TOWARDS A FUTURE OF SUSTAINABLE CONSUMPTION:

A practice oriented, participatory backcasting approach for sustainable washing and heating practices in Irish households.

Volume One

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DECLARATION

I hereby declare that this thesis has not been submitted as an exercise for a degree at this or any other university. This thesis is entirely my own work; any inclusion of the unpublished and/or published work of others is duly acknowledged in the text. I agree to deposit this thesis in the University's open access institutional repository or allow the library to do so on my behalf, subject to Irish Copyright Legislation and Trinity College Library conditions of use and acknowledgement.

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How to encourage a shift to more sustainable practices of household water and energy consumption and what these practices might involve is at the heart of this thesis. While production processes and resource efficiency have long received attention in environmental policy and research, patterns of consumption by households in industrialised nations are increasingly recognised as central to current environmental, social and economic problems. To date, attempts to encourage sustainable household consumption of key resources such as energy and water have focused mainly on information provision, economic instruments and incremental technology improvements. These are criticised for their simplistic behavioural assumptions, which overlook the embeddedness of daily consumption practices and fail to challenge escalating consumption demands and expectations. Against this background, there is a need to consider more radical socio-cultural, technological and organisational innovations that might enable the fulfillment of daily consumption practices in a more sustainable manner. Future visioning procedures are increasingly mooted as a means to identify and encourage such system level innovations.

Participatory backcasting is a visioning tool involving the collaborative development of desirable future visions, followed by working back to the present ("backcasting"), to see how they could be achieved. Backcasting offers potential as a more ambitious, deliberative governing mechanism to help liberate stakeholders from patterns of disjointed incrementalism and open up new possibilities for policy, research and development, and entrepreneurial activity. To date, both academic and policy-led backcasting studies have been criticised for their emphasis on technological change, with less attention to social dimensions of sustainability transitions. This research aims to address this gap by using social practice theory to inform the design of a participatory backcasting process for more sustainable home energy and water consumption practices in Irish households. Social practice research notes that much of our daily household consumption activities (such as lighting, washing, eating and heating) take the form of routinised social practices. These are said to be socio-technically mediated, involving a complex interplay of forces including systems of provision, institutional arrangements, technologies, practical knowledge and social conventions. To date social practice research has focused on analysing practices, with less attention to generating and evaluating alternative configurations.

This research therefore aims to: design, apply and analyse a practice oriented, participatory backcasting process for more sustainable home heating and personal washing practices in Irish households. Home heating and personal washing are selected as test beds for experimenting with the social practice approach as they are the most energy and water intensive practices in Irish households respectively. The research therefore has both a product and a process focus and is simultaneously concerned with exploring the question of
how the practice oriented, participatory backcasting process might be operationalised and what outputs it might produce. A central, yet under-evaluated, claim of backcasting is that learning is promoted amongst participants, improving chances of follow up and spin off. Exploring these learning processes was therefore identified as an additional dimension for analysis in this research.

A multi-phased, iterative backcasting process was applied in parallel for the heating and washing studies, the results of which comprise the bulk of the empirical material for this thesis. Chronologically, its phases involved: stakeholder visioning workshops; the elaboration and sustainability evaluation of scenarios for sustainable heating and washing practices in the year 2050; citizen-consumer focus groups; and stakeholder transition workshops to create long-term transition plans. Three scenarios were created for each practice, distinguished by their varied emphasis on socio-cultural, regulatory and organisational changes. These scenarios were found to serve as successful counter-images, widening stakeholder perceptions on the problems of sustainable home energy and water consumption and opening up new routes for socio-technical innovation. Citizen-consumer focus groups provided valuable insight for further scenario iterations. Promising qualities for both heating and washing were identified and included the promotion of personal adaptability and control rather than automation, a greater awareness of personal bodily warmth and cleanliness needs, and more variable practices in line with natural limits and fluctuations facilitated with technology.

In the final phase of the backcasting process, stakeholder transition workshops led to the identification of a range of interventions including policy, commercial, and educational measures to build towards the future scenarios. Although the visioning and transition workshops produced a high number of individual ideas, most insight was garnered in seeing how these could be creatively combined into coherent strategies. This was reflected in participant feedback which assigned marginally more value to the qualities of collaboration, holism, liberation, and long-termism embodied within the backcasting process than to the outputs it produced. The thesis research shows that these inherent qualities of the backcasting process were also stimulants to higher order learning. While operationalising the social practice approach proved challenging, it was highly rated by participants, many of whom stated an intention to draw upon the results in their own professional domains. This does not guarantee action however and it is argued that both practical and ideological challenges would be faced if similar approaches were to be applied within environmental governance settings in Ireland. Nevertheless, the research suggests that practice oriented, participatory backcasting processes provide valuable spaces for learning and collaboration, which over time, may result in the acceptance and upscaling of more transformative processes and their resultant outputs. This thesis aims to contribute, practically and theoretically, to research on social practices, backcasting and the governance of transitions for sustainable consumption.
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CHAPTER ONE:
INTRODUCTION
1.1 Sustainable consumption

The challenge of sustainable development is one of the greatest facing humanity in the 21st century. Despite being on the political agenda for over two decades, heated debate remains on what a sustainable future might look like, how it could be encouraged and its consequences for everyday life. Meanwhile, unsustainable trajectories of development continue and mounting empirical evidence suggests that “planetary life-support systems” are being pushed to breaking point, potentially causing “irreversible and abrupt environmental change” (Jansen, 2003; Rees, 2011; Pearce, 2010: 30). While production processes and resource efficiency have long been targets of environmental policy, the unsustainable consumption patterns of advanced economies are increasingly recognised as being at the heart of current economic, social and environmental crises (Jackson, 2005; Hinton and Goodman, 2009; Tukker and Fedrigo, 2009; UNEP, 2012). The dependence of the global economic system on consumption-fuelled growth coupled with increasing population levels and the spread of western-style consumerism is heightening pressure on key natural resources involved in the supply of societal goods and services. As a result, a “perfect storm” of insufficient energy resources, water scarcity and food shortages is predicted by 2030 (Sample, 2009). In the face of these challenges, a pressing question is how to manage critical energy, water and food resources so that “one planet living” is achieved, characterised by the provision of societal wellbeing within ecological limits (WWF, 2012).

Many researchers in the field of sustainable consumption argue that living within the earth’s ecological limits will require a fundamental re-think of production and consumption systems and a shift from an expansionist economic model to one based on contraction and convergence (Geer Ken et al., 2008; Tukker et al., 2008b; Diaz-lopez et al., 2009; Jackson, 2009). This argument stems from the large observed discrepancy in consumption patterns between (and within) nations whereby an equitable distribution of resource usage would require advanced, western economies\(^1\) to contract their consumption in order to permit growth within less developed and emerging economies. The ecological footprint indicator is commonly used to illustrate this point (Wackernagel et al., 1999). This shows that if every person in the world adopted the lifestyle of an average North American, more than four earths would be required to sustain the associated rates of consumption, resource depletion and waste assimilation (Kitzes et al., 2007).

It has therefore been argued that massive dematerialisation is required to achieve sustainable consumption which is typically described as the use of goods and services that meet people’s

\(^1\) In this thesis the term advanced, “western” or developed economies is often used typically referring to the US, Canada, Japan, many of the European Union states (especially the 15 existing members before the +25 expansion in 2004), the Asian Tigers, Australia and New Zealand. Rapidly emerging economies, known as the BRICs include Brazil, Russia, India and China. When the term developing country, or less-developed country is used this refers to nations with a low living standard, undeveloped industrial base and low Human Development Index (HDI) relative to other countries.
basic needs and improve quality of life with minimal impact on the environment. Goals for
dematerialisation range from a “factor four” level of improvement in the immediate-term
whereby resource efficiency is improved four-fold using existing methodologies whilst avoiding
negative impacts on the overall quality of life (von Weizsäcker et al., 1998) to higher targets
for a ten-fold (“factor ten”) or twenty-fold (“factor twenty”) level efficiency improvement by 2050
amongst advanced economies. These include the United States of America, Canada, Japan,
Australia and Western Europe (Jansen and Vergragt, 1992; Weaver et al., 2000; Schmidt-
Bleek, 2007). By 2050, the Intergovernmental Panel on Climate Change (IPCC) has asserted
that developed countries must achieve greenhouse gas emission reductions of 80-95%
relative to 1990 levels to avoid dangerous climate change (IPCC, 2007).

These are hugely challenging targets for society to achieve. Although the immediate cause of
many environmental problems such as the degradation of ecosystems and the over-extraction
of non-renewable resources is directly linked to production activities including agriculture,
mining and manufacturing, consumption by households and the public sector is considered
the fundamental driver of these activities. Household consumption defined as “the selection,
purchase, use, maintenance and repair of any product or service by members of a household”
is increasingly highlighted as an area requiring attention (OECD, 2002: 1; Geyer-Allely and
tends to be described as either ‘indirect’, which includes environmental impacts along the
production chain of household goods and services, or ‘direct’ which involves environmental
damage from consumption of key resources such as energy and water within the home. Of
these two categories, direct usage accounts for the most negative environmental impact.
Indeed, 75% of the environmental impact of households can be traced to direct consumption
in the following three areas: housing (which includes water, energy use and waste
generation); mobility; and eating and drinking (EEA, 2012a). In 2009, direct energy use in
homes for these activities accounted for 25% of the EU-27’s energy related, end-use
greenhouse gas emissions (EEA, 2012a) and 15% of its water consumption in 2005 (EEA,
2005).

In both the Republic of Ireland and Northern Ireland, levels of household energy and water
consumption exceed those found in many other European countries (EEA, 2005; SEAI,
2008b). In 2009, households accounted for 25% of total final energy consumption in the
Republic with the majority of this (c.70%) going towards space and water heating (SEAI,
2010b). A number of researchers note a cross-cultural convergence in preferences for higher
and more standardised indoor temperatures placing greater demands on fossil fuel powered
space heating and cooling to fulfil these expectations (Shipworth, 2005; Shove et al., 2008a).
With regard to water use, households consume 60% of Ireland’s treated water supply and
personal washing is the most resource intensive end-use, accounting for around 38% of a
person’s daily direct water consumption (EPA, 2006). Many studies report increasing societal
expectations of bodily cleanliness and more frequent and water intensive showering practices,
which, when coupled with population growth and conditions of climate change place greater pressure on water resources now and into the future (Waterwise, 2008; Ashenburg, 2009).

In targeting sustainable consumption, Irish policy (North and South) has reflected broader European and international trends by adopting techno-economic responses which have been widely criticised for their failure to address the magnitude and urgency of the present environmental crisis and the systemic nature of household consumption (Tukker et al., 2008b; Davies et al., 2012b). Indeed, recent European policy discourse seems to be shifting away from language of sustainable consumption to avoid engagement with strategies of “sufficiency” or demand reduction. Instead consumption problems are cast as issues of “resource efficiency” necessitating technological solutions and green economy fixes. This is typical of policy discourse embodying strategies of ecological modernisation (Hajer, 1995; Davies and Mullin, 2011) and is reflected in national strategies for sustainable consumption including Ireland’s most recent national sustainable development strategy which begins with the following statement:

“Resource efficiency allows us to do more with less, delivering greater value with less input and using resources in a sustainable way... embracing resource efficiency offers a path to economic growth and the creation of decent jobs” (DECLG, 2012a: 30).

