgroup, representing 72% of economic motivators was overwhelmingly the top economic driver. *'Saves money'* was the most frequently reported *economic* motivator of line-drying clothes, putting on a jumper rather than turning on a heater, changing to energy efficient light globes, limiting air conditioning, choosing appliances with the highest (energy) star-rating, keeping showers short, buying recycled products (perceived by these respondents as less expensive than products made from new resources), selecting a fuel efficient car, not running a car at all, installing a solar hot-water system and installing photovoltaic (PV) panels to generate electricity. These results accord with previous findings showing that saving money is a motivator of pro-environmental actions, especially energy-saving

(Whitmarsh, 2009). Outer layer financial motivators were expressed in a range of ways, and these were kept distinct to assist understanding of financial motives for pro-environmental actions. For example, distinction was made between *'saves money'* and *'durability and saves money in longer term'* because longer-term thinking is more relevant to some actions and more habitual for some individuals than others.

Representing 12% of *economic* motivators, the second top subgroup was *'convenience and infrastructure opportunism'*. This was the most frequently mentioned of three forms of convenience that motivated mitigation actions and relates to people's willingness to use an existing easy-to-use system, usually provided by government. *'Convenience and infrastructure opportunism'* was the main *economic* motivator of habitually recycling and of using reusable shopping bags. This motivation was mostly expressed as sensible, pragmatic opportunism. Examples include, *'The recycling system is there, why not use it?'* and *'It was so easy. They actually came and put the (energy efficient) globes in, so I signed up for it'*. Less often, people described small systems they had set up for themselves to make the action more convenient and therefore habitual, e.g. *'In the kitchen I have three bins, one for garbage, one for recycling and one for compost'* and *'I carry my green (reusable) shopping bag in my handbag so I always have it with me'*.

The third top economic subgroup, representing 4% of *economic* motivators, was *'full or part rebate or subsidy'*. This subgroup was kept distinct from *'saves money'* because many actions that save money (e.g. limiting air conditioner use) do not require the extra intervention of a government subsidy. That *'full or part rebate or subsidy'* drivers of Climate Scale actions represented only 4% of *economic* motivators does not reflect anything like the real costs paid by NSW electricity consumers and the three tiers of government for services and equipment related to several of the Climate Scale actions. For example, about three years prior to the survey period the then NSW Greenhouse Gas Abatement Scheme began to offer, via various contract companies, free energy efficient light globes to NSW residents. These programs replaced incandescent light globes and many survey respondents discussed first encountering the give-away programs at stalls set up in local shopping centres. In some cases they were given new globes on the spot and in other cases, their contact details were taken. In order to

reduce the practice of people visiting give-away stalls multiple times to stockpile items, later implementation of the scheme often included contractors visiting homes and installing the required number of globes, along with water-saving devices (Warren, 2006, I.P.A.R.T., 2007). While some survey respondents had purchased energy efficient globes, many had benefitted from the free give away or installation programs. The light globe replacements aligned with the Australia-wide phase-out of incandescent light globes started by the Howard Government in 2007 and continued under Rudd and Gillard Governments (*Australia to pull plug on light bulbs*, 2007, D.C.C.E.E., n.d.).

Representing 3% of economic motivators, the fourth top subgroup *'don't own drier and/or air conditioner'* was reported mostly by people who felt they did not need these items. Representing 3% of *economic* motivators, the fifth top subgroup *'durable, saves money in longer term'* was mainly offered as a reason for changing to more energy efficient light globes. The remaining six subgroups, each representing less than 2% of *economic* motivators for taking Climate Scale actions mainly referred to various levels of willingness-to-pay and convenience motivators not already mentioned. A second convenience subgroup, *'saves time'* was most commonly reported for limiting shower times and very occasionally for choosing to buy products with less packaging, expressed in ways such as, *'I hate wasting time undoing packaging'.* Perhaps implying some confusion among consumers, high energy efficiency star-ratings were sometimes seen to infer quality, hence the 12 responses in the '*preserves possessions, quality'* subgroup for the action of consciously trying to choose the appliance with the highest star rating. A third convenience subgroup, *'convenience, environmental opportunism, sun and wind'* referred to sensible, opportunistic use of free environmental services, given as a reason for line-drying clothes and not using an air conditioner. Example responses included *'the sun is there, so of course I use it to dry the clothes'* and *'I don't need an air conditioner; I open the window'.* A very small group took an action because it required *'little additional cost'*. Similarly, one respondent reported buying Greenpower because they had been given a 'no additional cost' introductory offer from the electricity retailer. Intriguingly, only one survey respondent said that they took a specific action in response to a *'public education advertising campaign'*. However, this survey did not test for how people gained information about climate change or the

environment and while this particular result implies that public education campaigns may not be directly related to specific actions, there could well be a role for them in building the awareness of consequences (AC) needed to help provoke intentionally pro-environmental behaviour. Furthermore, as discussed shortly, in the middle layer of motivation, highly convenient and personalised public education projects were found to successfully achieve climate change mitigation actions that otherwise would not have occurred.

Interaction between external conditions and outer layer is influential

Hierarchies of motivation vary between individuals, as do contextual conditions. This is exemplified by the different motivational emphases for changing to energy efficient light globes, with 84 mentions of *'saving money'*, 17 mentions of *'saving money in the longer term'* and 36 mentions of receiving the globes for free, with an additional 13 mentions which fitted the *'convenience and infrastructure opportunism'* subgroup. One small survey cohort, concerned over the health impacts of mercury in compact fluorescent globes if accidentally broken, and whether spent globes could be recycled, were referred to the NSW Household Chemical Cleanout program which provides information on mercury and accepts the globes for recycling (NSW O.E.H., n.d.). Despite their understandable concern, these respondents had a positive view of the new globes. These survey findings provide an outer layer example of how external condition 'nudges' (Thaler & Sunstein, 2008) can lower the behavioural cost (Kaiser, 2010) needed for actions, thereby increasing opportunities and willingness to act. For those that received them, free globes provided an incentive that *'smoothed the path'* (Heath & Heath, 2010) which was important as compact fluorescent globes were more expensive than incandescent ones. While everyone who gained free home installation of globes were pleased, disabled and elderly respondents were especially appreciative. The high level of acceptance of energy efficient globes seemed largely due to the free, convenient give-away programs that simultaneously promoted the longer lives and reduced energy costs associated with the new globes.

Actions 17 and 19, *adding solar hot water and PV* are usually unattainable by renters except on very rare occasions where undertaken by the property owner, as reported by some public housing tenant respondents. In a very powerful 'nudge' such solar hot

water and PV installations are likely to have occurred through the Blacktown Solar City project which included installations totalling nearly 200 kW in PV systems and 100 solar hot water systems in NSW Department of Housing properties (Blacktown Solar City, 2012)

Middle layer: attitudes regarding finances and convenience

Advantages of smoothing the path and scripting the moves

Inclusion of the Y Green householders provided considerable in-depth data describing cases where provision of salient information led to climate change mitigation action. In line with Heath and Heath (2010) and Monroe (2003), findings indicate that clear, specific information was essential for lifting mitigation behaviour above usual practice. Significantly, while most of the 14 Y Green home sustainability audit interviewees (Barry et al., 2009) stated that they '*would not have gone out of their way'* to arrange a home sustainability audit, they took the opportunity when Y Green staff *'smoothed the path'* (Heath & Heath, 2010) by literally knocking on their doors. A number of respondents reported that they had been thinking about making further pro-environmental changes, to *'do their bit'* for some time and that the Y Green program gave them a welcome nudge as well as the necessary support and information to make relevant changes. On completing the audit, Y Green *'scripted the moves'* (Heath & Heath, 2010), by providing clear, specific instructions. The result was increased low behavioural cost mitigation actions among all 14 Y Green interviewees and installation of solar hot water heaters by two of the householders even though Y Green staff only suggested they consider solar hot water and did not provide actual finance or additional information.

Necessity of the capability to act and control action outcomes

The importance of Schwartz's (1973) second aspect of AR, being capability to undertake an action and having control over its outcomes becomes clear in this middle layer of economic motivations. The following examples outline the types of actions that Y Green program participants undertook having received advice that was tailored for them. Self-funded retiree YG3 was only slightly concerned about climate change. Her awareness of consequences (AC) largely focused on saving energy and money, in line with her particular dislike of wastage in any form and to shore up her income in

the wake of the global financial crisis. YG3 had run the office of a busy veterinary practice, so she had an underlying view of herself as both responsible and capable, expressing AR in the form of a moral obligation to look after herself and the capacity to do so. Y Green appealed to her autonomous motivation for saving money, further developing her capacity to do so with salient energy efficiency information.

> *I turned off the second fridge in the cooler months and put tape around the doors and windows to seal them. I did the things I could do that were simple enough – YG3, female, ≥36 years, first language English*

While YG3's AC and both aspects of AR were not pro-environmentally focused, they achieved climate change mitigation actions to reduce energy. In contrast, YG7's AC and AR were firmly focused on climate change mitigation. He was also in a financial position that enabled him to install a solar hot water system and he was contemplating a PV installation.

> *We had to replace the stove top anyway, so I thought let's look for something that would save power. We also replaced the refrigerator seals because ... they were all cracked and broken... (I varied) the temperatures in the freezer and refrigerator. I got thermometers ...to help me set the temperatures... Before the solar hot water was installed, I set the hot water temperature. I made sure the pipes were all wrapped (with insulating material). I got onto Sydney Water and got little kits sent out for reducing water ... and we put reducers in a number of taps – YG7, Male, >36 years, first language English*

YG7 explained that he had been investigating energy saving through online forums for some time. However, the saliency of information tailored for his home considerably enhanced both his capacity to act and his belief that the actions would provide worthwhile outcomes. Similarly, after making adjustments encouraged through a Blacktown Solar City household sustainability audit, PT2 was:

'surprised ... how changing the heat settings on my gas hot water system...made a massive contribution to reducing my gas bill by lowering my consumption of gas' – PT2 Male, >36 years, first language English

As part of the Blacktown Solar City project, PT2 also had a solar PV electricity generation system installed. In contrast, despite his awareness of consequence (AC) regarding climate change and sense of moral obligation to act, PT3 had *'decision paralysis'* (Heath & Heath, 2010), overwhelmed by the options for replacing his ageing, inefficient electric hot water system with a solar-powered system. Living outside areas covered by Y Green and Blacktown Solar City, PT3 wished for a home-based assessment to help him decide whether he needed *'three panels, or two panels or one panel? What's the most effective? What's the most cost efficient? Is it flat panels or that tube system? There are so many of those products out there and so many suppliers, it's so hard to choose.'* Lack of clear, salient information stalled action in the case of time-poor PT3. Similarly endowed with AC and a sense of moral obligation to act, YG2 indicated her aim to install a PV system but that it was taking a long time to arrange. When asked what was causing the delay, she answered *'It's the time factor. My husband has talked to a supplier. He's got some information and an estimate on the cost. It's a matter now of looking at it and deciding whether that's the way we want to go and then getting around to doing it.'*

While there is no guarantee that independent expertise focused on the nuances of the sites and household needs of PT3 and YG2 would have delivered solar installations; the findings showed that such salient information was highly regarded and effective. Where such information is provided by independent and credible sources, it may assist in overcoming situations in which ego-depletion is causing lack of action. These would include situations where individuals who spend much of their working days making complex decisions have few inner resources left for making complex decisions regarding household mitigation actions even when they are inclined to do so (Baumeister et al., 2007). Further to supporting the capability and control component of AR, economic motivations in the middle layer illustrate and support Ajzen's (2002) argument that perceived behavioural control includes both internal (self-efficacy) and external aspects. Energy efficiency actions relied on respondents' (internal) technical

knowledge of heat transference and how electrical and gas appliances and related systems operated in relation to their specific (external) household site, size and energy needs, as well as respondent (internal) self-perceptions of their abilities to make relevant decisions and changes. Of course, some people had more (external) financial means to undertake actions that others could not. Indications are that human capital investments providing specific, well-targeted energy-efficiency information and education play three important roles. Firstly they tap into existing autonomous motivations (Deci & Ryan, 2008) and provide the 'how' to enable action by supporting the control capability aspect of AR and TPB (Schwartz, 1977, Ajzen, 1991, 2002). Secondly, they provide the 'why' by raising AC in specific tailored ways which often relate to the financial benefits for individuals as well as environmental benefits. For example, the Y Green staff discussed with householders their actual electricity and water bills and helped quantify the energy and related financial savings achievable through the suggested changes. Thirdly, the quick convenient provision of such tailored information seemed to help overcome the tendency for people to delay. With the right policies and price signals, such convenient pathways can provide mitigation actions even when AR and AC are more focussed on the economic savings for oneself or one's family than on the environment.

Only two in-depth respondents had installed solar PV. PT2 had done this with the assistance of Blacktown Solar City. PT4 self-arranged the installation during the generous 60c kWh feed in tariff period of the NSW Solar Bonus Scheme (Industry & Investment NSW, 2010b). While his motivation for doing was clearly financial, his description of his motivation provides a glimpse of the complexities involved, demonstrating why many people unfamiliar with the field may prefer undertaking such an investment armed with information and guidance they can trust.

> *I got a 2.2 kW PV system. The aim was for it to pay for itself in five years' time which is roughly the equivalent of paying an electricity bill of $300 a quarter. That should work based on the orientation of my house and how the sun falls.... I got in when the NSW feedback tariff was 60 cents per kW hour. I also got the rebate (RECS), so the system was less to install because the certificates went to the installation company. ... For me the main reason I installed them was for the*

dollars, as important as the environment is. ... The scheme is guaranteed for six years and the panels pay themselves off in five years. Even if it only makes $1,200, then that's four weeks less off my mortgage repayments – PT4, male <36 years, first language English

PT4 was attracted to the NSW Government Solar Bonus Scheme's guaranteed continuation of the generous feed-in tariff for six years, which gave him a strong degree of financial certainty that the panels would pay for themselves relatively quickly. While not guided by a personalised program such as that offered by Y Green or Blacktown Solar City, PT4 was the beneficiary of a Government scheme which diffused costs among other domestic electricity buyers much like government services, including Y Green and Blacktown Solar City, diffuse costs among taxpayers.

Living within the budget comes first

Even some of those most concerned about climate change and most pro-environmental in their views clearly stated that personal or family finances were, at least in the short term, valued more highly than their pro-environmentalism, as exemplified by YG9's quote, below.

My own environmental ethics are in conflict with some of my behaviours. Whilst I like to believe my behaviours stem from the altruistic origins of my values and integrity, I confidently justify why I don't stop junk mail being delivered, or why I don't choose environmentally designed products. I understand the plight of the environment, the shortage of non-renewable resources and impact the western consumerism has on the planet. I cry when I see shows on polar bears and their plight for survival as the planet heats up. So even though I am environmentally aware, the most important decisions I make as a consumer stem from economic needs first, with the added benefit of saving the planet second. Will things change for me going forward? It still depends. YG9, female, <36 years, first language Mandarin

For YG9, with young children and whose husband had been recently retrenched, prioritising the further mitigation actions she wished to take, such as purchasing heavy curtaining to reduce heat loss in winter and installation of solar hot water, were dependent on whether she or her husband could find work. Similarly, while PT1 had personally invested heavily in gaining environmental management knowledge and qualifications and was the only in-depth respondent to own a hybrid vehicle, she also had a mortgage to pay. In relation to buying appliances, PT 1 explained:

> *I focus more on price. So if it has a good energy rating but its cost is exorbitant then I won't purchase that. I'll purchase one that is maybe a little bit less energy efficient but is also better for my pocket – PT1, female, <36 years, first language English, Climate Action Score medium*

Here, PT1 has exemplified the weighing up of price against environmental values that was reported by several in-depth respondents as standard practice when they make major purchases. In contrast however, S27 who also considered both cost and environmental values, took the longer term view regarding energy efficiencies.

> *I always consider the power rating of an appliance when purchasing as most appliances we buy last for a number of years and the efficiencies of power usage is considerable over the life time of any appliance. I consider both the cost to me and the waste of power as an environmental cost – S27*

Given recent power cost increases (Industry & Investment NSW, 2010a, b, I.PA.R.T, 2012) those selling large or small good quality, energy efficient appliances may benefit from promoting their longer-term savings in energy and money.

Environmental and economic values converge in concept of wastage

Several in-depth respondents indicated a deep dislike of any kind of wastage and this emerged as a small yet significant driver at the middle level of economic motivators. YG3 had recently downsized to a townhouse from a larger home on an acreage which

she had shared with one of her adult children and his family. Now living alone, she discussed the process of getting used to not needing to buy so much food.

> *Well, it's just stupid. Like you wouldn't throw a dollar into the street yet you might be throwing out a loaf of bread that's worth a couple of dollars. When you put a cost to what you're throwing out, well you're just an idiot really YG3, female, >36 years, first language English*

For several in-depth respondents, a dislike of wastage was deeply ingrained in childhood as discussed shortly along with other deepest layer economic motivations.

Small infrastructure and system tweaks can smooth the path

Sometimes small, everyday infrastructure and systems create barriers off-putting enough to deter mitigation improvements becoming habitual. In some instances removing such barriers would be relatively easy and inexpensive. YG3 mentioned one such situation that annoyed her as an onlooker.

> *I find the green bags quite irritating actually because people turn up, doing the right thing I suppose, with their green bags but it takes them a lot longer to get through the supermarket checkout. They slow it right down. – YG3, female, >36 years, first language English*

Problems of reusable bags slowing checkout lines have been overcome where checkouts are set up so that 'green' bag handles fit easily on the bag handle holders, and in shops where customers pack their own bags. Relatively small adjustments can make real differences to both the practical problems and peoples' perceptions of them, and assist in making pro-environmental actions normative. A similar principle can work with regard to larger infrastructure. After an accident, PT9 became reliant on public transport and noticed a problem relating to the local bus service.

We've only really become aware of the bus service recently because we're using it. But the bus stop has got a roof about this wide. If it rains you'd be drenched – PT9, female, ≥36 years, first language English/

It is likely that potential bus commuters and those who experience a drenching at the bus 'shelter' would rather drive than arrive at work or school soaked through. Given the cost of building bus shelters, it would seem that they may as well be designed to actually provide shelter. While the adjustments to systems and infrastructure discussed above would provide no guarantee that either green bags or buses would be more frequently used, in each case they would seem to remove one barrier to their use.

Lack of responsibility for economic management reduces energy saving

In her primary school workplace, PT10 encouraged management to allow her to apply for funding for PV solar panels but faced resistance because the Department of Education (rather than the school) was responsible for energy bill payments, so any financial savings would not be accrued by the school. YG10 exemplified Booth's (2012) assertion that by-standing in the face of anthropogenic climate change is morally wrong, and she felt a strong moral obligation to act to reduce greenhouse gas emissions wherever possible and to model these actions for her students. However, her degree of personal responsibility-taking was not matched by that of the school management team. This is not surprising given that outer layer results show that of the *total* reported motivators for taking mitigation action, 30.5% related to saving money. This was clearly the more frequent motivation when compared to the 3.5% of *total* motivations related to greenhouse gas reductions, the 3.2% of *total* motivations relating to moral obligation and the 10.5% of *total* motivations relating to saving energy or fuel, bringing this sub-total to 17.2%. These figures provide further evidence that during the course of *'everyday life'* (Norgaard, 2011), by themselves awareness of environmental consequences and a sense of moral obligation to act are unlikely to drive climate change mitigation actions. As this study focus is household mitigation, workplace implications are limited yet there is no reason to assume that the importance of financial incentives for energy saving are not transferable to workplaces. Companies reliant on profits have inherent financial incentives to reduce energy and fuel costs and to consider onsite power generation options with favourable payback periods. So too

with public sector organisations where organisational structures give managers responsibility for energy payments *and the ability to bank any savings for their other workplace budget needs or for staff bonuses for achieving substantial savings*. Identification of opportunities for appropriate governance adjustments may be assisted through using the Social Dilemma Model (Gifford, 2008).

Carbon pricing inherently adds to complexity

While this research preceded the public discourse specifically relating to the Clean Energy Futures legislation, it coincided with some of the debates over its precursor, the Carbon Pollution Reduction Scheme (CPRS), which failed to pass into law. YG13 was disappointed when then Prime Minister Rudd decided to delay carbon pricing after the Senate's second rejection of the CPRS legislation. YG13 felt that businesses needed to take responsibility for their carbon emissions, and saw it as a fairness issue.

> *I certainly think they made a commitment to reducing carbon output and all that sort of stuff and then go back on that, and I think well what sort of modelling is that? (Prime Minister Rudd) said he was going to do that and he didn't. Or he's gone back on his word. I think they have a responsibility to force business into complying because they are one of the major effectors. ... If I'm going to take that responsibility individually, someone needs to make business do it – YG13, female, ≥36 years, first language English*

A different view was expressed by S13, although he agreed that climate change needed addressing.

> *Climate change is a global problem with depleting ozone, rising oceans, unpredictable and violent weather patterns. Something must be done. However, I am angered by reports of the Rudd government 'rising to the climate change challenge' by making decisions and enforcing rulings on Australians that will have a detrimental impact on our industries, employment, and which will result in consumer price increases; while concurrently relaxing rulings on developing countries ... that need global assistance and carbon trading concessions to catch*

up with the developed world. Don't misunderstand what I am trying to say. I believe that the developed world should support developing nations, but at what cost? If we are all poor, we can't help anyone – S13

S13's implication that carbon pricing will reduce Australia's international competitiveness seems increasingly unlikely as more nations, states and provinces introduce carbon pricing. For example, the European Union, South Africa, Japan, some provinces in China, The Republic of Korea, New Zealand, India and Taiwan either have or are introducing some level of carbon pricing in the near future (SBS, 2012). Nevertheless, his concerns over the financial and trade implications of carbon pricing outline some of the complexity facing policy makers on the 'wicked' and 'diabolical' problem of climate change (Rittel & Webber, 1973, Garnaut, 2008). Furthermore, S13's argument reveals the individual, company, business and government ambiguity toward taking climate change mitigation action given Australia's reliance on carbon intensive industries and the associated sunken costs. This mirrors Randall's (2009) argument that there is no avoiding the fact that undertaking significant mitigation action will incur considerable loss. Similarly, YG6 was 'against' carbon emissions trading and he had a web of complex reasons for his view.

If we want to cure the problem we have to cure the problem. We can't say you can produce ten times more carbon and sell (sic) carbon credits to a country over here that's not producing carbon. That's not curing the problem; it's just moving the problem around the world. That's just selling (sic) into another country. To me that's just ridiculous. That's beyond belief. ... Why can't the coal industry just put pollution control on the tops of their stacks? The only technical difficulties I see with that is that the coal industry does not want to pay for that. I've got nothing against the coal industry – I do a lot of business with the coal industry. ... The coal industry is so big, so powerful. It doesn't want to pay for this. It wants everybody else to pay for it. They want to keep their profits and if you don't give us money, government, we'll shut the system down. We won't be able to produce coal, see, because of your recommendations government, so we're holding you to ransom. Also, if you're going to make us

do this, we're going to make even bigger profits from the ordinary person by charging them more for power. ... But I'm also sceptical about whether climate change is actually happening because there were reports two weeks ago where the actual temperature has not changed. The scientists before said that it has changed. But other scientists are saying it hasn't changed. ... It makes you confused. It is confusing and people are confused but we're the ones at the end of it bearing the brunt of it – YG6, Male, ≥36 years, first language English

The ambiguities that YG6 expressed in relation to the coal industry and his financial relationship with it, complicated by his views of technical quick-fix pollution controls and misunderstandings about carbon trading (inverting the selling and buying of carbon credits) made even more complex his views of climate change and debates about its existence. YG6 demonstrates the challenges for science communicators and policymakers in assisting the public understand the issues. Yet he also reiterates the political difficulties associated with challenging industries as economically powerful and therefore as politically powerful as the coal industry (Pearse, 2006). Additionally, YG6 further highlights the competing *'everyday life'* issues and the salience of personal values, attitudes, situations, contradictions and anxieties that people may have when sifting through information and making decisions on how to respond to the concept of climate change (Barr & Gilg, 2007, Norgaard, 2011, Lertzman, 2013).

As there were only a few in-depth discussions on carbon pricing not too much can be drawn from the data. However, it is perhaps significant that these discussions *lacked* anyone saying, *'I'm willing to pay my share of the cost to reduce carbon emissions'*. Lack of such willingness accords with the seeming success of the Liberal-National Party Coalition's campaign against *'the great big new tax on everything'* (Taylor, 2009, Abbott, 2012, Hanson, 2012, Hetherington, 2013, Liberal Party, n.d.)

Deepest layer: Economic category guiding influences

Financial means often drive consumption

Many in-depth respondents, even some who discussed the financial restrictions their families had when they were children, spoke of how they had become more indulgent

consumers as financial circumstances allowed. For several, such as YG9 these habits changed back to prudence in response to times of straitened finances in their adult lives, such as through job losses. This pattern of higher consumption echo Australian Conservation Foundation (2007) findings that levels of consumption, and therefore impacts on the environment and climate, vary mainly in accordance with financial means. S26 discussed consumption pattern changes typical of the narratives of several in-depth respondents.

> *With three children under the age of three, parenting was my primary focus. In hindsight, during this time due to financial circumstance my environmental practices were more favourable than they are today. I did not have a (driver's) licence so the children and I walked to local shops; we were a one car family, bath times consisted of three in a tub, a vegetable garden provided fresh vegetables, holidays were local and activities were such things as board games, drawing and play dough made of flour, water and food colouring. This lifestyle changed over time to include driving and increased consumption, excused by things such as lack of time due to full time work and study, step child, grandchildren, ageing parent and so on – S26*

Such respondents admitted that when financial means were plentiful, motivation to save was lower and that this had environmental impacts. The change in the consumption pattern of S26's family largely revolving around demands on her time, which were very different when she was a stay-at-home mum compared with her full-time work commitments coupled with additional caring responsibilities. While saving money was the most frequently reported outer layer motivator, convenience of action was also important, as discussed earlier in this chapter. Similar to the pattern seen in social and environmental motivational categories, discrepancies and ambiguities across economic motivators are guided by the hierarchy of values held by an individual at any given time. These personal value hierarchies automatically adjust according to context and conditions, particularly financial conditions. When S26's family relied on her partner's single income, money scarce and therefore valued more than was convenience and time saving. Then, S26 felt she had time to walk to the shops and tend a vegetable garden. However, once her children were more independent, she

gained full-time work and a driver's licence and simultaneously gained responsibility for a step child and elderly parent. This is consistent with the finding of Pooley et al. (2011) that people are more likely to use cars when they are responsible for children or the elderly, especially where such responsibilities coincide with them feeling time-pressured. For S26, money had become more plentiful but time was restricted, so convenience and time-saving became more highly valued than small financial savings. The advantage of S26's insight is that she is old enough to be able to reflect on these different stages of her life and their flow-on environmental impacts.

Personal motivations can completely contradict each other

A significant sub-set of both Australian-born and migrant in-depth respondents discussed consumption-limiting habits acquired in childhood, mainly from their parents. YG5 exemplified these discussions.

> *My parents were of a generation that never like waste. Whether it was waste of food or waste of water or waste of power. When you see people who leave on everything in the house when they're not using it, you just think well you're paying money to run it why are you doing it? – YG5, male, ≥36 years, first language English*

The origin of such attitudes and related practices was prudent money-saving, sometimes through necessity and for those who continued to maintain these practices, mitigation and pro-environmental impacts were *unintended or secondary motivating factors.* For some, the importance of maintaining financial capital was understandably seen to enhance autonomy as well as the capability to take and control actions (Schwartz, 1973, Ajzen, 1991, 2002). PT4 provides an interesting example due to the consumption pattern contradictions he embodied in regard to anthropogenic climate change. PT4's interview made it clear that he deeply enjoyed nature, and found being in nature *'important for a sense of being'*. Simultaneously, PT4 had frugal expenditure habits and he highly valued financial security, a value acquired from his family.

I think, 'do I really need what I'm thinking about buying'. ... I've always been like that mainly because of my parents and grandparents, in terms of their expenditure habits - just because of going through things like the Depression ... I suppose it's a generational socialisation process. ... Right at the moment I'm trying to juggle the travel too because I get a lot out of travel, you know - seeing different cultures and so on, so that will push the mortgage back a bit. But my aim is to pay off the house as quickly as I can. That way, later in life I can spend more time with family. I won't have to be as concerned about job security as much – PT4, Male, ≤36 years, first language English, Climate Action Score: High

This quote indicates that air travel was an exception to PT4's habitual frugality. Deeper psychological approaches to viewing climate change responses encourage consideration of that which is unstated in addition to consideration of that which is stated. PT4 showed both AR aspects of feelings of moral obligation to act and capacity to do so as well as awareness of consequences or AC regarding climate change impacts. He seemed to be beginning to consider that climate change impacts were currently occurring and likely to be worse in future. Yet he considered air flights only in financial terms, specifically noting that paying for them will delay finalising his home ownership. Although concerned over climate change, even specifically regarding coral bleaching of the Great Barrier Reef, PT4 did not conceptually connect his air flight to enjoy the Reef and the Reef's bleaching. Interestingly, in contrast two other in-depth respondents, who also discussed taking airflights and who indicated less concern regarding climate change than PT4 did acknowledge the high carbon emissions of flying. One of these respondents, S2 worked for an airline.