As with European policy, Ireland’s ‘Resource Efficiency Strategy’ does little to challenge societal patterns of consumption, and simplistic assumptions are made about the power of information to yield behaviour change. Despite being discredited by recent social science research, the information deficit model, which elevates the role of rational decision-making and individual values and attitudes in shaping daily actions, remains prevalent within policy. Based on this rationalised model of human behaviour, strategies for sustainable household consumption hinge upon information provision (including product labelling and environmental awareness campaigns) pricing tools (for example carbon taxes) along with regulations and financial incentives for more efficient technologies (such as eco-efficiency design regulations and grants for home energy retrofits) (Davies et al., 2012b). Whilst these measures represent small steps which could lead to greater action, an often highlighted limitation is that technological solutions do not automatically yield reduced environmental impacts, nor is behaviour change guaranteed, even with higher levels of awareness.

Rebound effects whereby gradual improvements in efficiency are cancelled out by overall increases in consumption are a widely reported problem (Maxwell et al., 2011). Likewise, individual-based explanations of behaviour (i.e. lack of financial incentives or absence of environmental attitudes) are simplistic and overlook the situated nature of our consumption practices including the socio-cultural, technological, infrastructural and institutional constraints which are said to “lock” people in to particular patterns of consumption (Sanne, 2002). In addition, policy is often infused with a resource centric approach that focuses on ‘predict and provide’ models of energy and water provision which do not allow room for questioning the
ultimate end uses and needs that these resources serve. One potential alternative means of conceptualising and promoting sustainable consumption is found within the burgeoning literature on social practice theory from academic communities within geography, sociology and design fields (Reckwitz, 2002; Shove, 2003; Warde, 2005; Ropke, 2009; Scott et al., 2009; Gram-Hanssen, 2010).

1.2 Social practices and visioning techniques

From a social practice perspective, much of our direct daily household consumption is considered to take the form of habitual ‘social practices’ such as heating, lighting, cooking and washing. Far from being static, social practices and the meanings and needs which they serve evolve through time in conjunction with new technologies, infrastructures, regulatory and institutional relations (Shove, 2003; Warde, 2005). For example, studies on the evolution of washing practices show that what used to be a once off weekly bath in the early decades of the 20th century, has changed to practices of showering once or twice daily assisted by the development of water mains infrastructure and power showers, reinforcing societal demands for immediacy, convenience and cleanliness (Hand et al., 2005; Ashenburg, 2009). Practices are therefore considered to be “socio-technically mediated”, influenced by a complex interplay of social and material elements including “forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge” (Reckwitz, 2002: 249).

In attempting to shape daily practices of household consumption towards more sustainable outcomes, a systemic lens must therefore be adopted to consider the complex socio-cultural, political, organisational, and technological forces that shape them. An important implication of a social practice approach is that societal expectations of what is considered a “normal” practice change through time. This shows that the needs which many of these practices serve (such as comfort and warmth in the case of home heating, or cleanliness and refreshment in the case of personal washing) are malleable social constructs. Social practices are considered to be nested within broader “meso-level” socio-technical regimes that comprise a cluster of elements including regulations, technologies, user practices and markets, cultural meanings, infrastructures of provision, maintenance and supply networks.

There is a link to be made here with theory and methodological processes applied within the fields of system innovation (Elzen et al., 2004), socio-technical transformation (Bijker and Law, 1992; Smith et al., 2005) and societal transitions towards sustainability (Rotmans et al., 2001; Raskin et al., 2002). While each of these has a slightly different emphasis, they are united in their concern for understanding and engendering processes that trigger, enable and support socio-technical transitions. The unit of focus in these sustainability transition studies can be on different levels, from societal shifts (e.g. the change from agrarian to industrial
society) to changes in societal functions such as transport, housing, communication, energy supply and use (Börjeson et al., 2006). They begin with the premise that incremental innovations are insufficient to achieve larger sustainability advancements and assert that more fundamental system level innovations are necessary. In exploring and initiating such systems changes, long-term, iterative and deliberative processes including collective visioning techniques are widely applied. A recent Sustainable Consumption Research Exchange (SCORE)\(^2\) policy brief emphasised the importance of such approaches stating that “a process of ‘visioning’ and experimentation, particularly when it is not totally clear into which direction the change has to go, is essential” (Tukker et al., 2008b: 1221). These procedures are an integral component of formal transition management policy. Developed in Netherlands in the 1990’s, transition management aims to identify and encourage, long-term, large-scale system changes particularly in the water, energy and transport sectors (Geels, 2002; Kemp et al., 2006; Bailey and Wilson, 2009).

One type of visioning method used in transition studies by policy makers and academics alike, is backcasting (Vergragt and Quist, 2011). Backcasting is a multi-phase, iterative process based on the design of desirable future scenarios followed by working back to the present (“backcasting”) to devise practical transition steps for their achievement. This form of futures research is said to be of particular value in situations where: the problem is complex and affects many sectors of society; there is a need for major rather than marginal changes; dominant trends are part of the problem; the market cannot rectify the problem; and when the time horizon is long enough for deliberate choice (Dreborg, 1996). It is thus uniquely suited to ‘wicked’ sustainability problems such as those relating to sustainable production and consumption (Vergragt and Quist, 2011). Other futures techniques of scenario development and forecasting aim at the formulation of likely or possible futures. Given their extrapolation from current unsustainable trends, it is said that they have limited potential to develop transition-inducing innovations. By contrast, backcasting is explicitly normative and is based on the construction of desirable future visions which, rather than serving as “blueprints” for the future, are intended to provide original insights into the nature of problems and open up new perspectives and solutions to tackle them (de Geus, 2002; Sondejiker et al., 2006: 191). The creative visioning processes involved in backcasting are a well documented way of permitting freedom from current norms and constraints, stimulating the imagination of a range of possible solutions compared with thinking from the present (Dreborg, 1996; Jungk and Mullert, 1987; Young et al., 2001). Owing to these qualities, visioning techniques are often applied in a range of other fields such as corporate strategy, commercial innovation processes and urban planning.

A defining feature of recent backcasting approaches in policy and academic contexts is the involvement of actors outside the research team. This shift towards participatory backcasting

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\(^2\) SCORE acts as one of the EU’s central support structures for the UN’s 10 Year Framework of Programs for Sustainable Consumption and Production (see: www.score-network.org).
approaches links to theoretical debate in environmental governance (Jordan et al., 2003), collaborative planning (Healy, 1997) social learning and deliberative democracy (Dryzek, 2000). For example, the general public are often involved in local area based backcasting projects (Carlsson-Kanyama et al., 2008; VEIL, 2010) while multi-sectoral and multi-disciplinary actors from public, private and governmental spheres are often included in strategic sustainability backcasting research (Quist and Vergragt, 2006). A fundamental element of participatory backcasting is that it promotes reflection and learning about sustainability problems amongst its participants, which may then be translated into action beyond the remit of the experiment itself (Brown et al., 2003; Davies et al., 2012a). As Jungk and Mullert (1987: 72) articulate: “the success of a [visioning] workshop is not…to be measured solely in terms of the schemes or catalogues of proposals it generates but also by how it subsequently affects the participant’s minds and behaviour”. Establishing the precise impact of the backcasting process on individual learning is not a simple task however and despite recent advances by Quist et al. (2011) the “methodological organisation of the learning process” remains an understudied area (van de Kerkhof and Wieczorek, 2005: 733).

1.3 Research gaps, questions and contributions

To date, backcasting processes have typically been applied to encourage transitions at the level of socio-technical regimes, taking food, energy or water production and consumption systems as the units of analysis. For example, many studies have focused on the problem of shifting to renewable energy supply (McDowall and Eames, 2006) and on processes for up-scaling regime changing technologies or infrastructures (Weaver et al., 2000). Others have involved the public in designing future visions for improving the sustainability of their city or district (Carlsson-Kanyama et al., 2003; Eames and Egmose, 2010). However a growing criticism of visioning and backcasting studies, especially those employed in policy processes, is their narrow interpretation of system innovation as confined to technological and infrastructural innovation. In this way, cultural forces that shape consumption practices are ascribed to the landscape-level rather than considering them as ones which can be actively influenced (Shove and Walker, 2007; Bailey and Wilson, 2009; Nye et al., 2010). There have been some exceptions however, notably Quist et al. (2001) and the recent EU FP7 backcasting project, SPREAD (2012) both of which examine sustainable lifestyle futures. Nevertheless, practical perspectives on the social aspects of socio-technical transitions are underdeveloped and no studies have been identified by the author with an explicit social practice orientation. This is reflected in comments by Shove and Walker (2007: 768) who state that conventional policy-led transition management processes have “lack[ed] the conceptual resources with which to enter these ordinary arenas of everyday life”. They therefore argue for “exploring other social scientific, but also systemic theories of change” (Shove and Walker, 2007: 768).
Social practice theory embodies the more systemic understandings of change in everyday consumption practices that Shove and Walker (2007) refer to. To date, much social practice research has been focused on developing theoretical insight, looking at how infrastructural, technological, and socio-cultural dynamics evolve through time and across cultures giving practices their current forms. Other empirical studies have examined existing sustainable consumption initiatives, such as retrofit programmes, or community action initiatives from a social practice perspective to gain original insight for their improvement (Shipworth, 2005; Hargreaves et al., 2008; Moloney et al., 2010). There is also growing focus within design research as to how social practice theory might be practically applied using co-design and ethnographic methodologies (Scott et al., 2009; Kujer and De Jong, 2012). However, as Kujer and De Jong (2012: 73) note, “while quite some work has been done in the area of analysing practices, little research has yet been conducted into generating and evaluating alternative configurations”.

Based on these conceptual and operational gaps identified in social practice research and backcasting studies, an interesting study presents itself which focuses on the mechanisms of merging insight from social practice theory with a backcasting approach. The question investigated is whether such an approach would advance research on practical applications of social practice theory and potentially lead to the identification of novel socio-technical innovations and interventions for more sustainable consumption. Furthermore, it would re-integrate social considerations into backcasting processes, challenging and extending their associated conceptual frameworks and methodologies. With the exception of broader research on sustainable consumption policy and governance (Doran, 2007; Pender et al., 2007; Barry, 2009) and ecological footprinting (Lammers et al., 2008) the area of sustainable household consumption is relatively under-explored in Ireland and there are no instances of backcasting studies. The research that underpins this thesis therefore focuses on Ireland and is part of a broader research project, ‘Consensus: Consumption, Environment, Sustainability’ that is examining four key problem areas of household consumption - transport, energy, water and food - on an all Ireland basis (North and South)\(^3\). This thesis is concerned with home heating and personal washing practices, as these are the most consumptive end-uses of energy and water resources respectively in Irish households.

**The overall aim of the research is:**

To design, apply and analyse a practice oriented, participatory backcasting process for more sustainable home heating and personal washing practices in Irish households.