The organisational culture is to encourage travel, by offering discount airfares and convenient and easy and readily available access. ... The other motivator is the experience and the learning you get from travelling to culturally different lands. This gives insight into people's plights, cultural issues and physical achievements and catastrophes. My ethnicity also dictates the overuse of planes, there is a bond with the old homeland which attracts and makes me want to be part of it at times. This encourages regular visits overseas to touch base with my

spiritual self. Early childhood teaching of Greek culture in ancient times is also a factor, often distant travel is romanticised and many of my forefathers were great travellers and explorers, so I say, why not continue their journey? – S2

Where PT4 shows his blind spot in not connecting air travel to climate change, S2 shifts her responsibility to her forefathers and her ethnicity. These examples support Randall's (2009) view of the considerable challenge involved in encouraging people to sacrifice opportunities such as air travel. With regard to regulatory focus theory, the *promotion focus* of nurturance, growth and goal-attainment in the form of cultural experience are outweighing *prevention focus*, being the desire for security (Idson et al., 2000). For current generations, affordable air travel has been analogous to a gift, and encouragement to relinquish it is likely to spark *'the endowment effect'* aspect of loss aversion, where people want substantially more compensation to part with such gifts than they would have been willing to pay to acquire them (Harinck et al., 2007, Tom et al., 2007). A similar problem arises regarding private vehicle use, as discussed by PT3.

I think we're always going to have cars. Growing up in Western Sydney as a young fella, cars were important. They probably kicked in before girls. They're in our culture. Change the way our car runs to make them more efficient. It's about making those technologies and our use of resources more energy efficient. More environmentally friendly – PT3, male, ≤36 years, first language English

Technology improvements provide great hope, yet these are costly and even where they appear to be successful the huge technical and systemic changes required can be problematic. For example, reports of more than one million solar PV installations in Australia have been followed by accusations by the Energy Supply Association of Australia (ESAA) and Managing Director of Origin Energy that solar panel owners 'free-ride' on other electricity customers by not paying the full costs of enabling small PV system connections with the electricity grid (Dagge, 2013, E.S.A.A., 2013, Palmer, 2013a, Rolfe, 2013). This problem may be able to be corrected by adjustments to retail pricing structures accompanied by clear explanations as to the technical difficulties of

the grid accommodating small scale solar installations, and transparency of actual costs. However, such accusations also have the potential to undermine confidence in solar power and perhaps cause social divisions between those without solar panels and those with them, *whether or not* those with PV are eligible for and receive generous feed-in tariffs such as those provided by the NSW Solar Bonus Scheme and paid for by all NSW electricity customers (Industry & Investment NSW, 2010a, b). The scale of sunken costs, complexity of existing systems and number of related state and federal government policies – and their frequency of change - provide considerable potential for conflict during such large-scale technology changes. A respectful, transdisciplinary approach may assist in addressing such conflicts in ways that take into consideration the many varying viewpoints of different stakeholders.

Next, Chapter 7 presents an integrated discussion of the findings and their implications for the development of climate change mitigation policy and programs that engage with the most common motivations for taking mitigation actions.

Chapter 7 Integrating the findings ready for use

In response to a radio broadcaster question on whether she was worried that a change in government at the upcoming September 2013 election would lead to policy changes … 'You don't do climate change policy, Fran, if you worry about those sorts of things' – Australian Climate Change Authority's Chief Executive Officer, Anthea Harris (Harris, 2013)

Summary

This last chapter combines all the findings across the motivational categories, triangulating results where practicable. A holistic view of the outer layer of motivation shows that economic drivers representing 42% dominated, followed closely by environmental motivations representing 39%, with social motivators representing a less influential 19% of outer layer motivations. *'Saves money'* was the single most reported outer layer motivator, representing 30%. Combined, the top three outer layer motivators, *'saves money', 'unspecified environmental benefit'* and *'saves energy or fuel*', represented 57% of outer layer drivers, with the fourth top motivator being *'health or sensory benefit'* which represented 8%. This is compared with *'reduces greenhouse gas emissions or climate change'* and *'to influence others to mitigate',* representing a combined 5% or one in 20 outer layer motivations. The *order* in which respondents reported their multiple motivations for each action were consistent with the *frequency* of reports for motivation, in that the top motivators were nominated in much stronger numbers as a first mentioned driver, much less frequently as a second mentioned driver and rarely (if at all) as a third mentioned motivator, implying that order of mention was significant and that the first mentioned motivator was the most potent. Furthermore, the 14 most frequently reported actions were less expensive than their alternatives or incurred no additional financial cost, indicating consistency with the survey respondent self-reports showing '*saves money'* as the dominant motivation. Subjective individual motivation can belie external factors including undetected normative influence and the substantial government costs associated with providing financial incentives and infrastructure such as recycling services. Outer layer findings highlight the problem that while most people are prepared to undertake only low behavioural cost actions, societal and economic reliance on fossil fuels

requires major change, inevitably demanding increased responsiveness from business, organisations and especially government.

There was postulation of a step by step process in which the elements of the Self-Determination Theory (SDT) of motivation (Ryan & Deci, 2000b) and Schwartz's normative explanations of helping (Schwartz, 1973, 1977) work together within individuals to achieve intentionally pro-environmental motivations. Such a process would explain the findings of this research that specifically relate to intentionally pro-environmental actions. In-depth data revealed two main causes of any perceived environmental value-action gaps, being external conditions too difficult to overcome, and unintended outcomes of actions sparked by non-environment related values, concerns and desires. Policy and program implications of the research findings relate to a range of areas including methodology, the potential of the Y Green project as a model, motivational layering, engagement with the main categories of motivation, implications specific to each of the three layers, overcoming the tendency to delay, diffusion of service costs, and areas that might benefit from further research.

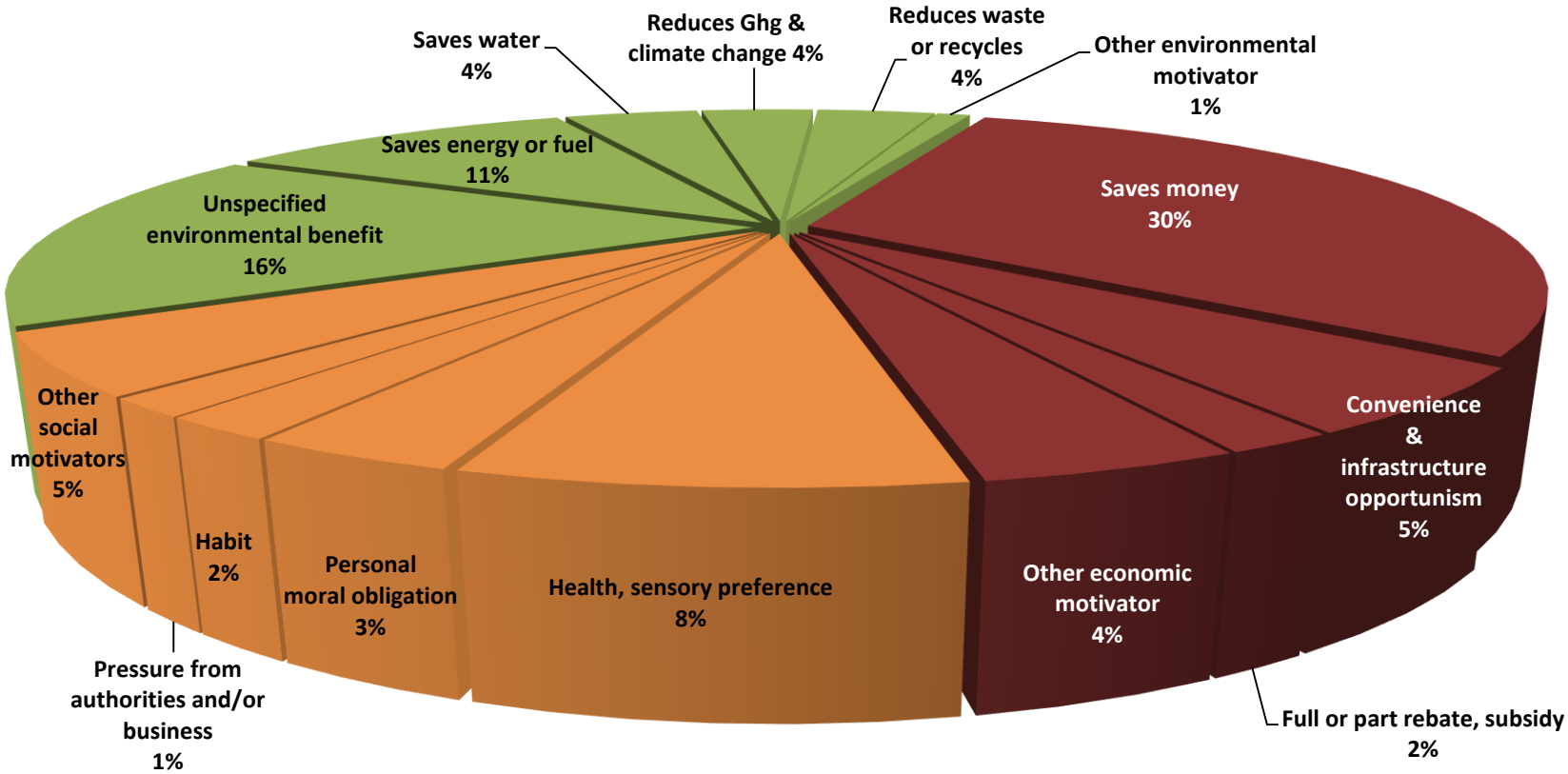
A holistic view of the outer layer of motivation

Economic dominance followed closely by environmental motivations

For practical purposes, findings indicate that slightly more than 40% of outer layer motivations are economic, slightly less than 40% are environmental and slightly less than 20% are social. Based on percentages of the total 2,124 survey dataset motivations reported for taking Climate Scale actions, Figure 7.1 presents motivators according to subgroups discerned from the data. *Economic* motivations dominate the outer layer in two ways, with *'saves money'* the single most reported motivator, representing 30% of *all* motivations and combined reports for *economic* motivations representing 42% of all outer layer motivations. This is slightly more than the frequency of combined *environmental* motivations at 39% and considerably more than the frequency of combined *social* motivations at 19%. Figure 7.1 summarises the frequencies for all subgroup reports, based on data shown at APPENDIX M.

Figure 7.1 Total major subgroups shown as percentages of outer layer motivations.

Red indicates economic motivators (42%), green indicates environmental motivators (39%). Orange indicates social motivators 19%.



Major findings: climate change itself is a minor outer layer motivator

Figure 7.1 shows that the top two outer layer environmental subgroups *'unspecified environmental benefit'* and *'saves energy or fuel*' represent a combined 27% of motivators, and are therefore slightly less influential than the top economic motivator, *'saves money'*. Together, these top three motivational subgroups represent 57% of all outer layer motivators. The next largest single subgroup, representing 8% of all outer layer motivations relates to health or sensory preference. Most notably, the *'reduces greenhouse gas emissions or climate change'* subgroup represents 4%, and even when combined with *'to influence others to mitigate',* represents only 5%. Additionally, multiple motivators were frequently reported by an individual for any given action. Furthermore, while the extent to which climate change knowledge and concern underpinned responses in the *'unspecified environmental benefit'* and *'saves energy or fuel*' subgroups is not known, respondent terminology referred to 'the environment' rather than to 'greenhouse gases', 'carbon emissions' or 'climate change'. More specifically, importance ratings data demonstrated that the environment attracts more care and concern than does the issue of climate change. Combined, these findings indicate that very few people undertake common mitigation actions solely for the sake of mitigation. Outer layer reports relating to normative influences were rare and this might indicate lack of individual awareness of such influences, which would be in line with findings from previous research (Goldstein et al., 2007, Nolan et al., 2008).

Quite rightly, many government and business initiatives currently target Figure 7.1's top three motivators, *'saves money'*, *'unspecified environmental benefit'* and *'saves energy and fuel'*, as evidenced by a Google search for 'saving money and energy in Australia' showing more than 94 million results and one for 'saving money and environment in Australia' showing more than 140 million results. However, outer, middle and deepest layer data indicate that individuals undertake climate change mitigation actions for a wide variety of interacting reasons, all of which provide benefit to the relevant individual. From a climate change mitigation policy stance, many of these are 'co-benefits' but in the minds of the individuals concerned, they are the primary benefits and motivator/\s, therefore programs are likely to be enhanced through engagement with them. In addition, findings from the energy-efficiency experiment conducted by Nolan and colleagues (2008) and the hotel towel re-use

experiment conducted by Goldstein and colleagues (2008) indicates that there is likely to be further enhancement through the use of honest and verifiable descriptive messaging of the specific (climate change mitigating) pro-environmental behaviour of others. For example it would be true to state in a messaging context that *'over one million Australians households gain some or all of their electricity from home solar panels'* (Arup, 2013a, Edis, 2013a, Palmer, 2013a).

While unlikely to be able to engage with all 33 motivational subgroups, designers of policies and programs may benefit from considering each motivational subgroup to determine whether or not there is potential for their work to engage with it. A policy and suite of coordinated programs could engage with the top motivations, thus providing economic, environmental and social co-benefits. Co-benefit opportunities abound. Examples include reduced local air pollution and increased personal fitness from replacing car trips with walking and public transport use, and improved biodiversity habitat and soil quality where locally native species are used to plant carbon forests. However with particular reference to the latter case, the limit to which sequestering carbon in forests can offset current levels of carbon emissions means such strategies should be adjunct to decarbonising the economy.

Order of motivation mention is consistent with other findings

Many respondents reported more than one motivator for any given action, raising the question of whether the order in which motivations were nominated was significant. To test this, motivations were distinguished according to the frequency of being mentioned first, second or third. Almost without exception mentions of motivations for each Climate Scale action followed the same pattern: drivers were nominated in much stronger numbers as a first mentioned motivator, much less frequently as a second mentioned motivator and rarely (if at all) as a third mentioned motivator. Motivators most commonly mentioned first were invariably the most reported drivers of the action. This implies that order of mention was significant and that the first mentioned motivator was the most potent. Separately, to triangulate the survey respondent self-reports of motivations, the Climate Scale actions were considered along with the financial costs for each. Table 7.1 shows the frequency of reports for taking each Climate Scale action, being *what* people reported doing rather than *why*

they did it. Actions are listed in order of reported frequency from the most undertaken action, regularly using the household recycling bin, to the least undertaken action, becoming carbon neutral.