As this aim implies, the research will address the methodological and theoretical organisation of the practice oriented approach together with its associated outputs. The research is

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\(^3\) Further details on the Consensus project can be found in Appendix A
therefore exploratory, aimed at considering how a practice oriented, participatory backcasting approach might be developed and to what effect, rather than generating empirical evidence upon which to evaluate any particular hypothesis. Through this research the thesis ultimately aims to contribute to knowledge in the fields of sustainable consumption, social practice theory and backcasting.

With this aim in mind, three key research questions have been developed:

1. How might a practice oriented, participatory backcasting process be operationalised targeting sustainable household consumption?

2. What outputs can be developed from the practice oriented, participatory backcasting process as applied to sustainable home heating and personal washing practices in Irish households?

3. What are the benefits and limitations of the practice oriented, participatory backcasting procedure as reflected in participant feedback and the levels of learning it stimulated among them?

Question one relates to the design of the practice oriented, participatory backcasting process (termed backcasting hereafter for brevity). Answering this question necessitates a critical review of existing research methodologies within the sustainable consumption, social practice and backcasting fields, reflecting on their merits and limitations and considering how they might be modified to suit this topic of study. Question two relates to the output generated as a result of the iterative backcasting process. It will be answered through in-depth analysis of the results developed from each backcasting phase. Three main phases are identified as follows: I) the Visioning Phase involving the development and assessment of future scenarios for more sustainable heating and washing practices, II) the Citizen-consumer Phase evaluating feedback from the public on the future scenarios, and III) the Transition Phase based on the development of interventions and action plans to build towards the achievement of the most promising future scenarios. This analysis aims to reveal whether any unique insights and novel ideas are produced from the backcasting process, the results of which will comprise the main body of empirical evidence presented in this thesis.

Question three, the final research question, aims to explore the benefits and limitations of the practice oriented, participatory backcasting process with special reference to feedback from participants. Having developed and applied the process, this question seeks to identify where the value of the procedure lies. In particular, it will look at the levels of learning it produces, which according to literature is of vital importance, especially given its role in stimulating follow-up and spin-off (Quist, 2007). This research therefore places itself at the intersection between developments in social practice theory, backcasting, and sustainable consumption governance and policy development.
1.4 Thesis structure

The thesis has nine chapters. Chapter two provides a comprehensive review of the origins of sustainable consumption, its core concerns and its emergence onto the international political agenda. Policy action at international, European and national scales is evaluated with special attention to action targeting sustainable household water and energy consumption in the Irish context. Chapter three examines contributions from social practice theory and research within the field of futures studies. Through these two literature review chapters, the conceptual and theoretical underpinnings of this research project are clarified along with the rationale for the identified research questions. Chapter four is the methodology chapter in which basic detail is provided on each of the key phases in the practice oriented, participatory backcasting process. Given that the design of the process was one of the key aims of the research, a more in-depth elaboration of the theoretical operationalisation of the practice orientation is provided in the proceeding empirical results chapters.

Chapters five to eight constitute the body of the empirical results and discuss the outputs from each of the core phases in the backcasting process. Chapter five details results from the Visioning Phase that included stakeholder visioning workshops, along with a back-office scenario elaboration and sustainability evaluation exercise. Chapter six is based on the citizen-consumer engagement phase of the backcasting process that evaluated the future heating and washing scenarios from the perspective of everyday practitioners. The next chapter, chapter seven, presents the results of the Transition Phase that was oriented around the development of action plans to build towards the future scenarios. Chapter eight, evaluates feedback from stakeholders involved in the backcasting process with attention to their perceptions of its benefits and limitations and the levels of learning stimulated by their involvement. Chapter nine is the conclusion chapter. It reviews the main findings from the research and reflects critically upon its broader academic contributions. Commentary is provided on the challenges of embedding the research results in the Irish context and more generally on the potential for using practice oriented, participatory backcasting tools for the governance of sustainable consumption transitions.
CHAPTER TWO:
SUSTAINABLE CONSUMPTION: POLICY RESPONSES
2.1 Introduction

This chapter provides a comprehensive review of literature on sustainable consumption outlining its different conceptualisations, key challenges and policy responses to date. The chapter begins by detailing the emergence of sustainable consumption onto the political agenda and its primary concerns with ecological limits, equality and meeting basic needs. Recent patterns and figures relating to water and energy consumption in Irish households (North and South) are presented, highlighting how these fit with macro socio-economic and cultural trends. To address these complex sustainability issues, action and collaboration is required across government, industry and civil society. While detail on industry and civil society action is provided in the next chapter, this chapter concentrates on governmental responses. This reflects the crucial role of government at all levels in encouraging action, innovation and collaboration amongst citizens and the private sector to facilitate the governance of a societal shift towards sustainability (Hajer and Wagenaar, 2003). A brief overview of sustainable consumption policy within the international and European political arenas is presented, followed by an analysis of strategic policy responses within the Republic of Ireland and Northern Ireland. A detailed critique is provided on the dominant communicative, economic and regulatory tools employed by policy at national and international tiers to target sustainable household water and energy consumption. This chapter therefore sets the scene by overviewing the ways in which sustainable consumption is currently being conceptualised, promoted and encouraged. The benefits and limitations of current responses are identified, pointing to the potential value of drawing upon social practice theory and collaborative visioning techniques in designing interventions for more systemic shifts towards sustainable household consumption practices.

2.2 Sustainable consumption: emergence of concept and central concerns

The history of human and economic development has been intimately linked to the control and manipulation of natural resources. The scale of this exploitation increased dramatically with the onset of the industrial revolution in the late 18th and early 19th centuries. This heralded changing socio-economic conditions and the spread of pollution and habitat destruction, provoking the emergence of early modern critics of consumption including Thorstein Veblen, Henry Thoreau, and William Morris towards the end of the 19th century (Connelly and Smith, 2006). The rise of Fordism in the 1930’s marked the start of a socio-economic period characterised by mass production and mass consumption, encouraged by the proliferation of media advertising, state intervention and market protectionism to ensure steady demand. It has been argued that since the 1970’s, Fordism has been replaced with consumption-led, neo-liberal capitalism as the dominant politico-economic system. This system is characterised by less state intervention, faster product life-cycles, flexible
production systems, global consumer goods and targeted marketing (Harvey, 1989). Another defining feature of the mid to late twentieth century, has been the advancement of water, gas, and electricity infrastructures in more developed countries resulting in the transformation of household consumption practices such as space heating, lighting, washing and cooking beyond anything imagined at the start of the century (Foresight, 2008). These advancements have made important contributions to overall poverty reductions and to the health, sanitation and wellbeing of householders. However they have led to rising levels of fossil fuel and water consumption contributing to global environmental problems of climate change, environmental degradation and pollution (Simms et al., 2009). Between 1971 and 2012 energy use doubled worldwide and given that the majority (c.90%) comes from fossil fuels, energy related emissions now account for over 80% of global, yearly carbon emissions (Dimas, 2008). In addition, pollution of many of the world’s water bodies since the onset of industrialisation has impacted upon the health of marine and freshwater ecosystems and when coupled with conditions of climate change and population growth, contributes to constraints on the availability, quality and use of fresh water into the future (UNEP, 2004a; Brandes and Brooks, 2010).

In the 1960’s there was an awakening to the environmental problems associated with the western model of development. The initial focus was on overpopulation, rising consumption levels, resource exploitation, and pollution articulated in various influential publications including ‘The Limits to Growth’ (Meadows et al., 1972), ‘A Blueprint for Survival’ (Goldsmith, 1972), and ‘Small is Beautiful’ (Schumacher, 1973). The crux of the issue for these commentaries is encapsulated by Schumacher (1973: 3) who stated, “It does not require more than a simple act of insight to realise infinite growth of material consumption in a finite world is an act of impossibility”. Although these works are not without their critics⁴, their reference to the ecological limits of growth and the ethics of uneven consumption patterns has had a lasting influence on the development of the environmental movement and the emergence of the concept of sustainable development (Connelly and Smith, 2006). Articulated by the Brundtland Commission in 1987, sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” and has since formed the dominant mode of environmental thinking (Connelly and Smith, 2006). A central aim of sustainable development is to achieve a balance between the three interdependent and mutually reinforcing pillars of economic vitality, environmental protection, and social development (UN, 2005). Ten years after the Brundtland Commission, overconsumption in industrialised countries was recognised as being a fundamental barrier to the achievement of sustainable development leading to the first international political agreement on sustainable consumption in Rio de Janiero in 1992 at the United Nations Conference on Environment and Development (known as the UNCED Earth

⁴ For example ‘Limits to Growth’ was criticised for it’s pessimism and neo-Malthusian viewpoint while Schumacher’s ‘Small is Beautiful’ has been criticised for its over-emphasis on decentralisation and restructuring of socio-economic systems around small scale principles (Connelly and Smith, 2006).
Summit). There, the 179 governments present signed up to ‘Agenda 21’, the key policy document arising from the event, which acknowledged the imperative of changing consumption patterns:

“The major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries, which is a matter of grave concern, aggravating poverty and imbalances” (UN, 1992).

Since this point, sustainable consumption has been targeted as an area requiring concentrated, coordinated action at various scales of governance. Although a variety of sustainable consumption definitions exist depending on the interests and ideology of the definer, a commonly cited definition is that developed at the UNEP Oslo Symposium in 1994 (IISD, 1994):

“Sustainable consumption is the use services and related products which respond to basic needs and bring a better quality of life, while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations”.

As this definition reveals, sustainable consumption shows similar concerns to sustainable development in its goal of establishing conditions for human flourishing whilst minimising resource use and associated environmental impacts. However, one of the most contentious questions is how much consumption should and could be reduced. This is complicated by differing interpretations of the constituents of “basic needs” and “quality of life” and the relationship between these constructs and consumption levels. A number of philosophical thinkers have provided theories on the composites of universal human needs (e.g. Illich, 1978; Max-Neef, 1992; Sen, 1999). Max-Neef (1992) presents one of the most cited theories on physiological, social and psychological needs and their contribution to quality of life. The premise of Max-Neef’s thesis is that once basic needs of subsistence and survival (including shelter, housing, clothing and nutrition) have been met, the focus shifts to non-material needs including leisure, participation, affection, freedom, understanding, creativity, and identity. As society grows richer, much empirical research suggests that these non-material needs can become overlooked or replaced through material purchasing leading to marginal improvements in happiness while increasing environmental pressures (Max-Neef, 1992; Abdallah et al., 2009; Lawlor et al., 2009). Although richer societies tend to report higher levels of subjective wellbeing, studies show that beyond a certain level, the correlation between life satisfaction and personal income weakens (Wilkinson and Pickett, 2009). Layard (2005) maintains that once an economy reaches $15,000 per person, economic growth ceases to produce gains in happiness. In support of this claim, Layard cites research showing that despite a doubling of personal wealth over the past 30 years in the United States, reported happiness decreased from 35% to 30%.
Similarly, while access to energy is classified as a basic need (in Max Neef’s terms and by the United Nations Development Programme), there is clearly a threshold, albeit a blurry one, where a shift occurs from basic to more luxurious levels of usage. This is backed by empirical evidence from Reddy (2002 in Najam and Cleveland, 2003) who found that the relationship between energy consumption and quality of life breaks down with as little as 100 watts per person per year. Reddy maintains that this quantity of energy provides enough to service basic cooking needs and home electrification for lighting, indoor warmth or cooling, and to power a small fridge and television. Yet, as Najam and Cleveland (2003) state, 100 watts comprises just one tenth of that required to support a modern western European’s energy demands. This shows that it is not only the replacement of “non-material” needs with material purchasing that is the driver of over-consumption given that what are cast as “basic material needs” such as energy use can also be subjected to societal forces and consumerist pressures. This is reflected in the growth of more luxurious and resource intensive solutions to fulfil “basic” household activities evidenced by the increase in purchase rates of power showers, and ever more specialised cooking, heating and washing appliances (Bode, 2000). Such trends show escalating societal expectations and dimensions of “conspicuous consumption” within realms traditionally delineated as household subsistence and survival. This highlights the shortcomings of relying on what have been termed essentialist conceptions of human needs (Soper, 2008) given that aspects of wellbeing are culturally determined, dependant on personal preferences and variable through time and space (SDC, 2007).

The current economic paradigm based on perpetual growth, driven by a culture of consumerism, has therefore been characterised as having a pervasive environmental and social logic (Stiglitz et al., 2008). Another key social concern is the large discrepancy both between and within nations in their levels of consumption and in the distribution of associated negative environmental impacts (Hinton and Goodman, 2009). In 2009, the highest income countries, containing 15% of the world’s population consumed nearly half the world’s energy and used more than eleven times energy per person than that of low income countries (World Bank, 2009). By contrast, the International Energy Agency estimates that over 20% (1.4 billion) of the world’s population do not have access to any electricity (IEA, 2011a) while more than one billion people worldwide lack access to clean water, a major contributor to high mortality rates especially in rapidly expanding urban areas (Harmon, 2012). Even within developed countries, despite high levels of resource consumption overall, many households struggle to access basic water and energy services due to low personal income or geographic isolation from centralised supply networks.

Population, economic and societal trends indicate that cycles of uneven and excess consumption will continue into the next decades. A predicted population growth of nine billion by 2050 all aspiring to OECD levels of economic growth (of c. 2% per annum) would, according to Jackson (2009), imply a world economy fifteen times larger than its current size. The International Energy Agency (2008) forecasts a 45% increase in energy demand by 2030
from 2006 levels as the world’s population increases and industrialisation spreads. Meeting this demand will be hugely challenging given that the IEA predicts that production from known oil and gas reserves will fall by about 40-60% by 2030 (IEA, 2011c). While at present there is enough fresh water on the planet for its six billion inhabitants, its distribution is highly uneven and much of it is polluted, wasted and unsustainably managed. If present climate change and socio-economic trends continue, the Global Environmental Outlook 4 (UNEP, 2007) predicts that 1.8 billion people worldwide would be living in absolute water scarcity by 2025 and two-thirds of the world’s population could be living under water stressed conditions.\(^5\) Given such demand projections, concern has therefore widened from a focus on peak oil, to “peak everything” referring to impending declines in six key areas of freshwater, climate stability, fossil fuels, agricultural land, fish harvests and uranium production (Heinberg, 2007).

All of these studies build a strong evidence base to show that unrestricted freedom to expand material usage is unsustainable in a finite planet. Strategies of contraction and convergence are therefore often called for. This involves a reduction in resource consumption amongst industrialised nations to allow for sustainable growth in emerging economies while respecting ecological limits (Meyer, 2000 in Darby, 2009). When calculating levels of consumption reduction required, the ecological footprint indicator is often referenced. This is measured in global hectares (gha), representing the amount of biologically productive land and sea area required to sustain levels of resource usage and discharge by a population. Dividing global resources equally, it is said that the average global citizen has 1.8 gha available. In 2012, the Republic of Ireland’s ecological footprint was estimated at 6.19 gha, ranking it tenth highest in the world (WWF, 2012), while Northern Ireland’s was estimated at 5.6 gha in 2005 (DENI, 2006). The ecological footprint indicator demonstrates that if every global citizen adopted Irish levels of consumption, over three planets would be required to support their rates of consumption whilst providing necessary ecosystem services. Thus to minimise ecological footprint inequalities, whilst remaining within the carrying capacity of the planet, large-scale reductions in resource consumption are needed. Typical estimates are that a “factor four” improvement in resource efficiency is required in the immediate term (von Weizsäcker et al., 1998), while others call for a “factor 10”, or “factor 20” level improvement amongst advanced economies in the long-term (Schmidt-Bleek, 2007). Ambitious goals have also been set by the EU to reduce greenhouse gas emissions by between 80-95% based on 1990 levels by 2050 (EC, 2011a). These targets would imply massive dematerialisation and there is widespread agreement within sustainable consumption communities that this will require not only technological solutions but also socio-cultural changes towards less resource consuming lifestyles (Lorek and Spangenberg, 2001; Diaz-lopez et al., 2009; Tukker and Fedrigo, 2009).

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\(^5\) According to the UN definition, once annual water supplies drop below 1,000 m\(^3\) per person, the population is said to face “water scarcity”, and below 500 cubic metres is defined as “absolute scarcity”. (see: http://www.un.org/waterforlifedecade/scarcity.shtml).
2.3 Sustainable household consumption

Household consumption within advanced industrial economies is increasingly being highlighted as an area requiring more attention within policy and research communities (Geyer-Allely and Zacarias-Farah, 2003). Household consumption is defined differently depending on the type of accounting used. When considered as a discrete sector, direct consumption by households is calculated separately from government and private sectors. Using macro-level accounting, the environmental impacts from public and private sectors are incorporated into household consumption figures given that households are the ultimate end-users of their products and services. From this perspective, Lorek and Spangenberg (2001: 16) affirm that in any national economy around 80% of its natural resource consumption can be allocated to households. Within conventional policy discourse, it is more common to separate out these up-stream environmental impacts from production and government sectors and to consider direct consumption impacts from basic household activities. This is reflected in the typically quoted definition of household consumption developed by the Organisation for Economic Co-operation and Development:

“Household consumption is the consumption of goods and services by households. It includes the selection, purchase, use, maintenance, repair and disposal of any product or service. However it does not include consumption by the public sector or intermediate consumption of products and services in the productive sector” (OECD, 2002: 5).

The European Environment Agency (2012a) identify three household consumption categories for which environmental effects are highest. These are: housing which includes water, energy use and waste generation; mobility; and eating and drinking. The contributions of these categories of household consumption to greenhouse gas emissions are estimated in Figure 2.1, while their contribution to other environmental pressures such as material usage can be found in Appendix B. The CONSENSUS research project, of which this thesis research is a part, is examining each of these three categories. The research for this thesis is based on the problem area of “housing”, specifically focusing on issues of direct water and energy consumption by Irish households. Between 1990 and 2005, spending in the “housing” category increased to comprise the heaviest share of European household expenditure at 27.8% in 2005 followed by ‘transport and communication’ (at 15.8%)\(^6\). The household sector is responsible for 25% of the European Union’s total greenhouse gas emissions, of which “housing” comprises the largest share at 30.6% (EEA, 2012b). Figures from the European Environment Agency in 2005 suggest that households consume about 15% of total European

\(^6\) Geographic variation in expenditure on these key areas is evident throughout the EU. EEA (2005) suggests that this variation arises from differences in dwelling type, cultural preferences, levels of urbanisation, structure of rental markets, population, mobility, price differentials and local taxes. Between 1990-2005 there was a decline in the proportion of household budgets devoted to ‘food, beverages and tobacco’ while this remains the highest expenditure category for the lower income new member states.
water use\textsuperscript{7}, while the agricultural sector remains the most consumptive accounting for one third of total use (EEA, 2005). The largest end-use of energy in households in the EU-15 is for space heating and cooling at 68\%, followed by electricity for lighting and appliances at 15\%, water heating at 12\% and cooking at 4\% (EEA, 2012c). With regard to water consumption, personal washing and toilet flushing each account for around 30\% of water use in the average European home (EEA, 2005). A variety of macro socio-economic and cultural trends are expected to place greater demands on energy and water resources for residential usage. These will be discussed in the following sections and range from trends for growth in house sizes with fewer occupants, to increasing rates of electrical appliance purchases, along with escalating cultural expectations for warmth and cleanliness. As issues of climate change, environmental degradation, energy security and resource scarcity grow in prominence, the need to improve the sustainability of household water and energy use becomes increasingly pertinent. As the next section reveals, European level trends in energy and water consumption are replicated within the Irish context, albeit with national specifics arising from particular cultural, technological and politico-economic circumstances.

**Figure 2.1** Greenhouse gas emissions from household consumption in EU-27

![Graph showing greenhouse gas emissions from household consumption in EU-27](image)

Direct and indirect greenhouse gas emissions caused by private consumption distributed by consumption (COICOP category) in EU-27 in 2007 (EEA, 2012b).

\textsuperscript{7} Water use refers to water actually used by end users (e.g. households, services, agriculture, industry) within a territory for a specific purpose such as domestic use, irrigation or industrial processing. Water supply, in contrast, is the delivery of water to end users including abstraction for own final use.
2.3.1 Challenges of sustainable household consumption in Ireland (North and South)

Household consumption in areas of energy, transport, waste and water were key sources of environmental pressure in Ireland during the Celtic Tiger economic boom of the late 1990’s to 2008 (EPA, 2006 in Davies et al., 2010). While a recent EPA State of the Environment Report for the Republic of Ireland asserted that “Ireland’s environment is in generally good condition overall”, it noted that it “faces tough challenges in the coming years to meet EU commitments and targets across a range of areas including water, waste, air quality and green house gas emissions” (EPA, 2012b: iii). These challenges are replicated in the Northern Irish context (DENI, 2008). Despite the fact that Ireland and the UK are on track to meet their greenhouse gas emissions targets for the 2008-2012 period (DECC, 2012; EPA, 2012b), much of this progress has been attributed to the recession and marginal technological advancements and cannot be confused with real transformations towards sustainable living (EPA, 2012). Since 1992, SEAI (2008a) report a trend for relative decoupling in total primary energy requirement, whereby the amount of energy needed to produce each unit of economic output has fallen due to fuel and technology efficiency improvements. However ‘rebound effects’ pose a major challenge to this progress. These effects occur when the efficiency gains in a product or service are cancelled out by more intensive use, or related energy cost savings free up income to spend on other environmentally damaging goods and services. This militates against the achievement of absolute decoupling and economic growth and energy use remain closely correlated. This is illustrated by SEAI (2008a) figures showing that a 10% contraction in the economy between 2007 and 2010 was met by a 9% reduction in energy demand overall, while energy in buildings grew by 9% over this same period. The increase in residential energy use is attributed to the unusually cold weather that led to greater usage of central heating, cancelling out potential efficiency gains from fuel switching and better insulation in new homes and revealing the impact that variations in householder practices have on overall consumption levels.