Table 7.1 Frequency of Climate Scale action-taking and financial cost for each action

Rank	Action frequency and percentage of respondents	Action	Financial cost
1	N=286 95.3%	Do you regularly use the household recycling bin?	No additional cost.
2	N=279 93%	Do you usually hang clothes out to dry instead of using the dryer?	Less than the alternative.
3	N=266 88.7%	Do you put on a jumper first rather than turn on the heater or light the fire?	Less than the alternative.
4	N=254 84.7%	Wherever possible have you replaced your light globes with compact fluorescent globes?	Less in the longer term and many respondents received the first set of compact fluorescent globes free of charge.
5	N=249 83%	Do you try to limit your use of air conditioning? E.g. Only use it when the temperature is extreme?	Less than the alternative.
6	N=239 79.7%	When buying an appliance do you consciously try to choose the one with the highest star rating?	Less in the longer term.
7	N=224 74.7%	Do you usually make a conscious effort to keep your showers short?	Less than the alternative.
8	N=218 72.7%	Do you usually use reusable shopping bags?	Cost neutral or there may have been an initial small outlay.
9	N=196 65.3%	Do you try to use rechargeable batteries rather than disposable ones?	Less in the longer term.
10	N=163 54.3%	Do you discuss climate change with others?	Likely to be cost neutral.
11	N=160 53.3%	Have you taken any particular action to help you learn more about climate change?	Dependent on action, but likely to be cost neutral.
12	N=155 51.7%	Do you usually buy recycled paper? Eg copy paper, paper towels, toilet paper?	Cost neutral or perceived as costing less.
13	N=151 50.3%	When shopping, do you usually try to choose items with less packaging?	Cost neutral or perceived as costing less.
14	N=147 49%	Have you consciously set out to run a car that is fuel efficient?	Less in the longer term.
15	N=64 21.3%	Do you choose not to run a car at all?	Less than the alternative.
16	N=59 19.7%	Do you buy Greenpower?	Costs a little more, depending on the percentage of power nominated. At the time of the survey, some initial contracts seemed to be based on a cheaper introductory offer.
17	N=53 17.7%	Do you have a solar hot water system? (Heat pump also scores yes)	Considerable initial costs but costs less in electricity in the

			longer term and has attractive payback period, shortened more by any rebate.
18	N=19 6.3%	Are you vegetarian?	Potential to cost less than the alternative.
19	N=17 5.7%	Do you have solar panels that produce electricity (not just for hot water)	Considerable outlay and while it costs less in electricity in the longer term, the payback period is long – except where there is a substantial rebate and/or a feed-in tariff that provides parity with electricity cost.
20	N=4 1.3%	Have you become carbon neutral – calculated your carbon footprint and offset emissions?	Cost dependent on the level of greenhouse gas emissions associated with the individual's lifestyle and cost of the offsets.

Table 7.1 indicates that the *14 most frequently reported actions were less expensive than their alternatives or incurred no additional financial cost*. This is consistent with the survey respondent self-reports showing '*saves money'* as the dominant motivation. Furthermore, implications of both Figure 7.1 and Table 7.1 are consistent with '*Who Cares?'* survey findings (NSW O.E.H., 2013) and those of Whitmarsh (2009) indicating that financial savings are a motivator of climate change mitigation actions such as reducing the use of electricity and fuel. Indeed '*Who Cares about the Environment in 2012?'* noted a sharp rise in the number of respondents citing cost as a reason for their energy-saving, likely due to the recent increases in NSW electricity prices (Industry & Investment NSW, 2010a, b).

The place of normative influence

Ostensibly, these triangulated findings of saving money as the most influential of the outer layer motivations may seem to contradict those of the energy-efficiency experiment which demonstrated that normative influence was a more potent driver than saving money (Nolan et al., 2008) but such a contradiction may not be the case. Rather, these motivations may be aligned, in that it is likely that many people know others who take actions to save money and see it as normative. This was evidenced by in-depth respondents YG5, PT4 and others who had internalised frugality as normative in childhood, and it could be expected that the favouring of frugality would increase in a time of rapid increases in electricity prices. While Nolan's team offered

great insight into the power of normative influence *once others were behaving in the desired way*, it did not increase understanding of the motivations of those in the community referred to in the descriptive normative messages who were already taking energy savings measures, nor did it identify any role, such as perhaps self-justification, that may have been played by merely having the saving money or environmental motivations as other possible motivations for taking energy saving actions. While these aspects are unclear, it seems wisest to take the motivational findings offered by people on face value, design programs that engage with these, and utilise descriptive normative messages that align with injunctive messages (Cialdini, 2003) strategically and purposefully to help increase participation. Over time - as increased numbers adopt the action - the increased social proof of adoption, iteratively promoted via the descriptive messaging is likely to further increase the rate of diffusion (Rogers, 2003). These strategies would seem useful and applicable irrespective of what the desired action is and irrespective of both conscious self-perceived motivations and any *'undetectable'* motivations of the potential participants (Nolan et al., 2008).

Subjective views sometimes belie substantial public investment

Outer layer findings relate to individuals' top-of-mind, subjective views which need to be considered alongside external factors including normative influence and any government infrastructure and systems that also enabled the actions. For example, *regularly using the household recycling bin for recyclable waste* was the most frequently reported Climate Scale action undertaken by survey respondents, with *'unspecified environmental benefit'* by far the most commonly reported driver of recycling. Yet, viewing recycling rates in light of previous normative influence findings (Goldstein et al., 2008, Nolan et al., 2008) raises the consideration that the high participation in domestic recycling is likely to be enhanced by the high visibility of its common practice, with yellow lid bins seen on the front verge of all neighbourhood homes each fortnight. Also unspoken in subjective *'for the environment'* motivations are the substantial, long-term public investments in recycling. Councils provide, directly or through contractual arrangements, the trucks, infrastructure and labour engaged to undertake the fortnightly collections. In Sydney, councils have been developing and refining recycling systems for the past 25 or so years (Ha, 2005, 2006) strongly 'nudged' by NSW Government. In one such nudge

for example, in addition to its other roles, the NSW Protection of the Environment Operations (Waste) Regulation 2005 enables the Waste and Environment Levy which taxes waste going to landfill, financially driving local government authorities to provide recycling collections additional to residual waste or 'garbage', collections and often also in addition to organic 'green' waste collections.

Coping with the car culture

Aligning with Whitmarsh's (2009) observation that forgoing car use is an action relatively few choose, Table 7.1 indicates that frequency of action-taking drops sharply between Action 14, with 147 respondents consciously running a fuel efficient car and Action 15, with only 64 not running a car at all. Of the 25 motivators reported for *not running a car*, eleven fitted the subgroup *'saves money'*, eight indicated a *'health or general preference'* not to own a car, three stated *'unspecified environmental benefits'*, two respondents had lost their drivers' licences and one aimed to *'reduce greenhouse gas emissions'*. Interestingly, several of the *'health or general preference'* cohort were migrants from the sub-continent, which could indicate more openness to not owning cars among those from places with less of a 'car culture' and this may be worthy of further investigation. Such a preference was in contrast with PT3's discussions of the cultural importance of cars for young Western Sydney males and S26's references to the convenience and time-saving that cars provide for people with multiple working and caring responsibilities.

In all, outer layer findings highlight the major problem of climate change mitigation: most people are prepared to undertake *only* low behavioural cost actions that impose little or no cost or inconvenience, yet society's deep reliance on fossil fuels requires major change for effective mitigation. Inevitably, this demands increased responsiveness from business, organisational and government levels.

Integrating outer, middle and deepest layers findings with theory

Self-Determination Theory explains motivations for taking actions

A small minority of motivations were clearly imposed, thus were inherently extrinsic, not autonomous and not relevant to the following discussion. These included *'pressure from authorities and or/business', 'peer pressure' and 'action is required in workplace'*. The Self-Determination Theory (SDT) of motivation (Ryan & Deci, 2000b) provides a framework for exploring the motivations behind the pro-environmental actions of both the biocentric and anthropocentric in-depth respondents. It could be that the more biocentric values held by YG12 and PT9, discussed in Chapter 4, drove them to develop intrinsically pro-environmental motivations, i.e. motivations aimed to assist the environment for its own sake, which when realised would provide inherent satisfaction to YG12 and PT9. However, this could not be argued for the vast majority of in-depth respondents, whose outlook was far more anthropocentric and whose main reason for acting to protect the environment was to provide amenity and/or needed resources to future generations of humans. Therefore, SDT would indicate that the motivations of the majority of in-depth respondents were not intrinsic. Yet they were autonomous. The deepest layer discussions of experiences that sparked the desire of in-depth respondents to take actions indicated that they had assimilated the values of parents, religious teachings and friends. The implication is that anthropocentric, pro-social values were assimilated to the point where the taking of pro-environmental actions for the good of future generations was congruent with the in-depth respondents' senses of themselves (Ryan & Deci, 2000b).

As outlined in Chapter 5, a drive to protect the environment for future generations was discussed by almost all in-depth respondents. This drive often co-existed with additional human-focused values underpinning motivations. In some cases there was an explicit demonstration of assimilated values. This is particularly clear where people spoke of their religious commitment, exemplified by S29 and PT3 in their (different) interpretations of God's requirements for how humans should relate to the environment. While in these cases the focus was theocentric, YG9, PT2 and YG14, indicated feeling a secular moral obligation to protect the environment for future generations. However, sometimes the anthropocentrism was more implicit, such as through nostalgic discussions of a better environment remembered from childhood,

along with the wish to pass on such a world and related activities, like growing food at home, to one's children, with S18 and YG9 providing such examples. Slightly differently focused were fond memories of childhood times in natural settings, usually with significant others, exemplified by S26, PT1, PT2 and PT10. Both of these assimilation mechanisms was exemplified by PT5 who referred to her religious sense of duty to *'make a difference'* and then internalised and assimilated the values of her pro-environmental friend, thus becoming motivated to act on these new values. Indeed, on the basis of this evidence, the in-depth discussions support the aspects of SDT relating to the assimilation of values to form autonomous motivation (Ryan & Deci, 2000b). The evidence also shows that this process of assimilation mainly began in childhood.

The study findings also support SDT assertions that autonomous motivations are assisted by *autonomy, relatedness* and *contextual conditions* (Ryan & Deci, 2000b). Respondents discussed the contextual conditions of the actions they took in ways that related their personal motivations to external conditions and to the specific actions. This is supported by 30 or the 33 motivation subgroups not indicating overt pressure. The wide variety of motivations included preferences for the feel, smell and perceived health outcomes of line dried clothes, wanting to save money, wanting to protect the environment for children and grandchildren and wanting to influence others. Furthermore, middle layer findings largely showed that respondents related their knowledge and concerns about the environment to the actions they took. Examples include PT1 who had bought a hybrid car to reduce emissions, PT2 who added solar panels and lowered the temperature on his gas hot water system to reduce emissions, YG12 who signed up for Greenpower due to her concerns over land degradation from coal mining and S1 who joined a local group to prevent electricity privatisation, for fear that it would lock NSW into contracts with coal-fired generator companies. Mitigation actions were shown to be more common where there were supportive external conditions, and in a range of cases government was instrumental in providing these conditions. Supply of a convenient recycling system and free provision of energy efficient light globes are low behavioural cost examples of this. Furthermore, in-depth datasets indicated that success was achieved by the Y Green home audit project which

created contextual conditions that supported people with salient information that enhanced their ability to act.

Normative explanations of helping explain intent

Like survey respondents, in-depth respondents discussed economic motivators such as saving money. However, due at least partly to how in-depth respondents were selected and the questions asked of them, their discussions mainly focused on motivations that were *intentionally* pro-environmental. Middle and deepest layer findings indicated that awareness of consequences (AC) produces little *intentional* action without an individual also having both aspects of ascription of responsibility to self (AR), being a strong sense of moral duty to act and feeling capable of controlling the action and its outcome (Schwartz, 1973, 1977). The acquisition of the moral obligation to act was developed largely in social and cultural settings as just discussed in relation to SDT. While the moral responsibility facet of AR was exhibited by virtually all in-depth respondents, the importance of feeling capable of taking action and controlling its outcomes was particularly evident in Y Green householder discussions which offered specific examples of how these respondents had been empowered by the knowledge they gained through the program. Similarly, PT2's discussion of learning to control the setting of his gas hot water system from the Blacktown Solar City project provided an example of increased capability resulting in increased actions being taken. On the other hand, PT3's confusion over choosing the best solar hot water system highlighted the inaction that may arise from a lack of knowledge or relevant capability.

Self-Determination Theory plus normative explanations of helping

Findings of this study further imply that where climate change mitigation actions are driven by intentionally pro-environmental motivators, there seems to be a causative relationship between the elements of normative explanations of helping (Schwartz, 1973, 1977) and those of SDT (Ryan & Deci, 2000b, a). The in-depth datasets revealed that the elements of these two theories seem to be typically intertwined in the way described below. Through social, cultural and perhaps religious learning, a child acquires a sense of moral obligation to assist other humans, with the related values personally assimilated in the way described by SDT to become personal norms – part of an individual's self-identify to the point that they feel morally obliged to take action

congruent with these values. Such a sense of moral obligation is the first aspect of AR or ascription of responsibility to self, an essential element of normative explanations of helping. Because the values underpinning the sense of personal moral obligation have been fully assimilated, the sense of obligation to act forms an autonomous motivation, in line with SDT. Then in later life, in line with normative explanations of helping, when the individual becomes aware of the negative consequences (AC) on the environment of certain actions they *relate* the negative consequences to the flow-on negative implications for fellow humans, including and often especially those of future generations. This activates their pre-existing sense of moral obligation to protect the environment for future human use and enjoyment. While not directly related to either theory, such activation is likely to be enhanced where the individual also has fond memories of social childhood activities in nature.

In line with the second aspect of AR, an intentionally pro-environmental action will occur only if the individual feels capable of taking the action and of controlling its outcome. At this point, whether the action is undertaken depends on self-efficacy, personal skill factors and the behavioural cost of taking the action given contextual conditions, such as financial cost of the action compared with personal financial means. Where the action has a high behavioural cost and/or is relatively unusual, social proof in the form of government or other support may assist (Schwartz, 1973, 1977, Ryan & Deci, 2000b, a, Cialdini, 2003, Cialdini, 2009). Figure 7.2 shows the relationship between normative explanations of helping and SDT as a set of chronological steps leading to action that is *intentionally* pro-environmental. Utilising examples distilled from the data, Figure 7.2 also shows the points at which supportive interventions are likely to assist action-taking.

Figure 7.2 Steps to intentional pro-environmental actions

The 'staircase' combines relevant aspects of the Self-Determination Theory of motivation (Ryan & Deci, 2000b, a) and normative explanations of helping (Schwartz, 1973, 1977) which were supported by the findings of this research. Shown in boxes beneath the 'staircase' are points suitable for intervention and potential interventions distilled from the data.