Water quality in Ireland is better than in many other EU countries, however as EPA (2012b: 43) noted there will be “considerable challenges to meet the objectives of the WFD (Water Framework Directive) within the required timeframes” and water resources are coming under increasing pressure from climate change and growth in demand. In Ireland, there has been a relative lack of research on sustainable development (with the exception of Morrow and Turner, 1998; Turner, 2006a, 2006b; McClenaghan, 2008; Barry, 2009) and even less on sustainable consumption (Lammers et al., 2008; Davies et al., 2010; Winston, 2012). The following section provides an overview of sustainability problems associated with patterns of energy and water consumption in Irish households, drawing mainly upon policy documents and relevant literature from cultural and sociological studies of consumption behaviour. Given commonalities in trends and issues associated with the consumption of these resources in the Republic and Northern Ireland, an integrated discussion is provided, drawing upon any key
differences where present. It is important to note that greater difficulty was encountered finding data on sustainable consumption trends in Northern Ireland than in the Republic of Ireland. This made comparisons problematic in some instances and many figures from the British government are aggregated across the United Kingdom rather than broken down into constituent regions.

2.3.2 Energy consumption in Irish households: trends and issues

Within the Republic of Ireland, facilitated by the ‘Celtic Tiger’ economic boom, energy consumption in the residential sector grew by 38% between 1990 and 2008. Latest figures show that the household sector accounts for around 25% of total primary energy use by sector, coming second after the transport sector (which comprises 34.7% of final energy use) (SEAI, 2010b). Direct energy consumption by the residential sector accounted for 25% of national carbon dioxide emissions in 2008 (SEAI, 2008a), while in 2012, it was estimated that such consumption accounted for 11.5% of Ireland’s greenhouse gas emissions (EPA, 2012a). In Northern Ireland, the residential sector is the largest consumer of energy (at 39%) (Dodds, 2012) contributing to 19% of its greenhouse gas emissions (AEA, 2012). High levels of energy usage in Ireland (North and South) can be attributed to common national and macro socio-economic, population, and cultural trends. In the Republic of Ireland between 1990 and 2008, there was a doubling in the number of houses while average occupancy within these homes reduced by 16% over a similar period (1991-2006) increasing aggregate energy demand (SEAI, 2008b). The reduction in number of household occupants is a general trend across the developed world due to the decline of the traditional nuclear household (Enerdata, 2004). As the number of home occupants is reducing, average floor space is increasing simultaneously. In the Republic of Ireland, there was a 24% increase in average floor space per home over the 1990 to 2007 period (SEAI, 2008b) while in Northern Ireland the average detached house is 17% bigger than the UK average (Carbon Trust, 2005). Longer life expectancies and aging populations and are also expected to have implications for consumption. Older people tend to have second homes, and live in more remote areas that can be vulnerable to environmental pressures and are more difficult to service (EEA, 2005). Coupled with inefficient heating systems and boilers, inadequate insulation and colder weather conditions, energy consumption levels by NI and ROI households are higher than elsewhere in the UK (Carbon Trust, 2005). In 2008, SEAI reported that households in the Republic of Ireland consumed 27% more energy than their UK average and 31% more than the EU-15 average (SEAI, 2008b).

Both countries have exceedingly high levels of fossil fuel imports, making them vulnerable to external supply disruptions and price hikes and contributing to greenhouse gas emissions. The Republic of Ireland’s import dependency was reported at 88% in 2009, 60% of which came from oil resources mainly imported from the UK. Oil comprises the bulk of primary
energy consumption at 52% and natural gas is at 29%. Just 4% of the Republic of Ireland’s energy supply is delivered from indigenous renewable resources (SEAI, 2011). Northern Ireland shows even higher levels of import dependency at 99% most of which (93%) is fossil fuels (Green New Deal, 2009). These are remarkably high when compared to the EU import dependency average of 55% in 2008 (SEAI, 2011). Within Irish households, the largest end-use of this energy for both ROI and NI is space heating representing c.60% followed by hot water heating at c. 24% (SEAI, 2008b; Carbon Trust, 2005). Figures 2.2 and 2.3 below show the profiles of end uses within Irish households, North and South revealing remarkable similarities. Many studies in the UK report that expectations for thermal comfort have been raised through the normalisation of central heating at home and at work and because of more sedentary lifestyles (Lane, 2011). In the UK, average indoor temperatures have risen from 12ºc in 1970 to around 17.5ºc today. Based on historic trends, average internal temperatures in UK households are expected to rise to 20ºc by 2050, stabilising in 2030, this represents a 2.5ºc rise on the 2007 winter average (HM Government, 2009). Much research demonstrates that just a 1ºc increase in internal temperature can increase the energy consumption for space heating by 10% or more (Sorrell, 2007). In addition, there is a tendency to heat more rooms for longer periods, placing upwards pressure on energy demand for home heating (Lane, 2011; Shipworth, 2005). Meanwhile, levels of awareness and action to reduce energy usage in the home are low. A study by Lavelle et al. (2012b) for the CONSENSUS research project showed that over half of the all-Ireland population (53%) had not attempted to cut down on their energy use in the past month. This study also showed that the environment is a low motivator in purchasing energy efficient appliances and in insulating the home.

Figure 2.2  Energy end-use in ROI households

![Energy end-use in ROI households (SEAI, 2008b)](image)
Fossil fuels remain the dominant energy source for home heating although there is a marked difference in types of fossil fuels used between Northern Ireland and the Republic. In Northern Ireland, 70% of households now use oil while 12% use natural gas for home heating requirements (DETINI, 2009). This followed a comprehensive fuel switching programme that between 1996 and 2001 saw a 13% reduction in energy consumption by the residential sector through the move from solid fuel to oil fired heating (Carbon Trust, 2005). By contrast in the Republic, oil use is just 40% and natural gas usage, a less carbon polluting fuel, is much higher at 35%. Electricity fuels 10% of Ireland’s home heating needs, while 15% comes from “other” sources including renewables (Kema, 2008). With the push for energy liberalisation through the single electricity market (SEM) the energy needs of both these countries are served by large, private and commercial state providers including Bord Gáis, ESBI and Airtricity.

Despite trends for aggregate increases in energy consumption by the residential sector, the use of energy is not equitably spread throughout Ireland with many households suffering from fuel poverty. The typical definition for fuel poverty is when a household needs to spend more than 10% of its income on energy in order to maintain an acceptable⁸ level of heat throughout their home (McAvoy, 2007). Fuel poverty is seen to be caused by three main things: poor thermal efficiency of dwellings, low household income and high fuel prices (Home Energy Conservation Authority, 2009). Fuel poverty is pervasive, affecting an estimated 19.4% of households in the Republic in 2009 (DCENR, 2009) and up to 34% of households in Northern Ireland.

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⁸ According to the World Health Organisation an “acceptable” level is 21ºc in the living room and 18ºc elsewhere (McAvoy, 2007).
Ireland in 2006 (the highest of any level in the UK) (NIHE, 2009b). The higher levels of fuel poverty in Northern Ireland are mainly due to lower income levels and the higher costs associated with oil based heating where the average bill was £2,114 in 2012 (Dineen, 2012). McAvoy (2007) reports that the proportion of the population living in fuel poverty increased by 7% between 2001 and 2006. This was mainly due to a 12% decline in personal income and a 38% increase in fuel price, showing the vulnerability of Northern Irish households to energy market fluctuations. Owing to these high levels of fuel poverty, Ireland and Northern Ireland, after Portugal, have the highest levels of excess winter mortality in Europe at 2,800 per year (McAvoy, 2007). Another key challenge for sustainable energy use stems from the inadequately insulated housing stock across Ireland. In a poorly insulated house, it is said that between 20-30% of heat generated is lost. In ROI, almost 60% of its 1.7 million homes are in need of investment to improve energy efficiency (SEAI, 2008b) while the Green New Deal (2009) estimates that over 90% of the 705,000 dwellings in Northern Ireland fail to meet the best energy performance standards.

Lastly, although advancements in home energy insulation, heating systems and appliance efficiency are designed to reduce consumption overall, a widely documented challenge for improving the sustainability of home energy consumption is the existence of rebound effects. Evidence of direct rebound effect is reported in relation to energy efficiency improvements to space heating/cooling, white goods and lighting along with personal transport which together are estimated to result in increases of energy consumption of between 10-30% in advanced economies (Greening et al., 2000; Sorrell, 2007). This is also illustrated in a study by Wallenborn et al. (2009) who found that while efficiency in these household appliances increased by 20% between 1990 and 2004, electricity consumption decreased by only 2% over this period. Higher replacement and purchase rates of electrical appliances are also reported due to rising disposable incomes, lower prices, globalisation and faster fashion and technological change (OECD, 2002; O’Doherty et al., 2008 in Leahy and Lyons, 2009). Once purchased, items are often used in unintended, inefficient ways or used more frequently, placing greater demands for electricity consumption (Verbeek and Slobs eds., 2006 in Geer Ken et al., 2008). Owing to these trends, growth in household electricity usage is expected to occur at 1% per year over the next decade in Northern Ireland (DETI, 2009). Likewise, in ROI, SEAI (2008a) attribute recent increases in electricity consumption (from 16% TPER in 1990 to 23% in 2008) to the rise in home appliance ownership and use. This is aligned with findings from Leahy and Lyons (2009) who show a shift in patterns of consumption over the Celtic Tiger period from one similar to that of low-income OECD countries (like Greece and

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9 It is important to note that there are complications in comparing across fuel poverty calculations mainly arising from calculating fuel poverty based on external research or levels of self-reported fuel poverty. For example, by contrast to the 19.4% figure for ROI derived from the 10% income fuel poverty measure, only 4.6% of the population self-reported as suffering from energy poverty in 2006 (DCENR, 2009). Similarly, a recent Exeter study placed fuel poverty levels at 13% using different calculations - a dramatic difference from the 34% figure used by the Northern Ireland Housing Executive.

10 This is because much of the stock were built pre-1981 when energy efficiency features were not required.

11 Most electricity is consumed for heating water in the home (23%), lighting is responsible for 18% of final electricity consumption, followed by space heating (at 14%), cooking (at 12%) and wet appliances (at 9%) (SEAI, 2008b).
Portugal) to one similar with high-income countries (such as Canada and Australia) with more spending on non-essential goods such as household electrical equipment. The rebound effect is therefore a real challenge for sustainable consumption policies, compromising the goal of achieving absolute decoupling of resource consumption from economic growth (UNEP, 2004b; Sorrell, 2007).