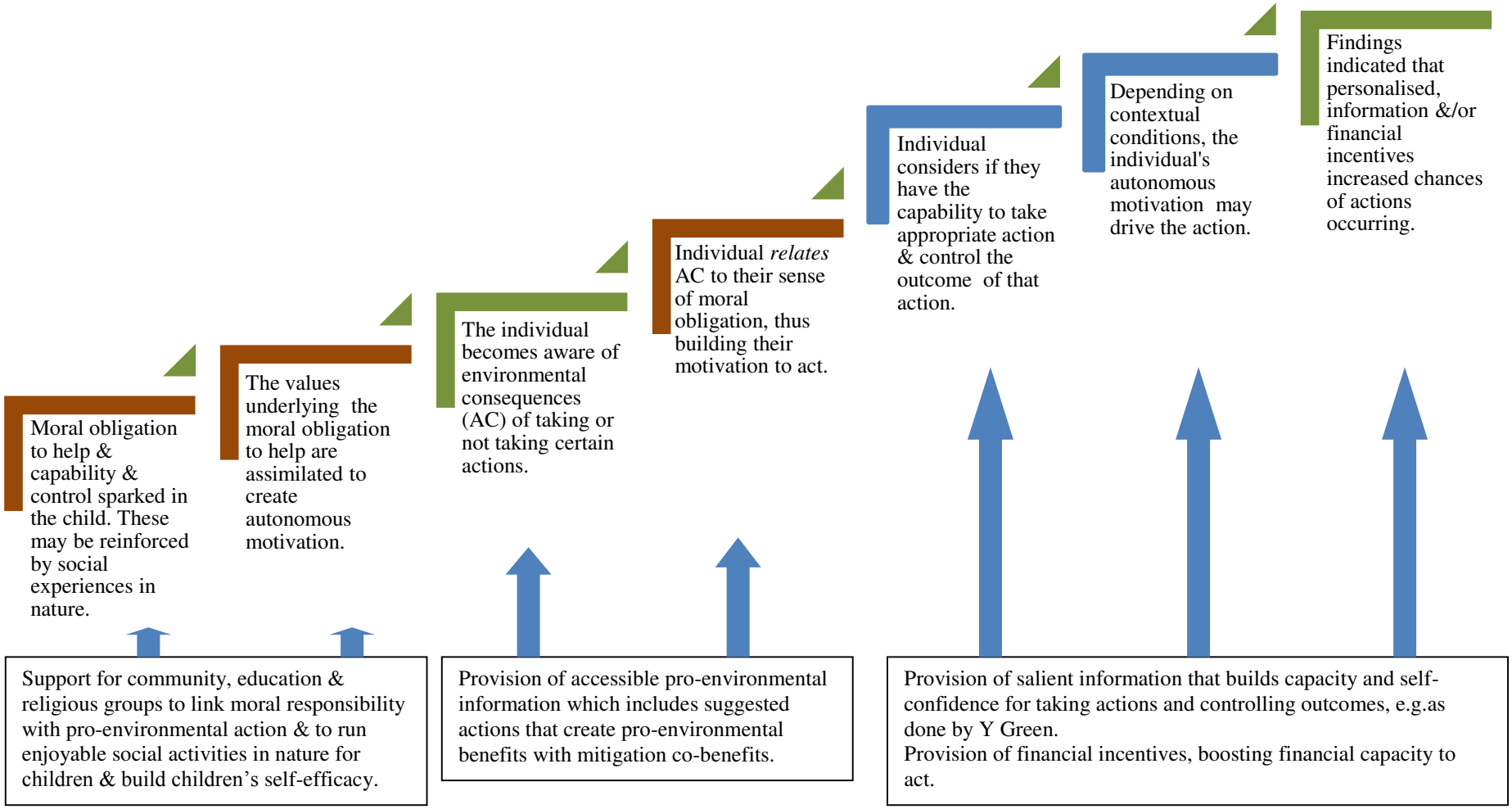


Figure 7.2 has been designed to focus on pro-environmental intent rather than mitigation intent because the term 'environment' was found to be more motivating of intentional action that mitigates climate change, than was 'climate change'.

Value-action gaps caused by external conditions and other values

Not surprisingly, there was no evidence of action-taking to *intentionally* produce greenhouse gas emissions. The value-action gap is not, as the term may imply, a void i.e. it is not a literal gap between one's care for the environment and one's apparently conflicting action. Rather, in line with previous research, (Guagnano et al., 1995, Stern, 2000, Ajzen, 2002, Kaiser & Gutscher, 2003, Whitmarsh, 2009) perceived gaps were often an outcome of too-high behavioural cost. More specifically, in-depth data revealed two main causes of any perceived environmental value-action gaps and in some cases, examples fit into both of these categories of cause. The first category of cause for value-action gaps was that of external conditions too difficult to overcome, exemplified by situations such as no local public transport options for S24, PT8's need for a large car to accommodate her family and PT10 not being able to add a solar hot water system to her home because it was rented. The second category of cause was comprised of unintended outcomes of actions sparked by non-environment related values, concerns and desires, exemplified by S15 flying overseas to see her family, PT5 flying in order to experience other cultures and PT3's discussion of the cultural importance of cars to young men in Western Sydney. In some cases, especially those related to family obligations, the steps shown in Figure 7.2 may have taken place driven by an individual's sense of current moral obligation to their family, rather than by caring for the environment for the future of their family and/or others. An intriguing implication is that the elements of both SDT (Ryan & Deci, 2000b, a) and normative explanations of helping (Schwartz, 1973, 1977) that assist in explaining intentional pro-environmental actions may also explain other pro-social behaviours that happen to conflict with environmental interests. AR and AC are based on pro-social values and where a pro-social value unrelated to the environment is held more dearly than a pro-environmental one, it may spark a chain of action that happens to conflict with environmental interests. Just as economic and social values and concerns unrelated to climate change unintentionally encourage and even drive some mitigation actions; in different circumstances they can unintentionally undermine mitigation. In-depth

respondents may have had a higher than average sense of moral obligation to take pro-environmental action, yet the evidence shows that they were just as devoted to co-existing personal values, norms, obligations and desires, some of which increased rather than reduced greenhouse gas emissions.

Thus 'value-action' gaps can result from prioritising of personal values unrelated to the environment over those that are pro-environmental. Such values are *relativist or subjectivist* in that they are not right or wrong, but at times contrast and conflict with the *axiomatic* expert-driven values (Kalof & Satterfield, 2005) which seek to mitigate against the dangers of climate change. In addition to the ethical questions raised by any attempts to externally *change* individuals' values or even the hierarchical order of them, it would be difficult and likely fruitless to do so (de Groot & Steg, 2010). Furthermore in a pluralist democracy like Australia, potential for government imposition of values is limited. It is also unnecessary. Only 5-7% of Australians reject outright that climate change is occurring, with the majority accepting that it is a threat although also expressing nuanced views on the degree of attribution to human activities (Leviston & Walker, 2012, Reser et al., 2012d), findings reflected in the uncertainty voiced by PT9, YG10, YG6 and S13. In such situations of uncertainty – especially where the degree of danger or risk is not clearly visible, social proof of how to act is powerful. This principle of influence is one that governments are well-placed to utilise, along with authority, consistency in policy, regulatory frameworks and reciprocation (Cialdini, 2009), perhaps through requiring or encouraging those accepting subsidies to take further carbon-reducing actions

Anthropogenic climate change has arisen and remains because many of the values that drive humans are commonly achieved through activities that happen to emit greenhouse gases. AR – both a sense of moral obligation to act and the capacity to do so and to control the outcomes - and AC are needed to move us beyond our current technologies, systems and habits so that the values and needs that drive humans can be achieved through means that limit atmospheric greenhouse gases to safe levels.

Policy and program implications distilled from the findings

Methodological implications and limits to the extent to which findings can be generalised

The mixed methodology demonstrated success in providing insight into both top-of-mind and deeper motivations for actions that assist in climate change mitigation, implying the advantages of mixed methodologies for research underpinning evidence-based policy and practice. Furthermore, the empirically tested Climate Action Scale was shown to be successful in engaging members of the public and students, and was demonstrated as a reliable gauge of personal commitment to taking mitigation actions, implying its potential for further use.

Nevertheless, the study has a localised focus and the ability of the findings to be generalised to other locations and demographics may be limited. Furthermore, there remains the issue of unacknowledged and perhaps unknown and unknowable behavioural influences on the individual (Nisbett & Wilson, 1977, Nolan et al., 2008). It cannot be known from this research alone whether this was the cause, in full or in part, of the discrepancy between normative influence reported in the outer layer compared with that reported in the deepest layer. This raises the caveat for the outer layer findings that while they accurately reflect reported motivations they may under-indicate normative influences. In this regard, the study raises rather than answers the following questions. Did normative influence motivations occur less frequently in the outer layer than in the deepest layer because prompts were not used to elicit motivations in the survey but were used for the in-depth interviews and in the student assignment task? Or was the discrepancy due to the time lag factor – given that the deepest layer focussed strongly on prompts for past influences, such as from childhood? That is, could it be that people are more likely to credit others' influence upon them when they are allowed longer hindsight? Or could both prompting and longer-term hindsight have played a part? On the other hand, could it be that because this research was focused on motivation rather than on changes in behaviour or attitude, these issues have little relevance? This important area is worthy of further research.

Implications arising from the Y Green evaluation

As a pilot, Y Green offered the advantage of being relatively small and localised so that had problems arisen, sunken costs and social and political fallout would have been local and more manageable. Additional to Y Green's estimated yearly average 15% emission reductions for each of the 259 participating households (Barry et al., 2009) the evaluation itself provided insight for improving and adapting the program for future delivery in other areas, thus Y Green now provides a model.

Implications of motivational layering

That outer layer findings were derived from a quick top-of-mind survey and were most strongly influenced by economic motivators implies that this layer interacts most readily with external conditions. In turn this indicates that its findings are most useful for informing quick engagement or the initial contact strategies for attracting participation in programs, projects or courses that require higher levels of commitment. Middle level findings emerged from more considered thinking in response to questions probing for the drivers of pro-environmental action, implying that they are more useful for informing programs to engage those with pre-existing pro-environmental concern and/or projects or courses that require higher levels of commitment. Deepest layer findings, which sought to learn the antecedents of pro-environmental attitudes, found that they most typically began in childhood and were overwhelmingly underpinned by pro-social values often assimilated from parents, sometimes from religious teachings and sometimes from friends. This implies that deepest layer findings are most useful for informing engagement strategies with those who influence children, being parents, families, religious and educational organisations.

Implications for engaging with motivations

Thirty three different motivational categories were identified and individuals were found to often have multiple motivations for any actions that assist climate change mitigation, supporting Whitmarsh's (2011a) call for initiatives that aim to engage with multiple motivations. This research has provided evidence regarding which motivations are most influential. These were saving money and pro-environmental drivers in the outer layer, pro-environmental and pro-social drivers in the middle layer

and pro-social drivers in the deepest layer. Motivations were able to be classified as environmental, social or economic, implying that utilisation of the three pillars of sustainability as a framework may assist in the development of initiatives. Supporting *'Who Cares about the Environment in 2012?'* findings (NSW O.E.H., 2013) survey respondents with higher levels of education, were more likely than others to undertake pro-environmental actions and this may imply potential for this demographic to be targeted in order to encourage and support their participation as *'early adopters'* in any planned diffusion of climate change mitigation innovations (Rogers, 2003).

Implications specific to the outer layer

Representing 42% of outer layer motivators, economic motivations were the most influential of the three categories, implying that economic drivers provide strong potential for quick and initial engagement activities and as incentives for actions that require higher levels of commitment. Saving money represented 30% of all outer layer motivations, implying that wherever possible this driver should be the main target of any quick or initial engagement initiatives. Convenience and infrastructure support were also shown to be drivers that could be engaged, particularly in regard to routine or habitual actions. While 39% of outer layer motivations were environmental, only 5% were specific to climate change, and survey respondents consistently rated the environment as an issue of higher importance than climate change, implying that climate change mitigation messaging might best be provided in terms focused on the environment rather than specifically on climate change. Saving energy and fuel represented 11% of outer layer motivators indicating that these drivers should also be considered when developing quick or initial engagement initiatives and related messaging. Representing 19%, the social category was less influential in the outer layer of motivations which implies that in general, while it is wise to include social motivations, they should not be the major focus of quick or initial contact initiatives. One exception may be health and sensory preferences which were found to represent 8% of outer layer findings, which may imply potential for engagement through programs with personal health co-benefits and/or messaging focussed on personal health co-benefits. There may also be opportunities for engaging with health providers and those perceived to provide health benefits, such as gyms, fitness centres, sports groups and swimming pools and their members and patrons. There may also be ways

of further engaging with the commonly stated preference for fresh air, sunshine and the use of these natural environmental services. In the outer layer the sense of personal moral obligation to act was a lesser influence, focused mostly on habitual low behavioural cost actions, implying that it may be more an indicator of consistency with underlying middle layer pro-environmental and pro-social attitudes than a major outer layer driver.

Implications specific to the middle and deepest layers

In contrast to the outer layer, the middle layer of motivation was dominated by feelings of personal moral obligation to act pro-environmentally for the sake of future humans. In itself this implies that engagement of moral obligation is more likely to be successful where a commitment has already been made, than in a quick engagement setting such as at a shopping centre stall. This may further imply that a sense of moral obligation is an appropriate starting point for engagement with religious, educational, and ethical organisations and their members. However, an individual can only feel morally obliged to act pro-environmentally when they understand the reasons to act and the aggregated consequences of not acting. This implies that if practitioners aim to engage the motivation of moral obligation, they may need to check that the target group has the relevant environmental knowledge and where this is absent, they may need to provide it in ways that suit both the relevant organisation and audience. Self-efficacy or feelings of capability and being able to control outcomes were also seen to play a major role in motivating actions, implying roles both for building nature-based skills in childhood and providing salient climate change mitigation advice and guidance to adults. The Y Green program was convenient for household participants and its staff tailored energy-saving information for each householder's individual circumstances. That Y Green demonstrated considerable success in producing mitigation that otherwise would not have occurred implies that it provides a suitable model for similar programs. PT10 indicated that lack of responsibility for paying energy bills decreased incentive to reduce energy use and consider onsite energy generation, implying that devolving responsibility for energy bills may increase such incentives in cases where the relevant individuals or managers have discretion over the savings. In line the views of (Leviston et al., 2011) YG6 provided evidence of the complexities involved in communicating carbon pricing schemes to the public as inherently difficult, implying

the necessity for clear messaging perhaps through targeting those with higher education and/or interest to assist in diffusing such concepts throughout communities. As outlined by Rogers (2003), communications through such diffusion processes are two way, thus they can provide feedback on aspects that are not understood and/or not agreed upon. Such an approach may be helpful when addressing the very differing views and concerns that are raised by carbon pricing, as exemplified by YG13 who thought business should be made to take responsibility in contrast to S13 who raised concerns about the international competitiveness of Australian industries.

In line with Australian Conservation Foundation (2007) findings, YG9, S26 and others indicated that greater financial means had driven higher levels of personal and household consumption, implying that it may be wise to develop engagement and messaging initiatives that are differentiated according to socio-economic norms of an area or community, and/or in line with the prevailing economic climate. Even among in-depth respondents, who nearly all discussed their moral obligation to act pro-environmentally and demonstrated an awareness of the reasons to take action, large investments such as solar hot water systems or PV panels occurred with the support of rebates and other incentives. Among in-depth respondents, only three had PV panels. While S18 did not provide details, the timing of purchase seemed to fit that of the NSW Solar Bonus Scheme. PT4 added his system specifically to gain the then-available 60c per kWh feed-in tariff from that scheme and PT2's PV installation was assisted by the Blacktown Solar City program. There is little doubt that financial benefit provides a strong incentive. Together with outer layer findings of high levels of participation in switching to energy efficient light globes in response to free give away programs, these findings indicate that especially at the start of the diffusion process for an innovative mitigation technology or action (Rogers, 1962) financial incentives are effective. It is postulated that such financial incentives give additional credence to the decisions of *'early adopters'* and the *'early majority'* for taking up the innovations, bolstering the social proof and normative influence they provide to others that the action is appropriate and warranted (Cialdini, 2003, Nolan et al., 2008).

Overcoming the tendency to delay

Findings indicated two limitations of people's awareness of consequences (AC) regarding climate change likely to reduce engagement with their underlying sense of moral obligation to act. Firstly as revealed by the Lowy Institute (Hanson, 2012) and supported by this research, few people see the climate change threat as current or immediate and therefore see no urgency to act. Exceptions found by Reser (2012b) and supported by this research, tend to be those who perceive they have personally experienced climate change impacts. This study found that the sense of moral obligation to take pro-environmental action was largely anthropocentric, implying that one strategy to overcome the tendency to delay action may be to further disseminate clear information on the *current* climate change impacts on people. For example, there may be opportunities for better publicising the climate change impacts on Australia's smaller island neighbours and on the ongoing work to support these neighbours (Farbotko & McGregor, 2010, Adger et al., 2011, Oxfam, n.d.-a, b). However, discussions by the large majority of in-depth respondents focused on moral obligation to future generations, *'of people like us'* being implicit. Therefore, the current effects on Australians of increased intensity flooding, drought, heatwaves and bushfires may need to be highlighted (Steffen, 2013, Steffen et al., 2013).

A second strategy to help overcome the tendency to delay due to the perception of lack of urgency, is to continue with the explicit raising of AC through ongoing factually correct, verifiable and accessible updates of physical climate change impacts (B.O.M. & C.S.I.R.O., 2012, B.O.M., 2013b, c, Steffen, 2013, Steffen & Hughes, 2013, Steffen et al., 2013). A third strategy is to provide convenient, easy interventions that build individual capability for taking mitigation actions. This study found that the majority of Y Green householders freely admitted that they would '*not have gone out of their way'* to arrange a home sustainability audit. This was despite them being very welcoming of the offer that came with a knock at the door and several stating that they had been thinking about taking action on household sustainability for some time. In situations perceived as non-urgent and uncertain such as climate change, even when AC has sparked people to feel morally obliged to act, they may delay action indefinitely. It is likely that Y Green staff provided both a 'social proof' confirmation that action was needed (Cialdini, 2009) in addition to clear instructions on the

appropriate action to take for the given situation (Heath & Heath, 2010). Indeed programs like Y Green provide local, tangible evidence of action, leadership and support to assist in reducing the risks of climate change. YG6 in particular praised the involvement of Hills Shire Council in the program, seeing the involvement as evidence that Council took climate change seriously.

A fourth strategy would be continued engagement with motivations and values unrelated to climate change, such as financial advantage through energy and fuel savings, and engaging people in actions that provide mitigation as a co-benefit while addressing coexisting concerns for other environmental problems. Examples include the Federal Government's Carbon Farming Initiative reforestation policy, some aspects of the Liberal National Coalition's Direct Action Plan and the Regenesis project (Blacktown City Council & Liverpool Plains Shire Council, 2010, Commonwealth of Australia, 2011, Liberal Party, n.d.). However, the mitigation limitations of such projects need to be recognised and factored into overall policy to ensure that such policies and programs are not used as excuses to delay the decarbonisation of the economy (Mackey et al., 2013, Steffen & Hughes, 2013). The major pathway explored for reducing the fossil fuel reliance and intensity of Australia's economy has been carbon pricing, specifically emissions trading (Garnaut, 2008, 2011), which is reliant on political will. Yet, with only a handful of exceptions few study respondents spontaneously discussed the politics relating to climate change. While it is acknowledged that opinions on policy were not explicitly sought, this lack of discussion may bode badly for retention of Australian carbon pricing after the September 2013 election. In a fifth strategy, given that saving money was the top outer layer motivation, it may be effective to explicitly link extreme weather events to their related financial costs, especially those paid directly by individuals, such as home insurance premiums and perhaps there is potential for insurance companies to be engaged more in initiatives and messaging related to anthropogenic climate change.

Double sided coin that is diffusion of responsibility

Reference is now made to diffusion of responsibility. When related to the problem of climate change, the diffusion of responsibility causes the 'bystander effect', i.e. the tendency to delay action until others act (Marshall, 2003, Gifford, 2011). Ironically,

the findings from this study indicate a very different effect where costs of a program are shared or diffused among taxpayers. High convenience and shared costs, diffused such that they impose no obvious additional cost on individuals underpin domestic recycling and underpinned the energy efficiency light globe give aways.

Intertwining of adaptation and intention, behaviour and attitude

This study implies that intentional motivation as a response to climate change (Reser & Swim, 2011) and changes in personal behaviour that spark stronger pro-mitigation attitudes (Cialdini, 2009, Nail & Boniecki, 2011) can be chicken-and-egg cycles and it matters little where one enters the cycle. YG7's determined behaviour changes in direct response to climate change and YG10's provision of a solar hot water system to tenants despite no personal financial benefit were intentional responses to climate change. On the other hand, PT5's initially friend-influenced pro-environmental behaviour created a stronger pro-environmental attitude which spilled over to additional pro-environmental actions. Likewise, YG7's interest in adding PV panels heightened once he installed a solar hot water system. Indeed attitude and behaviour can evolve into an emissions-reducing cycle of continuous improvement. Y Green respondents showed a slight tendency to focus more strongly on actions than did other in-depth respondents, most likely due to the context of the program evaluation. However many had participated in the Y Green pilot in response to their pre-existing concern regarding climate change.

Areas that might benefit from further research

The study findings imply the following areas in which further research might provide benefits. It would be helpful for policy-makers and practitioners to know:

- if there is a tendency for a sense of reciprocal obligation to result from pro-environmental programs that provide direct benefits to individuals
- whether or not cultural and/or other demographic differences influence the degree of acceptance of 'nudges' (Thaler & Sunstein, 2008).
- whether there exist cultural and demographic factors that underpin the favouring of both public transport use and private car ownership and use

- more about the circumstances in which normative influence is and is not explicitly recognised by an individual and in which it is reported
- more about household decision-making processes in relation to environmental management and sustainability issues.

Final reflections

The speed of the climate change challenge

Fifty five years ago at the Mauna Loa Observatory in Hawaii, C. David Keeling began undertaking daily measurements of the levels of carbon dioxide (CO2) in the atmosphere - providing the world's longest running record of levels of atmospheric CO_2. These measurements describe the number of molecules of CO_2 divided by the number of molecules of dry air multiplied by one million, i.e. parts per million or ppm. For the first full year of data, 1959, the mean average reading was slightly less than 316 ppm. Since then, increases have been rapid. In the six years taken to write this thesis (part-time), atmospheric CO_2 increased from an average of 383 ppm to around 397 ppm, with some days in May 2013 showing readings of 400 ppm (N.O.A.A., 2013, Scripps Institution of Oceanography, 2013, N.O.A.A., n.d.).

For a 75% chance of limiting global temperature rise to 2°C, the world's greenhouse gas emissions budget now has just over 600 billion tonnes of CO_2 to last us for the next 35-40 years, by which time the world economy needs to be completely decarbonised. Current emissions are growing at 2.5% per annum, and if this continues, the world will have completely used up the budget by 2028 (Steffen & Hughes, 2013). This thesis has provided knowledge to support policymakers and practitioners in their work of assisting Australia play its role in keeping within this budget. Knowledge of the social, environmental and economic categories of motivation combined with that of the three layers of motivation offer a framework to assist in the ongoing development of initiatives, and provide clues about options and timing of support interventions for maximum effect. Findings provide guidance for engagement with people to take actions that assist in mitigation, no matter their level of 'belief' in climate change. Links between theories and research findings highlight ways in which policy and initiatives can complement and leverage individuals' autonomous motivations and sense of moral obligation to assist, as well as support people to

increase their awareness of environmental and social consequences of their actions and build their capacity for taking mitigation actions.

To some degree, we are all victims, perpetrators, mitigators and deniers

Throughout this study, respondents were generous with their views, insights and personal stories. Interestingly, only YG10 challenged the author's behaviour:

> *You've committed yourself to an issue on the assumption that there is a real threat and on the assumption that you can make a difference, and you've put a lot of time, energy and thought into it and yet you drive a car. And I bet you've got needs and wants that someone could stand there and be critical about and say those needs and wants are not important if there's really such a threat. How do you explain your behaviour? – YG 10, female, 36 years, first language English*

I answered that I lived in this society; that I didn't want to be outside it, that I had many calls on my time and needed to be practical about the limitations of public transport so I'd bought a fuel efficient car. I agreed that some of my behaviour could validly be criticised although I consciously tried to limit my use of fossil fuels.

YG10 responded:

> *I think you've hit on it – it's because we live in this society. .... So you can't be totally isolated can you? So you live in a society so you have to move with it. ... It's like a bubble, everything has to move with it and there's a lot of variation within the bubble, where you're positioned. ... So the push is to get enough people to move that bubble along in a certain direction, influence where it takes us – YG 10, female, 36 years, first language English*

Initiatives that engage people's real motivations enhance the chances of us all moving the bubble in the same direction.

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APPENDICES

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APPENDIX A Brainstormed climate change mitigation actions

1. Use home recycling bin for all recyclables that the Council system allows
2. Compost at home
3. Feed food scraps into a home worm farm
4. Replace all home light globes with compact fluorescent globes
5. Keep waste chemicals and deliver them to the Chemical Cleanout event arranged by a Council near them
6. Purchase goods with minimum or no packaging
7. Walk or ride a bike to the local shops
8. Install a solar hot water system
9. Send children to school via walking or riding a bike
10. Send children to school via a bus or train
11. Choose not to have children for environmental reasons
12. Buy green power
13. Install a photo voltaic system for all your home's electricity & feed excess electricity into the grid
14. Co-own and share a car with others, using it only when here is no public transport, walking or bike riding alternative
15. Participate in earth hour
16. Walk, ride a bike or catch public transport
17. Carpool
18. Make your household carbon neutral, i.e. carefully calculate the carbon emissions generated by the household, reduce the amount as much as possible and offset the rest through an accredited offsetting scheme
19. Look up the Australian Conservation Foundation website consumption calculator, assume your household carbon emissions are average for those in your postcode area, and offset this amount through an accredited offsetting scheme
20. Never use a car
21. Only use a hybrid car
22. Run a small, fuel efficient car
23. Grow most of your own fruit, vegetables and herbs at home
24. Keep chooks to provide for all the eggs you use
25. Email or write to media outlets regarding your concerns about climate change
26. Be an active member of an environmental group and lobby politicians and industry for action on climate change
27. Keep up to date with the science, government policy & legislation regarding climate change
28. Offset your car's carbon emissions
29. Offset carbon emissions for any air flights
30. Hang clothes on the line rather than use a dryer
31. Only purchase food grown locally
32. Only purchase goods manufactured locally
33. Give second hand clothes and goods to charity, rather than sending them to landfill
34. Give unwanted electronic items to charities or people who will use them
35. Make use of specific recycling systems for electronic waste, rather than sending it to landfill
36. Take reusable shopping bags when shopping
37. Recycle any plastic shopping bags via the supermarket bins

38. Be vegetarian
39. Be vegan
40. Reduce consumption of red meat
41. When purchasing appliances, only purchase the ones with the highest star rating
42. Don't have an air conditioner
43. Only use an air conditioner when the temperature is over 40 degrees C
44. Wear second hand clothes rather than purchase new ones
45. Hand wash rather than use a machine
46. Turn off lights and appliances when not using them
47. Reduce car trips to only those that are necessary
48. Replace lawns and hard surfaces such as concrete to plant trees, shrubs and grasses to reduce the heat island effect
49. Install a water tank
50. Place a 'no junk mail' sticker on the letter box
51. Arrange a 'walking school bus' for your child's school
52. Participate in Walk to Work day
53. Plant trees to sequester carbon
54. Plant trees, shrubs and grasses native to your area to sequester carbon and enhance biodiversity, improve habitat and reduce the 'heat island' effect
55. Ride your bike or walk to work
56. Mulch your garden
57. Avoid buying bottled water
58. Travel locally for holidays
59. Take holidays by public transport (but not aeroplane) or by bicycle
60. Prepare food at home rather than eat out
61. Refuse plastic bags at shops
62. Refuse polystyrene foam food containers at takeaway food shops
63. Learn to make your own natural cleaning products and use them
64. Join a bushcare group to participate in caring for shared environments
65. Decorate a tree in the garden or purchase a tree rather than buy a plastic Christmas tree
66. As gifts, buy vouchers for services, eg movie tickets rather than a product they may not need
67. Make online donations to Oxfam or similar organisations as gifts
68. Take your own mug to the coffee shop and takeaway containers when purchasing food.
69. Avoid using concrete and other 'high embodied energy' building materials
70. Use recycled, recyclable, renewable, natural building materials when building or renovating
71. Build according to solar passive design principles eg with living areas and large windows facing north
72. Install double glazing on windows
73. Avoid flights wherever possible
74. Work from home
75. Telecommute to conferences
76. Share your house with extended family
77. Prepare your home for bushfire and participate in local efforts to reduce bushfire risk
78. Purchase renewable fuels for your vehicle eg ethanol, biodiesel

79. Make your own renewable fuels for your vehicle
80. Install insulation in your walls and ceilings to reduce heating and cooling needs
81. Use light coloured materials for your roof
82. When requiring paper, toilet paper, household paper, buy recycled varieties
83. When needing furniture buy recycled timber furniture
84. Choose timber furniture over plastic to store carbon longer term
85. Use rechargeable batteries vs disposable
86. Educate your friends, family, colleagues and neighbours about climate change
87. Learn more about climate change through researching and attending education programs
88. Start and conduct a worm farm at work or at your child's school or child care centre
89. Start a recycling program for paper and recyclable containers at your workplace
90. Encourage a policy of purchasing recycled goods, such as paper in your workplace
91. Start a green team at work to reduce carbon emissions generated by your workplace activities
92. Work with your employer to audit your organisation's greenhouse gas emissions, develop a plan to reduce these as much as possible
93. Reduce your consumption, so that you only buy what you need
94. Purchase food through a local co-op to reduce packaging
95. Refuse to buy plastic toys for children
96. Re-use as much as possible
97. Avoid buying brand new items
98. Keep using electronic goods even when they are superseded.