2.3.3 Water consumption in Irish households: trends and issues

In the Republic of Ireland and Northern Ireland, domestic demand for potable water (water treated to drinking standards), has grown in recent years, straining economic resources and enhancing pressures on the natural environment due to water abstraction and treatment requirements. In the Republic of Ireland, household consumption accounted for over 60% of the total demand for water in 2006\textsuperscript{12}. The most demanding end uses after the residential sector are agricultural, commercial and industrial uses. In 1997 domestic demand for water in Ireland was estimated to be 130-139 litres per person, per day. By 2005, this figure had risen to an estimated 148 litres (EPA, 2006). While more up to date figures could not be obtained, this is in line with the general upward trend in residential water consumption across industrialised nations owing mainly to increasing intensities of water use in areas such as personal washing, clothes washing and gardening. This could perhaps account for the slightly higher levels of water consumption of 158.34 litres per person per day reported in Northern Ireland as these figures are more recent (Northern Ireland Water, 2009). Indeed, HM Government (2010) reported an expected increase of 50% in hot water consumption per household in 2050 relative to 2007 due to economic growth, increased use of water, and more water using appliances. Figures 2.4 and 2.5 show the breakdown of water use by activity in households in ROI and NI\textsuperscript{13}. This reveals that personal showering and bathing activities, including wash basin usage, make the most demands on our water usage with the average person consuming between 52-58 litres per day in these activities. In both NI and ROI, drinking and cooking comprise the smallest end use of water at under 6%. Nevertheless, all water supplied to households via the public mains is treated to drinking quality, a situation considered by many to be unnecessary and wasteful in terms of both financial and natural resources (Le Quesne et al., 2011).

\begin{footnotesize}
\textsuperscript{12} Equivalent figures for Northern Ireland could not be encountered. However household use accounts for 20% of total UK water consumption (Lazarus, 2009).
\textsuperscript{13} Note – the breakdown of end-uses is not exactly similar for ROI and NI as comparable data could not be found.
\end{footnotesize}
Figure 2.4  Household water use in ROI

Household water use in ROI (148 litres per person per day)  
(EPA, 2006)

- Showering & bathing: 38%
- Toilet flushing: 27%
- Shaving & bathing: 33%
- Clothes washing: 13%
- Other: 12%
- Gardening: 7%
- Drinking water: 3%
- Cooking: 3%
- Dish washing: 7%
- Washing machine: 10%

Figure 2.5  Household water use in NI

Household water use in NI (158.34 litres per person per day),  
(Northern Ireland Water, 2010)

- Showering & bathing: 33%
- Toilet flushing: 30%
- Shaving & bathing: 33%
- Clothes washing: 13%
- Gardening: 7%
- Other: 5%
- Drinking water: 4%
- Dish washing: 8%
- Washing machine: 10%
Placing these Irish consumption figures into context, it is interesting to note that there are large disparities revealed in levels of water use between developed nations. For example, one of the highest levels of household consumption is in Canada with an average of 335 litres daily per capita consumption, while one of the lowest levels is experienced in Denmark at 116 litres (Dail Eireann, 2004). The low figures for water consumption in Denmark is often attributed to water charging at one of the highest rates in the EU, while in Canada water tariffs are low and 44% of the population are not metered. Cultural norms come into place here too regarding preferences for different fixtures and fittings and practices of water use. High-powered water devices, especially power showers and intensive lawn watering are found to be a particular problem in Canada. Cross-culturally, personal washing is the largest growth area in domestic water consumption. While a once weekly bath was the norm in the middle of the century, modern plumbing and water heating systems, together with growing use of power showers and luxury fittings such as whirl pools, are increasing water consumption in this area (Hand et al., 2005; Ashenburg, 2009). UK figures show that only 5% of households had showers in 1970. Today it is 80%. Growing preferences for power showers, consuming between 10-20 litres per minute, places further pressure on water resources (Ashenburg, 2009). These figures of average daily water use far exceed basic minimum requirements for water use as set by the UN which are 50 litres per person per day or 15 litres for personal washing (73% less than what is currently consumed in developed countries for this activity) (Gleik, 1996). However, a UK study showed that existing solutions in home design and water re-use systems (greywater and rainwater) together with efficient, low flow fixtures can reduce household consumption by almost 60% (Dickie, 2005).

Today in ROI, local authorities produce and distribute water supplies to approximately 90% of the population. However this function is soon to be transferred to a new semi-state water body, Irish Water, who will take over the administration and manage the re-introduction of water charges. Indeed ROI and NI are the only OECD countries that provide water supply and sanitation free of charge and plans also exist to introduce metered water charges in NI under the auspices of a government owned company, Northern Ireland Water Limited. It is estimated that in ROI the average cost of water services per person per year is €650 (OECD, 2009). Currently borne by the state, the lack of water charging is said to contribute to lower levels of awareness and low incentives for prudent water usage amongst Irish households (a claim which is further analysed in Section 2.4). A key problem for both Northern Ireland and the Republic is high levels of leakage in old and poorly maintained public mains systems, prone to bursts, leaks and pressure problems. A 2008 report by the ROI Local Government Management Services Board (2008) revealed water leakage of up to 58.6% in local authority water mains with an average of 41%. While figures could not be obtained for Northern Ireland, an aggregated figure for UK networks showed leakage at about 26% in water mains (Pearce, 2012). The OECD ‘Review of Environmental Performance in Ireland’ (2009) was strongly critical of these “uncommonly high” levels of water leakage when compared with an average of less than 10% in other countries such as Germany. Those who are not on the public mains
(10% of the ROI population - mainly in rural areas) are served by one of the 5,500 plus group water schemes. The overall quality of drinking water produced by group water schemes is generally lower than that of the public mains. However, there was a setback in 2007 due to outbreaks of cryptosporidiosis in Galway public water mains causing the illness of over 240 people and leading to condemnation from the European Court of Justice. According to the EPA (2007: 1) while “many have taken the quality of water in Ireland for granted in the past, this can no longer be the case”.

Around 80% of our potable water is sourced from surface water supplies such as rivers, lakes and reservoirs, while 18% comes from springs and wells. Protecting these sources from pollution is of critical importance, with particular challenges stemming from contamination by organic matter, especially animal slurry, as well as poor maintenance of waste water treatment systems such as septic tanks. Although many think of water problems as distinctly local, they are subject to fluctuations in global weather patterns. Therefore, another fundamental challenge facing these water sources is climate change which will alter rainfall patterns and is predicted to bring a decline in summer rainfall by 20-28% in the south and south-east of Ireland by 2050. This will affect the quality, quantity and accessibility of water supply, impacting residential, agricultural, commercial and industrial sectors (Irish Committee on Climate Change, 2010). At present, water plants in the Greater Dublin Area (comprising Wicklow, Dublin, Kildare and Meath) are being extracted above levels considered sustainable. A shortfall is predicted as soon as 2015 due to increasing population14 and economic demands. This is prompting the search for an alternative water source likely to be the North Lough Derg on the River Shannon (Water Supply Project, 2010).

Findings from Lavelle et al.’s (2012a) all-Ireland survey show low conservation behaviour amongst the Irish public. Some 40% of the respondents stated that they do not pay much attention to the amount of water they use in their homes. In a recent Eurobarometer survey (EC, 2009c), the main concerns of respondents related to water quality, and increases, rather than decreases of water supply perhaps linked to the high levels of rainfall in Ireland which promote perceptions of abundance. Increasingly, the link between the two key resources of water and energy use in Irish households is being highlighted, especially in the context of climate change mitigation and adaptation. Large quantities of energy are consumed through pumping, treating, distributing and heating water for domestic uses and in the collection and treatment of wastewater (Solomon, 2010). A recent Environment Agency study estimated that energy usage to heat water for bathing, cooking and cleaning within British households accounts for 25% of fuel bills and more than 5% of total UK greenhouse gas emissions (Environment Agency UK, 2009). Similarly, water is vital for the production of energy in all its forms and is used, for example, to pump oil wells and for cooling in energy plants (Maas, 2010). Consideration of sustainable consumption therefore requires making linkages across these various sectors and scales.

14 It is estimated that the population in Ireland will reach 5 million by 2020 (Water Supply Project, 2009).
2.4 Sustainable consumption policy: approaches and critique

The previous section served to highlight the many economic, organisational, social and environmental challenges to the achievement of more sustainable household water and energy consumption. Issues of security of supply, dependency on fossil fuels, poorly insulated homes, rebound effects, socio-demographic trends and growing expectations for home warmth were highlighted as key problems for sustainable energy usage in Irish households. With regard to water usage, high levels of water mains leakage, climate change, escalating demands for water and expectations of unlimited water supply were shown to be crucial problem areas. This section analyses policy responses to sustainable consumption at various tiers of policy making, given their crucial role in encouraging and governing the shift to more sustainable consumption patterns. Governing bodies set the regulatory, institutional and market frameworks within which a variety of actors (consumers, public authorities, business and civil society organisations) interact and consumption takes shape. With their role in maintaining and creating domestic water and energy infrastructure and controlling land-use planning they are said to play a role in the “moral framing of social goods” and are thus major shapers of household consumption practices (Jackson and Michaelis, 2003: 60). Furthermore, the public sector occupies a unique position as a substantial end-consumer of goods and services and is expected to play a leadership role in coordinating, supporting and initiating visionary and exemplary actions toward sustainable living (UNEP, 2008a). This section begins by outlining action at the international and EU scales with particular attention to EU regulations and frameworks on water and energy consumption that have had a major bearing on Irish national policy. Next, policy responses in Northern Ireland and the Republic of Ireland are detailed with reference to national sustainable development strategies, energy, water and economic policy. The section concludes by critiquing the benefits and limitations of conventional policy responses to sustainable consumption and the behavioural models upon which they draw.

2.4.1 International and European policy action

Although the international policy arena remains an area of limited regulatory action within the environmental agenda (with the exception of the Montreal Protocol and the Kyoto protocol on carbon emissions), international conventions and task forces play a key role in driving regional and national action and shaping principles for sustainable consumption. As mentioned in Section 2.2, the Agenda 21 of the Rio Earth Summit in 1992 represented the first formal recognition of problems related to over-consumption. In 1998, The UN Sustainable Consumption Network was set up (now the Sustainable Consumption and Production, SCP branch). This marked the start of the United Nations Environment Programme (UNEP) taking the lead in the area of sustainable consumption together with the United Nations-Department

15 GPP Spending by public bodies accounts for c 16% of EU GDP (EC, 2008).
of Economics and Social Affairs (UN-DESA). That same year, the Human Development Report focused specifically on consumption, noting the uneven distribution of its benefits and dis-benefits and resultant growing social and environmental inequalities. In 1999, the UN Guidelines for Consumer Protection were expanded to include new elements on sustainable consumption relating to consumer research, providing information, testing products, promoting recycling and eco-products, encouraging life cycle thinking, and strengthening regulatory and economic measures (Jackson, 2006). At the Johannesburg World Summit on Sustainable Development (WSSD) in 2002, Sustainable Consumption and Production (SCP) was targeted as one of the three key goals of sustainable development together with ‘poverty eradication’, and ‘protection and management of the natural resource base’. The WSSD also set in motion the Marrakesh Process calling for a ‘10-year framework of programmes’ (10YFP) to assist countries in their development of national SCP policy with participation and support from the private sector, civil society, development agencies and other stakeholders (EEA, 2007). Since then, a number of global and regional roundtables on SCP have also taken place, and a range of expert task forces have been developed. In recent years, UNEP have produced a number of guidance documents and reports for the advancement of sustainable consumption. These include guidelines for promoting sustainable lifestyles through communication programmes (UNEP, 2005b) and guidelines for national programmes on SCP (UNEP, 2008b). Such guidance documents, supports and frameworks developed through these UN led international programmes have played a large role in shaping European policy responses to sustainable consumption.

At both the Rio Earth Summit (1992) and the World Summit on Sustainable Development (2002), it was emphasised that industrialised countries should take the lead in the newly defined SCP policy area. Reflecting this focus, the EU has included SCP as a key element in recent environmental policy making, setting the direction of member state policy. To date, SCP has been promoted in three key policy frameworks: the Lisbon Strategy (2000-2010), the Sixth Environmental Action Programme (2002-2012), and the EU’s Sustainable Development Strategy (EC, 2001, updated 2006) (EEA, 2007). The EU Sustainable Development strategy links in with the UN’s Marrakesh Process and contains what has been the cornerstone of EU policy on sustainable consumption - the Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan, launched in 2008. The SCP/SIP identified a mix of voluntary and regulatory actions to improve the quality of information on the environment and the efficiency of products, to aid green purchasing, and to support environmentally superior companies - all with a stated intention of decoupling economic growth from resource use. A range of directives concerned with promoting energy efficiency in

16 National roundtables have been held in Brazil, China, India, South Africa. Task Forces comprise the following groups: Sustainable Building and construction, Sustainable Tourism, Sustainable lifestyles, Education for Sustainable Consumption, Cooperation with Africa, Sustainable Production Policy, Sustainable Products (UNEP, 2009).
areas of product and building design and labelling were also launched under the SCP/SIP strategy (Szlezak et al., 2008).\(^\text{17}\)

Key directives include the Energy Labelling directive requiring the display of the energy performance of electrical equipment and the Energy Performance of Buildings directive (EPBD). The EPBD requires member states to set minimum energy standards for buildings to achieve a ‘nearly zero-energy’\(^\text{18}\) building standard by 2020, and to implement certification programmes illustrating a building’s energy efficiency rating (Williams \textit{et al.}, 2011). The provision of energy performance information that these directives require is said to encourage sustainable purchasing choices and to reinforce the bottom up approach of Agenda 21, providing a means for all levels of society including individual citizens to get involved in decision-making about the environment. As well as targeting the consumption phase, eco-labels are also considered a market-based tool as they encourage and reward products and services that are kinder to the environment, helping business to capitalise on growing green markets (Erskine and Collins, 1997). Another key directive within the EU sustainable consumption portfolio is the Energy Using Products directive (EuP) which defines environmental requirements for energy-using appliances. The over-riding focus on energy efficiency above other environmental measures such as life-cycle analysis has been criticised for being reductionist and simplistic as it is estimated that energy use accounts for only 35-40% of environmental impacts of any electronic product. Additionally, common eco-labels such as the Energy Labelling directive and the EU Energy Star apply only to home appliances and office equipment, which represent a small portion of consumer goods (Tukker \textit{et al.}, 2008a). Owing to this criticism, the Energy Using Products directive was updated in 2009 from its focus on energy using products to include all products that have an indirect impact on energy during use such as insulation, glass windows and water using products (EC, 2009b).

In addition, the EU is currently undergoing a consultation for the introduction a ‘water performance of buildings’ (WPB) directive that would include minimum water performance ratings and auditing schemes on buildings. These directives are part of larger suite of guidelines targeting SCP including the Waste Electrical and Electronic Equipment (WEE) directive, the Restriction on the use of Hazardous Substances directive (RoHS), the Eco-Management and Audit Scheme (EMAS) and Green Public Procurement (GPP) guidelines (Doran, 2007).

Issues of politics, power and influence in the creation of these EU design directives are explored by a range of authors with many noting the influential role of industry in decision-making processes (Wallenborn \textit{et al.} 2009). Referencing the EuP, Wallenborn \textit{et al.} (2009) note that while the process involves negotiations between industry representatives, NGOs, NGOs,\(^\text{18}\)

\(^{17}\) Further details of these directives can be found in Appendix C including detail on how these have been transposed into Irish law. A directive is a legislative act of the European Union. It requires member states to achieve a particular result without stipulating the means for its achievement. It is distinguished from regulations which are self-executing and do not require any implementing measures (Connelly and Smith, 2006).

\(^{18}\) A ‘nearly zero-energy’ building is defined as a building with a high energy performance where the very low amount of energy required should, to a very significant extent, be met by energy from renewable sources, including renewable energy produced on-site or nearby (Williams \textit{et al.}, 2011).
and policy makers, the construction of standards is largely based on the exchange of scientific data and expertise principally generated by industry. From the authors’ perspective, the emphasis on technical functionality of appliances is to the detriment of considering a systems approach. For example, a systems approach to the problem of clothes washing would require analysis of the clothes themselves, water, washing powder, the washing machine, user-behaviour and involvement in the process. In addition, due to a dearth of information on the use phase (EEA, 2005) average use patterns, or behavioural ideals are used to inform the development of the EuP and energy labelling systems. This according to Wallenborn et al. (2009) obscures the variability in user-practices which can result in widely differing levels of energy consumption.19

The premise of regulatory directives is that they send a strong signal from government on the importance of sustainability issues and stimulate voluntary business action in advance of, and upon implementation of regulations (Tukker et al., 2008a). Stimulated by regulatory drivers and rising demand for corporate social and environmental responsibility, voluntary industry-led agreements have grown at European and nation state levels in the retail, waste, energy/climate change, food and chemicals sectors (Jordan et al., 2003). The EU often supports these voluntary business initiatives and played a role in establishing the European Retail Forum in 2009.20 With participants from 24 individual retailers, consumer and environmental organisations, the initiative aims to identify and exchange best practice on sustainable consumption and to promote choice editing strategies which involves removing unsustainable options from company offerings. Indeed, choice editing in the fridges and freezers sector is credited with playing a key role in shifting the market towards more efficient appliances (EC, 2009a). Voluntary codes can also exert upwards pressure for formal regulations as was seen in 2008 when the level three rating of the voluntary Code for Sustainable Homes was made mandatory in Northern Ireland (NIHE, 2009a). Although regulatory directives can be effective in stimulating innovation and driving standards (Tukker and Fedrigo, 2009), the EU’s regulatory instruments have little direct impact on consumption behaviour as they typically target activity further upstream in the production stages. Additionally, they have been criticised for the administrative burden they involve and issues with monitoring and enforcement have been voiced. For example, compliance with the EuP is self-declared by the manufacturer and national bodies are required to monitor labelling. However as Pender et al. (2007) show, monitoring is frequently lax, especially in the Republic of Ireland. Others note the unintended consequences of top-down legislative interventions as evidenced by the EU-wide ban on incandescent light bulbs in 2009 which brought new

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19 In the case of the washing machine, EuP standards are based on the assumption of a standard 60°C cotton wash with a full load. However, Wallenborn et al. (2009: 40) note a number of studies which show that washing machines are most frequently used at lower temperatures, with less capacity (68% on average) and use more mixed textiles than assumed in standards.

20 See: http://ec.europa.eu/environment/industry/retail/about.htm. Other relevant industry initiatives include the European Soap, Detergent, and Maintenance Products Industry Association (AISE) ‘Code of Good Environmental Practice’ that requires manufactures involved (who represent 90% of the market) to provide information labelling, online information and usage instructions for users to make laundry less environmentally damaging. See: www.washright.com and www.sustainable-cleaning.com.
problems relating to environmental and health issues surrounding the production and disposal of new energy-saving CFLs (Davies et al., 2012b). These light touch regulatory and business-led strategies characterise the EU’s action in this field, as reflected in their mission statement for sustainable consumption and production below:

“Sustainable consumption and production maximise businesses potential to transform environmental challenges into economic opportunities and provide a better deal for consumers. The challenge is to improve the overall environmental performance of products throughout their life-cycle, to boost the demand for better products and production technologies and to help consumers in making informed choices (EC, 2012b).

This focus on “boosting demand” for greener products and services and greening existing patterns of economic growth reflects the EU’s traditional concern with economic development and the pursuit of ecological modernisation strategies based on technological and market fixes (Szlezak et al., 2008; Hinton and Goodman, 2009). As of yet, the EU has failed to regulate for, or even enter into debate on measures that would yield absolute reductions in demand. This stems from the difficulty in setting quantitative and qualitative indicators for strategies of “sufficiency” that are based on reduced levels of consumption supported by socio-cultural changes versus typical efficiency metrics. More fundamentally, difficulties arise from political requirements to deliver market growth and labour productivity and from the doctrine of consumer sovereignty.

Many commentators are in agreement that with small tweaks to the existing system, the goal of decoupling is virtually unattainable (Elzen et al., 2004; Darby, 2007; Tukker et al., 2008a; Diaz-lopez et al., 2009; Jackson, 2009). Nevertheless, this ‘win-win’ approach remains a strong rhetoric within EU policy and is especially prevalent in the recent Resource Efficient Europe Flagship Initiative. Launched in 2011, the goal of the initiative is “to create a framework for policies to support the shift towards a resource-efficient and low-carbon economy” (EC, 2011b: 3). The initiative aims to boost employment in the green sector and to stimulate technological innovation while ensuring the security of supply of natural resources and helping in the fight against climate change. It is part of a range of seven “flagship initiatives” under the Europe 2020 Strategy for areas such as energy, transport, resource use and climate change that aim to build towards the achievement of the EU’s headline 20-20-20 targets. These targets involve a 20% reduction in greenhouse gas emissions, raising the share of energy consumption from renewable resources to 20%, and a 20% improvement in energy efficiency by 2020 (EC, 2011b). With full implementation of existing measures, the EU states that it is on course to meet its 20-20-20 greenhouse gas and renewable energy goals however it forecasts that only 10% improvements in energy efficiency will be achieved by 2020 (EC, 2011 in WWF, 2011). These are the first milestones towards achieving the EU’s long-term (as of yet non-binding objective) of reducing greenhouse gas emissions by 80-95% by 2050 compared to 1990 levels.
Going forward, the directives and recommendations developed initially under the SCP/SCIP will be extended within the remit of the Resource Efficient Europe flagship initiative. Three key policies within this flagship initiative are of relevance to sustainable consumption research and show a trend whereby the EU is beginning to stretch the temporal limits of its strategic policy direction. The first one and most closely related to the SCP field is the ‘EU Resource Efficiency Roadmap 2020’ launched in September 2011. The main recommendations of this roadmap are: increased usage of market-based instruments; the phasing out of environmentally harmful subsidies; the greening of tax systems; and greater information on the true costs of resource use to society (the rationale for these economic and communicative measures is outlined in further detail in Section 2.4.5). This is complemented by specific renewable energy and energy efficiency targets outlined in the ‘Roadmap to a Low Carbon Economy in 2050’ and ‘EU Energy Roadmap 2050’ initiatives to build towards the 80-95% greenhouse gas emission reduction target (EC, 2011a).