APPENDIX B Brainstormed list revised

1. Use home recycling bin for most recyclables that the council system allows
2. Compost at home
3. Feed food scraps into a home worm farm
4. Replace all home light globes with compact fluorescent globes to reduce energy use and the risks of climate change
5. Keep waste chemicals and deliver them to the Chemical Cleanout event arranged by the local council or a nearby council
6. Consciously purchase goods with minimum or no packaging
7. Install a solar hot water system to reduce energy use and the risks of climate change
8. Choose not to have children for environmental reasons
9. Buy green power to reduce greenhouse gas emissions from coal-fired electricity production
10. Install solar panels on your roof to produce all your home's electricity
11. To reduce the burning of petrol and the risks of climate change, co-own and share a car with others, using it only when here is no public transport, walking or bike riding alternative
12. Participate in earth hour
13. Walk, ride a bike or catch public transport most of the times you leave the house, to reduce the burning of petrol and the risks of climate change
14. Carpool to reduce the burning of petrol and the risks of climate change
15. Make your household carbon neutral, i.e. carefully calculate the carbon emissions generated by the household, reduce the amount as much as possible and offset the rest through an accredited offsetting scheme
16. Look up the Australian Conservation Foundation website consumption calculator, assume your household carbon emissions are average for those in your postcode area, and offset this amount through an accredited offsetting scheme
17. To reduce the burning of petrol and the risks of climate change, never use a car
18. To reduce the burning of petrol and the risks of climate change, only use a hybrid car
19. To reduce the burning of petrol and the risks of climate change, run a small, fuel efficient car
20. Grow most of your own fruit, vegetables and herbs at home to reduce greenhouse gas emissions from refrigeration and transport
21. Keep chooks to provide for most of the eggs you use to reduce greenhouse gas emissions from refrigeration and transport
22. Be an active member of an environmental group and lobby politicians and industry for action on climate change
23. Keep up to date with the science, government policy & legislation regarding climate change
24. Offset your car's carbon emissions
25. Offset carbon emissions for any air flights
26. Hang clothes on the line rather than use a dryer
27. Wherever possible, consciously purchase food grown locally to reduce greenhouse gas emissions from refrigeration and transport
28. Wherever possible, consciously purchase goods manufactured locally to reduce greenhouse gas emissions from refrigeration and transport

29. Give second hand clothes and goods to charity, to reduce greenhouse gas emissions from landfill
30. Give unwanted electronic items to charities or people who will use them to reduce greenhouse gas emissions from landfill
31. Make use of specific recycling systems for electronic waste, rather than sending it to landfill
32. Take reusable shopping bags when shopping
33. Recycle any plastic shopping bags via the supermarket bins
34. Be vegetarian to reduce greenhouse gas emissions from land clearing, cattle and sheep, transport and refrigeration
35. Be vegan to reduce greenhouse gas emissions from land clearing, cattle and sheep, transport and refrigeration
36. Consciously reduce consumption of red meat to reduce greenhouse gas emissions and the risks of climate change
37. Consciously reduce consumption of all animal products to reduce greenhouse gas emissions and the risks of climate change
38. When purchasing appliances, only purchase the ones with the highest star rating
39. To reduce energy use and the risks of climate change, don't have an air conditioner
40. To reduce energy use and the risks of climate change, only use an air conditioner when the temperature is very hot
41. To reduce energy use and the risks of climate change, don't have a heater/fire in the home
42. To reduce energy use and the risks of climate change, only use a heater/fire when the temperature is very cold
43. Wear second hand clothes rather than purchase new ones
44. Hand wash rather than use a machine
45. Turn off lights and appliances when not using them
46. Almost always when shopping, consciously select options with the best environmental credentials
47. Reduce car trips to only those that are necessary
48. Replace lawns and hard surfaces such as concrete to plant trees, shrubs and grasses to reduce the heat island effect
49. Place a ‘no junk mail’ sticker on the letter box
50. Plant trees to sequester carbon
51. Plant trees, shrubs and grasses native to your area to sequester carbon and enhance biodiversity, improve habitat and reduce the ‘heat island’ effect
52. Mulch your garden to recycle green waste
53. Avoid buying bottled water because of the extra greenhouse gas emissions from manufacturing the bottle and transporting them
54. Travel locally for holidays to reduce greenhouse gas emissions from transport
55. Take holidays by public transport (but not aeroplane) or by bicycle
56. Wherever possible, prepare food at home to reduce greenhouse gas emissions and waste from food packaging
57. Refuse plastic bags at shops to reduce the greenhouse gas emissions from their manufacture and from their disposal
58. Refuse polystyrene foam food containers at takeaway food shops
59. Learn to make your own natural cleaning products and use them

60. Join a bushcare group to participate in tree-planting and caring for shared environments
61. As gifts, buy vouchers for services, eg movie tickets rather than manufactured products
62. Make online donations to Oxfam or similar organisations to give as gifts
63. Take your own mug and takeaway containers to takeaway food shops when purchasing food
64. Avoid using concrete and other 'high embodied energy' building materials
65. Use recycled, recyclable, renewable, natural building materials when building or renovating
66. Build according to solar passive design principles eg with living areas and large windows facing north
67. Install double glazing on windows to reduce energy use and the risks of climate change
68. Avoid flights wherever possible to reduce greenhouse gas emissions
69. Make your own renewable fuels for your vehicle
70. Install insulation in your walls and ceilings to reduce heating and cooling needs
71. Use light coloured materials for your roof
72. When requiring paper, toilet paper, household paper, buy recycled varieties
73. When needing furniture buy recycled timber furniture
74. Choose timber furniture over plastic to store carbon longer term
75. Use rechargeable batteries vs disposable
76. Educate your friends, family, colleagues and neighbours about climate change
77. Learn more about climate change through researching and attending education programs
78. Reduce your consumption, so that you only buy what you need
79. Purchase food through a local co-op to reduce packaging
80. Refuse to buy plastic toys for children
81. Re-use as much as possible to reduce consumption, waste to landfill and their associated greenhouse gas emissions
82. Avoid buying brand new items wherever possible to reduce consumption and its associated greenhouse gas emissions
83. Keep using electronic goods to reduce consumption and its associated greenhouse gas emissions.

APPENDIX C Ranking revised

	Action	Score	Yes/ No
1	Do you have a ‘no junk mail’ sticker on the letter box?	1.0	
2	Do you nearly always hang clothes on the line rather than use a dryer?	1.2	
3	Do you always participate in 'earth hour'?	1.2	
4	In winter, do you use heavy curtains and fabric door ‘snakes’ to keep in heat, to reduce energy needs for heating?	1.2	
5	Do you nearly always use the home recycling bin for the recyclables that the council system allows?	1.3	
6	Have you replaced all home light globes with compact fluorescent globes to reduce energy use and the risks of climate change?	1.3	
7	To reduce the burning of petrol & risks of climate change, do you run a small, fuel efficient car?	1.3	
8	Do you always turn off lights and appliances when not using them?	1.5	
9	When requiring paper, toilet paper or household paper, do you nearly always buy recycled varieties?	1.5	
10	Do you always take short showers to reduce energy for water heating?	1.5	
11	Do you recycle left over plastic shopping bags via the supermarket bins?	1.6	
12	Do you buy green power to reduce greenhouse gas emissions from coal-fired electricity production?	1.6	
13	Do you usually travel locally for holidays to reduce greenhouse gas emissions from transport?	1.7	
14	Have you set out to learn more about climate change through researching and attending education programs?	1.7	
15	Do you nearly always use reusable shopping bags when shopping?	1.8	
16	Do you nearly always use rechargeable batteries rather than disposable ones, to reduce greenhouse gas emissions	1.8	
17	Do you discuss climate change with friends, family & colleagues & encourage practical things we can do to help reduce it?	1.8	
18	Do you only use a heater/fire when the temperature is very cold, to reduce energy use & risks of climate change?	1.8	
19	Do you always give second hand clothes & goods to others rather than send then to landfill?	2.0	
20	Do you only use an air conditioner or electric fan when the temperature is very hot, to reduce energy use & risks of climate change?	2.0	
22	Do you nearly always refuse plastic bags at shops to reduce the greenhouse gas emissions from their manufacture and disposal?	2.0	
23	Unless very impractical, do you prepare food at home to reduce greenhouse gas emissions from packaging?	2.0	
24	Have you installed insulation in your walls and ceilings to reduce heating and cooling needs?	2.0	
25	Have you added shading, such as awnings, to the outside of your home to reduce energy for inside cooling?	2.0	
26	Have you installed a solar hot water system to reduce energy risks of climate change?	2.0	

27	When purchasing appliances, do you always purchase ones with the highest star rating?	2.2	
28	Do you always refuse polystyrene foam food containers at takeaway food shops?	2.2	
29	When shopping, do you nearly always conscioulsy choose the product with the best environmental credentials?	2.2	
30	Do you always give unwanted electronic items to others or to recycling schemes, to reduce greenhouse gas emissions from landfill?	2.3	
31	Have you reduced your consumption, so that you only buy what you need?	2.3	
32	Are you vegetarian to reduce greenhouse gas emissions from land clearing, animals, transport & refrigeration?	2.3	
33	Have you planted trees and shrubs to sequester (capture and store) carbon and reduce the 'heat island' effect?	2.4	
34	Do you refuse to buy plastic toys for children to reduce carbon emsissions from manufacture & disposal?	2.5	
35	Do you grow most of your own fruit & vegetables to reduce greenhouse gas emissions from refrigeration & transport?	2.5	
36	Do you avoid using concrete and other materials that use a lot of energy to manufacture?	2.8	
37	Have you installed solar panels to produce your home's electricity, to reduce energy use & risks of climate change?	2.8	
38	Do you mulch your garden to recycle green waste?	3.0	
39	Do you keep chooks to provide most eggs you use, to reduce greenhouse gas emissions from refrigeration & transport?	3.2	
40	Do you choose not to have children, or have fewer children, for environmental reasons?	3.5	
41	Have you made your household 'carbon neutral' - calculated your carbon emissions, reduced them & offset the rest?	3.7	
42	Do you co-own and share a car with others, using it only when there is no public transport, walking or bike-riding alternative?	3.8	
43	Do you make your own renewable fuels for your vehicle?	4.3	
44	Do you never use a car to reduce the burning of petrol and the risks of climate change?	4.8	
	TOTAL		

APPENDIX D Survey Schedule including Climate Action Scale questions

1	Please rate the following issues in terms of importance from 1 - 5, where 1 is not important at all and 5 is extremely important	1	2	3	4	5
a	Global financial crisis					
b	Climate change					
c	Terrorism					
d	Threat of war					
2	Closer to home, how would you rate the importance of					
a	Education					
b	Transport					
c	Unemployment					
d	The environment					
	ACTION	Sco re	Yes	Why?		
1	Do you usually hang clothes on the line rather than use a dryer?	1.2				
2	Do you regularly use the household recycling bin for recyclable waste?	1.3				
3	Wherever possible, have you replaced your light globes with compact fluorescent globes ?	1.3				
4	Have you consciously set out to run a car that is fuel efficient?	1.3				
5	Do you usually make a conscious effort to keep your showers short?	1.5				
6	Do you usually buy recycled paper? Eg copy paper, paper towels, toilet paper	1.5				
7	Do you buy greenpower?	1.6				
8	Have you taken any particular action to help you learn more about climate change?	1.7				
9	Do you put on a jumper first, rather than turn on the heater or light the fire?	1.8				
10	Do you try to use rechargeable batteries rather than disposable ones?	1.8				
11	Do you discuss climate change with others & encourage actions that help reduce climate change?	1.8				
12	Do you usually use reusable shopping bags?	1.8				
13	Do you try to limit your use of air conditioning? Eg Only use it when the temperature is extreme?	2.0				

14	Do you have a solar hot water system? (heat pump also scores yes)				2.0	
15	When buying an appliance do you consciously try to choose the one with the highest star rating?				2.2	
16	When shopping, do you usually try to choose items with less packaging?				2.2	
17	Are you vegetarian?				2.3	
18	Do you have solar panels that produce electricity (not just for hotwater)?				2.8	
19	Have you become carbon neutral - calculated & offset your carbon emissions?				3.7	
20	Do you choose not to run a car at all?				4.8	
	TOTAL					
3	If they seem keen to reduce climate change, ask:					
a	What are the barriers to doing the harder things: no time $ no motivation no info other					
b	Is there anything you do to help reduce climate change that I've left out?					
4	Would you be interested in participating in a longer, discussion about these issues? Y N					
a	If yes, what would be the best way to contact you to arrange an interview?					
	What is your postcode at home?					
	Education	Work outside the home? Y N What industry?				
	∟ Primary only		Age		Gender M/F	
	∟ Some secondary		∟ 18-25			
	∟ Year 10 equivalent		∟ 26-35			
	∟ Year 12 equivalent		∟ 36-45			
	∟ Trade Qualification		∟ 46-65			
	∟ Diploma/degree		∟ ≥66			
	∟ Higher degree					

APPENDIX E Survey Respondents Demographic Profile

The majority, 62.3%, of all respondents worked outside the home, with the most highly represented industries being retail, health and medical, education, construction and mining. Fifty four postcode areas were represented. The most frequently recorded postcodes were 2148 and 2770, each in the Blacktown City Local Government Area and each home to 36 respondents or 12%.

Table A.1 Survey respondent demographic information

Gender			
		Frequency	Percent
Valid	Male	127	42.3
	Female	172	57.3
	Self administered – info not supplied	1	.3
	Total	300	100.0
Education level		Frequency	Percent
Valid	Some secondary	27	9.0
	Yr 10 equivalent	60	20.0
	Year 12 equivalent	61	20.3
	Trade Qualification	30	10.0
	Diploma/degree	85	28.3
	Higher degree	37	12.3
	Total	300	100.0
Age		Frequency	Percent
Valid	18-25	68	22.7
	26-35	56	18.7
	36-45	79	26.3
	46-65	86	28.7
	66 plus	9	3.0
	Self-administered - info not supplied	2	.7
	Total	300	100.0

APPENDIX F Interview Schedule

Introduction

1. Do you mind if I record this discussion?
2. Let's do the ratings scale (read out questions and mark 2 copies)
3. Where you are on the scale?
4. Are there other things you do to reduce climate change that are not on the scale?
5. Look at the scale results together and discuss how there are additional things that they might like to do

Motivation

1. What motivates you to do these things that you've talked about? What makes you care about climate change/the environment enough to take some action?
2. Do you feel you have a strong understanding of the science relating to climate change? Does that come into it?

Inspiration

1. What's beneath the motivation? What is it that you value that motivates you to take these actions?
2. Do you have spiritual beliefs that inspire your action to reduce climate change?
3. Do you feel a strong connection with nature?
4. Do you think that your childhood experiences influenced your behaviour to reduce climate change?
5. Is the future important?
6. Do you have children – are they an influence on what you do regarding climate change/the environment?
7. Do you talk with them about climate change? Do you teach them to do certain things to help reduce climate change?

Practical matters

1. Are there things you think you should be doing to reduce climate change/help the environment, but you're not doing them? What stops you?
2. What practical things would make reducing climate change/protecting the environment easier?
3. What would be on your list of 5 things we could do as a society to reduce climate change/assist the environment?

APPENDIX G Y Green Householder Interview Schedule

Introduction

1. Do you mind if I record this discussion?
2. Let's do the ratings scale (read out questions and mark 2 copies)
3. Where you are on the scale?
4. Are there other things you do to reduce climate change that are not on the scale?
5. Look at the scale results together and discuss how there are additional things that they might like to do

Y Green

1. Discuss your motivation for participating in the Y-Green Project:
    a. was this related to climate-change sustainability goals,
    b. desire to improve personal sustainability practices,
    c. building relationships within the community;
    d. assisting in developing a sustainable model that can be replicated in other communities
    e. Other?
2. What were your expectations in regard to each/all of these? Were they achieved?
3. Discussion on gaining sustainability information related to your household practices.
4. What were your expectations of this project?
5. How did participation assist in achieving these outcomes?
6. What goals were not met?
7. Outcomes of the Y-Green Project implementation processes;
8. What aspects of the model worked in assisting you to develop sustainable practices?
9. What aspects did not assist you in this?
10. Discuss what aspects in your opinion need to be improved/modified/discarded?
11. Are there additional factors that you consider would have assisted you in achieving your goals?

Motivation

1. What motivates you to do these things that you've talked about? What makes you care about climate change/the environment enough to take some action?
2. Do you feel you have a strong understanding of the science relating to climate change? Does that come into it?

Inspiration

1. What's beneath the motivation? What is it that you value that motivates you to take these actions?
2. Do you have spiritual beliefs that inspire your action to reduce climate change?
3. Do you feel a strong connection with nature?
4. Do you think that your childhood experiences influenced your behaviour to reduce climate change?
5. Is the future important?

6. Do you have children – are they an influence on what you do regarding climate change/the environment?
7. Do you talk with them about climate change? Do you teach them to do certain things to help reduce climate change?

Practical matters

1. Are there things you think you should be doing to reduce climate change/help the environment, but you're not doing them? What stops you?
2. What practical things would make reducing climate change/protecting the environment easier?
3. What would be on your list of 5 things we could do as a society to reduce climate change/assist the environment?

Gender M F

Age

26-35 36-45 46-65 66 plus

No. of children Postcode

Income

$36,000 or less

$50,000 - $80,000

$80,000 - $100,000

$100,000 - $140,000

$140,000 plus

Country of birth First language

Email

APPENDIX H Information letters for interviewees

Dear

Thank you for participating in the Y-Green Project in July-August. As discussed in our recent telephone conversation, I am writing this letter to invite you to participate in further research.

I am currently enrolled in a PhD at the University of Western Sydney. As part of these studies, I am undertaking research to gain knowledge about the climate-change related opinions, motivations and behaviour of adults living in Western Sydney. I am particularly interested in learning the range of motivations people have for changing their behaviour to help reduce climate change and/or adapt to it, and any practical, day-to-day difficulties people are facing when trying to make these changes. My supervisors for the project are Dr Brent Powis who can be emailed at b.powis@uws.edu.au and Dr Zina O'Leary who can be emailed at z.oleary@uws.edu.au.

As arranged, I am inviting you to participate in a 45 minute face to face interview with me, at TIME, DAY & DATE at VENUE/ADDRESS. (Alternative wording for the focus groups: *I am inviting you to participate in a 45 minute focus group with others, to be held at TIME & DAY at LOCAL COMMUNITY VENUE & ADDRESS) where tea, coffee and a light snack will be provided.)*

Results from this research will be used for two purposes:
to further evaluate the Y-Green project; and
to gain knowledge about the climate-change related views, opinions and behaviour of adults living in Western Sydney.

While the general results gained through the research may be published, people taking part in the research will remain anonymous, with no identifying information stated in the results. Your involvement is completely voluntary. If you choose to participate in the research, you may decide to end your involvement at any time, without need for explanation.

Thank you very much for assisting with this project.

Yours Sincerely

NOTE: This study has been approved by the University of Western Sydney Human Research Ethics Committee. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (email: s.falleiro@uws.edu.au). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

APPENDIX I Interviewee Consent Form

I consent to participating in an interview discussion to be conducted by Helen Burnie as part of her PhD research project on the climate-change related opinions, motivations and behaviour of adults living in Western Sydney. I have received the information letter about this research project.

I understand that although I sign this consent form, my name will not be recorded for the research. I further understand that I am free to end my involvement at any time without need to explain my reasons.

Signature: Date:

NOTE: This study has been approved by the University of Western Sydney Human Research Ethics Committee. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (tel: 02 47 360 883). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

APPENDIX J Student Assignment Instructions

Perspectives of Sustainable Development

Assignment task – 2,000 – 2,500 words

The attached questionnaire (the Survey Schedule shown at APPENDIX 4) lists actions that we can each take to help mitigate climate change. It has been developed to list the actions in order from the easiest to undertake to the most difficult to undertake.

This assignment requires you to:

- Complete the attached questionnaire so that it reflects your behaviour. (Don't worry about your answers – no-one does, or has done all these things! Just answer 'yes' or 'no' truthfully.)
- Select three of the actions for which you answered 'yes' and three of the actions for which you answered 'no' .
- Write 2,000 - 2,500 words discussing your motivations for undertaking the three selected actions for which you answered 'yes', and your reasons for not undertaking the three selected actions for which you answered 'no'.

Your discussion should include:

- Reference to your personal environmental ethics and the factors that helped you develop these ethics, such as your culture, upbringing, childhood experiences and/or spiritual and religious beliefs
- Your perception of your relationship with the natural world and the experiences, thoughts and feelings that influence that relationship
- How your motivations, ethics, thoughts and feelings compare with those discussed in the literature.

APPENDIX K Demographic variables and Climate Action Scores

High CAS scores were achieved by 61/172 (35.5%) of women and 38/127 (29.9%) of men, with no evidence of the difference between the two being statistically significant. With the sample too small for analysis in smaller age groupings, age was concatenated into those who were 36 years and older and those who were less than 36 years. High scores were achieved by 57/175 (32.6%) of the older group and 42/123 (34.1%) of the younger group, but the relationship was not consistent, as young people tended to polarise to either low and high scores and were less likely to sit in the middle.

Chi-square tests were used to measure the presence or absence of statistically significant associations between demographic variables and low, medium and high scale Scores.

Table K.1 Crosstab Gender by High, Medium or Low CAS score

		Male	Female	
Low CAS score	Count	45	55	100
	% within row	45.0%	55.0%	100.0%
Medium CAS score	Count	44	56	100
	% within row	44.0%	56.0%	100.0%
High CAS score	Count	38	61	99
	% within row	38.4%	61.6%	100.0%
Totals	Count	127	172	299
	% within row	42.5%	57.5%	100.0%

Table K.2 Crosstab Age by High, Medium or Low CAS score

		< 36 years	≥36 Years	
Low CAS score	Count	51	49	100
	% within row	51.0%	49.0%	100.0%
Medium CAS score	Count	30	69	99
	% within row	30.3%	69.7%	100.0%
High CAS score	Count	42	57	99
	% within row	42.4%	57.6%	100.0%
	Count	123	175	298
	% within row	41.3%	58.7%	100.0%

Table K.3 Crosstab Education level by High, Medium or Low CAS score

		Low Education level < Yr 12	Medium Education level Yr 12 or Trade Qual	High Education level - Diploma, degree or higher degree	
Low CAS score					
	Count	38	31	31	Total
Medium CAS score	% within row	38.0%	31.0%	31.0%	
	Count	30	32	39	100
High CAS score	% within row	29.7%	31.7%	38.6%	100.0%
	Count	19	28	52	101
Totals	% within row	19.2%	28.3%	52.5%	100.0%
	Count	87	91	122	99
	% within row	29.0%	30.3%	40.7%	100.0%
					300

Chi-Square Tests Education level

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.133[a]	4	.016
N of Valid Cases	300		

Symmetric Measures Education level

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.265	.073	3.542	.000
N of Valid Cases		300			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

APPENDIX L Climate change importance by Enviro importance

Table L.1 Cross-tabulation of importance of climate change in rows, by importance of the environment in columns

		The Environment is ...					
		Not important at all	A little important	Somewhat important	Important	Very important	Total
Climate Change is ...							
Not important at	% within row	17%	8%	8%	17%	50%	100%
A little important	% within row	0%	5%	21%	37%	37%	100%
Somewhat important	% within row	0%	4%	15%	46%	35%	100%
Important	% within row	0%	0%	12%	32%	57%	100%
Very important	% within row	1%	0%	5%	10%	85%	100%
Total	% within row	1%	1%	9%	22%	67%	100%

Table L.2 Cross-tabulation of importance of the environment in rows, by importance of climate change in columns

		Climate Change is ...					
The Environment is ...		Not important at all	A little important	Somewhat important	Important	Very important	Total
Not important at	% within row	67%	0%	0%	0%	33%	100%
A little important	% within row	25%	25%	50%	0%	0%	100%
Somewhat important	% within row	4%	15%	26%	26%	30%	100%
Important	% within row	3%	11%	32%	29%	25%	100%
Very important	% within row	3%	4%	8%	17%	68%	100%
Total	% within row	4%	6%	15%	20%	54%	100%

APPENDIX M All Climate Scale action motivations shown by subgroup

Table M.1 Frequency of all survey respondent motivations for taking each Climate Scale action, shown by motivational subgroup

The total for each subgroup is also shown, along with its percentage of all motivations. Percentages may not be exact due to rounding. Red indicates economic subgroups; green indicates environmental subgroups; and orange indicates social subgroups.

Climate Scale actions	1. Recycle	2. Hang clothes	3 . Jumper before heater	4. Change lights	5.Limit air con	6. High star rating	7. Short showers	8. Reusable bags	9. Recharge batteries	10. Discuss CC with others	11. Learn about CC	12. Recycled paper	13. Less packaging	14. Fuel effic car	15. No car	16. Buy Greenpower 1	17. Solar hot water	18. Vegetarian 1	19. PV panels	20. Carbon neutral	TOTAL	%
Saves money	2	106	75	84	77	63	35	6	71	0	0	15	18	63	11	4	14	0	4	0	647	30.5
Unspecified environmental benefit	82	33	15	36	11	27	16	36	21	0	0	23	11	23	3	7	2	0	2	1	349	16.4
Saves energy or fuel	0	51	31	51	15	47	12	0	5	0	0	2	0	9	0	0	1	0	0	0	224	10.5
Health & sensory preference	3	64	31	6	19	1	4	6	0	0	0	2	14	0	8	1	0	2	0	0	161	7.6
Convenient infrastructure opportunism	40	0	19	13	0	1	0	23	9	0	0	2	4	0	0	1	0	0	0	0	112	5.3
Saves water	0	0	0	0	0	4	71	0	0	0	1	0	0	0	0	0	0	0	0	0	76	3.6
Reduces Ghg, climate change	10	6	2	8	5	7	2	7	2	5	6	5	4	3	1	0	2	0	0	0	75	3.5
Personal moral obligation	12	0	0	3	1	0	1	5	0	21	17	2	1	2	0	1	1	2	0	0	69	3.2
Reduces waste	18	0	0	0	0	0	0	17	6	0	0	0	12	0	0	0	0	0	0	0	53	2.5
Habit	13	11	6	0	0	0	7	3	0	0	0	0	0	0	0	0	0	0	0	0	40	1.9
Full or part rebate, subsidy	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	37	1.7
Pressure from authorities and or business	6	0	0	9	0	0	0	6	0	0	0	0	0	0	2	0	8	0	1	0	32	1.5
Don't own drier and/or air con	0	23	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	1.4
To re-use, close the loop	15	0	0	0	0	0	0	0	5	0	0	6	0	0	0	0	0	0	0	0	26	1.2

Durable, saves money in longer term	0	0	0	17	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	25	1.2
To influence others to mitigate	0	0	0	0	0	0	0	0	0	16	6	0	0	0	0	0	0	0	0	22	1.0
Curious, want to learn more	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	20	0.9
Saves time	0	0	0	0	0	0	14	0	0	0	0	0	3	0	0	0	0	0	0	17	0.8
Preserves possessions, quality	0	4	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.8
Convenient enviro opportunism, sun, wind	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	15	0.7
Peer pressure to undertake action	3	1	0	2	0	0	0	4	1	0	3	0	0	0	0	0	0	0	0	14	0.7
Save water, tank water reliance	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	13	0.6
Action is required in workplace	0	0	0	0	0	1	0	0	0	5	4	0	0	0	0	0	0	0	0	10	0.5
Future of progeny	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	9	0.4
Sceptic, rejection of CC science	0	0	0	0	0	0	0	0	0	6	3	0	0	0	0	0	0	0	0	9	0.4
Future generations	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	6	0.3
Saves trees	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0.2
Little additional cost	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	3	0.1
Support the industry	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0.1
Reduces food miles	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3	0.1
Cost neutral	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.0
Reduces air pollution or exhaust fumes	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.0
Public education advertising campaign	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
TOTALS	**208**	**312**	**181**	**265**	**132**	**163**	**176**	**113**	**128**	**71**	**53**	**66**	**69**	**101**	**25**	**19**	**29**	**4**	**8**	**1**	**2124**	**100 %**
ECONOMIC N=904 42.6%						**ENVIRONMENTAL N=825**								**SOCIAL N=395 18.6%**								