By comparison to its policy guidance and regulatory action on energy efficiency, to date the EU has given less prominence to issues of water consumption. Instead, debates around water have tended to be dominated by issues of water quality and challenges of cross-border river basin management as addressed in the Water Framework Directive (WFD). This has been the primary legislation on water. Its key aims are: to ensure sustainable extraction rates and water use; to prevent deterioration and enhance status of ecosystems; and to achieve good levels of water quality for human and environmental health. With regard to “sustainable water use” under Article 9 of the Water Framework Directive, national water pricing policies are required to provide adequate incentives for efficient water usage as well as a contribution to the cost of providing water services (DECLG, 2012c). As Section 2.4.2 will show, this has influenced recent policy within Ireland and Northern Ireland for the re-introduction of household water charges. While sustainable consumption issues were somewhat overshadowed by issues of ecology and water quality in the WFD, there are indications that this will take a more prominent role in future European policy. The impending Blueprint to Safeguard Europe’s Water will guide the EU's long-term water policy response with the overarching aim to “ensure good quality water in sufficient quantities for all legitimate uses” (EC, 2012a: 1). The Blueprint will represent the water milestone on the EU Resource Efficiency Roadmap 2020 and will continue to extend right up to 2050. It will build upon existing work under the WFD, action on water scarcity, drought, and climate change. Water efficiency is highlighted as a key area for concern in the draft Blueprint document with the aim being to enhance knowledge on future trends in water demand and availability and to “provide first indications for water efficiency targets” at EU, state, sectoral and river basin level. These targets represent the first regulatory attempt by the EU in the domain of sustainable water consumption. Other areas the Blueprint will target are ways to improve the water efficiency of devices, buildings and distribution networks (EC, 2012a). Figure 2.6 below presents the key International and European policy developments on sustainable consumption.
Figure 2.6  Key sustainable consumption policy developments: international and European levels

Global
- Rio Summit
- UNSCD work programme on SCP
- Jo'Burg Summit
- UNSCD review of SCP
- Rio+20
- Global framework of programmes on SCP

European Union
- 6th Environmental Action Programme
- Renewed EU Sustainable Development Strategy
- EU SCP Action Plan
- Directives (Appendix C)
- Europe 2020 Strategy
  - EU Resource Efficiency Roadmap 2020
  - Roadmap to a Low Carbon Economy in 2050
  - EU Energy Roadmap 2050
  - Blueprint to Safeguard Europe’s Water

National
- Implementation of national SCP action plans & Sustainable Development Strategies
- Implementation of national measures on water and energy

Timeline
- 1992
- 2002 / 03
- 2006
- 2008
- 2013

Legend:
- Event
- Policy
- Process
2.4.2 National action for sustainable consumption

Driven by UN and EC policy agendas, a number of nation states have developed specific SCP Action Plans. This was a recommendation from both the Marrakech Process and was reinforced at UN SCP conference held in Ljubljana, Slovenia (2007) where there was a call for national governments, in co-operation with business and society to “develop long-term national visions and frameworks of SCP, with due respect to available evidence, national context and the sense of urgency” (EEA, 2007). In 2009 it was reported that, globally, 30 countries had either developed SCP policies or were in the process of doing so (UNEP, 2009). Progress has been lagging amongst EU states and as Tukker et al. (2008a) note, only four member states: the UK, Finland, Sweden and Czech Republic had developed National Action Plans by 2008. These countries each adopted varying strategies focusing on different aspects of the SCP chain. The UK strategy emphasised the role of business, the Swedish strategy focused on consumer action, while Finland stressed research and development and stakeholder involvement (Tukker et al., 2008a). Although the EU sets the overall direction and targets for member state policy, this variance in national implementation strategies arises from differing political, institutional, and cultural contexts and varying interpretations of what sustainable consumption is and how it should be governed (Jackson, 2005; Davies et al., 2012b).

This section focuses on action taken by Ireland (ROI and NI) on sustainable water and energy consumption, referencing key policy documents. National policy has been strongly influenced by international initiatives and EU environmental policy which has shifted from more reactive styles of the past to the establishment of a range of environmental standards (Taylor, 2001 in Davies et al., 2010). Due to the diffuse and interconnected nature of environmental problems, since renewed devolution in 1998, there has been a push for formal collaboration between NI and ROI in environmental governance. This is emphasised in Northern Ireland's National Sustainable Development Strategy (2006 - present), which dedicates a section to the issue, stating: “we are acutely aware of the need to look at sustainability issues on an all-island basis” (DENI, 2006: 8). The strategy stresses the benefits that this can bring including economies of scale and enhanced outcomes, especially in the areas of river basin management through the WFD, air quality, waste, and biodiversity. In relation to sustainable consumption, NI’s Sustainable Development Strategy states the intention of conducting a joint project (between the NI administration and the ROI Environmental Protection Agency) to develop an all-island ecological footprint. It asserts that collaboration is necessary in the future to “to harmonise fiscal measures to avoid market distortions” and to produce the All-island
Energy Market Development Framework. Despite these intentions, it is interesting to note that no formal statements of co-operation are made in the Republic’s national sustainable development strategy with specific mention given only to the development of a North-South electricity interconnector and co-operation on integrated river catchment management (DECLG, 2012a). While there were intentions of collaboration between the NI Sustainable Development Commission and its Republic of Ireland counterpart, these were cut short after both these independent agencies were decommissioned due to economic pressures (Sustainable Development Commission Northern Ireland, 2010). So far, the only means for cooperation are found through the North-South Ministerial Council and the British-Irish Council, however, as Barry (2009) comments, progress has been slow and difficult to measure due to the lack of transparency surrounding these institutions. Gaps exist in the literature as little work draws on the relationship and interactions between the NI administration and ROI government in the area of sustainable development, despite recommendations from various researchers (for example Ellis et al., 2004, and Macrory, 2004 in Barry, 2009).

Strategies employed by the Republic and Northern Ireland are therefore discussed separately in the following sections. To start, each country’s overall guiding strategy on sustainable consumption is outlined with reference to key policy documents followed by an elaboration of responses to target household water and energy consumption specifically. As Davies et al. (2012b) note, economic and communicative instruments are the cornerstone of Irish policy for sustainable consumption. Economic instruments, variously called Market Based Instruments (MBI) focus on guiding rather than restricting markets and are increasingly being adopted as ‘softer’, less administratively burdensome approaches to regulatory interventions. MBI are based on the premise that many negative environmental trends are related to the market’s failure to reflect the true environmental and social costs of products and services. They therefore aim to ‘correct’ this market inefficiency to ensure that environmental costs are ‘internalised’ or reflected in market prices (OECD, 2002). The primary aim of these MBI is to speed the switch to greener markets often with a focus on stimulating the sustainable building sector and enabling more efficient household energy use. Predominant MBI include eco-taxes (e.g. fuel tax, or plastic bag tax), tradable permit schemes (e.g. the EU Emissions Trading Scheme) resource charges (such as domestic water and waste charges) and monetary incentives like lower VAT rates on energy efficient products and grants for supporting home

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21 No further details on “potential fiscal measures” are outlined in the NI National Sustainable Development Strategy. The ‘All-island Energy Market Development Framework’ is driven by the EU push for the creation of a Europe-wide internal market in electricity and gas. Collaboration between the NI Executive and the Irish government has been underway since 2004 to harmonise energy trade agreements, generation adequacy, improve security of supply and increase penetration of sustainable energy and energy efficiency measures (DETI and DCMNR, 2004).

22 The North-South Ministerial Council was established under the Good Friday Agreement in 1998. It comprises Ministers of the Northern Irish Executive and the Irish Government who meet to discuss issues mainly relating to waste management, environmental research, and water basin management (North-South Ministerial Council, 2010). The British-Irish Council (est. 1999) holds a similar role to the North-South Ministerial Council and includes all the UK devolved administrations. Among many issues, the council looks at health, agriculture, environment, energy and housing (British-Irish Council, 2010).
insulation upgrades (Jordan et al., 2003; Convery, 2009). Communicative instruments comprise a major element of sustainable consumption policy at European and national levels (Moloney et al., 2010). These involve eco-labelling, educational programmes, energy and water metering and environmental awareness campaigns. A recent study by the UNEP (2005a) found that 80% of governments surveyed had promoted mass media awareness campaigns mainly on energy efficiency, water conservation, and recycling. The provision of information on levels of energy and water consumption in the home through smart meters, information displays and informative billing is increasingly being promoted by governments and utility services alike. Such information is utilised as a means of engaging users in demand management which is considered “any programme which communicates with the consumer and either enables them or encourages them to lower or shift consumption” (Darby, 2009). Darby (2006) in her review of case studies on the subject found that direct feedback through meters and displays was the most effective tool, achieving savings in the region of 5-15% while indirect feedback such as billing information and annual reports, yielded savings of 0-10%.

These non-interventionist, informational strategies are viewed by policy makers as alternatives to regulation and are sensitive to the consumer sovereignty concept, prevalent in modern neo-liberal societies (Maniates, 2001). In contrast to the debatable merits of information provision strategies, the merits of environmental education within formal education settings and syllabus along with semi-formal peer to peer learning groups are well documented (Davies, 1999a; UNESCO, 2009). Education for Sustainable Development (ESD) is heavily promoted by the UN through UNESCO (United Nations Education, Scientific and Cultural Organisation) which “seeks to integrate the principles, values, and practices of sustainable development into all aspects of education and learning” (UNESCO, 2010). For this reason, many national strategies incorporate educational programmes at various tiers in the education system.

2.4.3 Republic of Ireland: sustainable consumption policy (water and energy)

The main document in which sustainable consumption policy is addressed is the Framework for Sustainable Development In Ireland (FSDI) (DECLG, 2012a). This replaced the long outdated National Sustainable Development Strategy (1997-2002) which, without being explicit in targeting sustainable consumption as a specific area for policy action, touched on issues of pro-environmental behaviour change, awareness and attitudes (DEHLG, 1997). Driven by developments at the EU level, "resource efficiency" is now the pervasive discourse and the guiding logic of the FSDI. This is articulated in the following statement:

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23 This is in large part driven by the EU Energy-end use Efficiency and Energy Services Directive (2005) that calls for the introduction of smart meters and improvement in the information given to energy consumers.
“Resource efficiency allows us to do more with less, delivering greater value with less input and using resources in a sustainable way...embracing resource efficiency offers a path to economic growth and the creation of decent jobs” (DECLG, 2012a: 30).

This reflects the growing emphasis on the green economy in government sustainability responses that aim at “encouraging technological eco-innovation and private sector enterprise, effectively greening the outputs of the mainstream economy” (Davies, 2012a: 2). This has led to a prioritisation of economic instruments (such as taxes, business supports and grants) and communicative instruments in policy responses. The FSDI identifies the following key elements; waste management, producer responsibility, recycling initiatives and infrastructure, environmental levies, public awareness, green public procurement, motor and carbon tax, water metering (in 2016), resource efficiency programmes for business, and learning through the education system. Much of the FSDI is devoted to general discussion of environmental problems and although reference is made to one planet living (“essentially we must live, produce and consume within the physical and biological limits of the planet”) there are no statements that this will require consumption reductions (DECLG, 2012a: 31). Aside from the EU 20-20-20 targets, no other targets such as ecological footprint indicators or carbon footprint calculations are provided to show the decrease required in overall material usage by individuals. A statement is made hinting that technological solutions alone are insufficient: “faster diffusion of existing technological and behavioural innovations is equally essential to improving resource efficiency” (DECLG, 2012a: 39). However there is no elaboration as to what such “behavioural innovations” could comprise, other than a commitment to continue with existing environmental awareness and education campaigns. The FSDI also plans to implement the long overdue Green Public Procurement Guidelines promised since 2008 (Department of the Taoiseach, 2008). Given that the government purchasing budget is over €10 billion per year, it is recognised that this would have good leverage in supporting greener products and services in Ireland and in providing a positive example to the public (DEHLG, 2010c). Towards the goal of “greening” markets, financial and strategic support has been made available for businesses offered through Enterprise Ireland, the Cleaner Greener Production Programme, Irish Business Employers Confederation (IBEC) environment awards, and Business in the Community (Doran, 2007).

Aside from high-level national sustainability policy, strategies for sustainable home energy use are also addressed in a variety of national climate change and energy efficiency policies. In the National Energy Efficiency Action Plan (DCENR, 2009) the government required carbon neutrality for new build by 2013 and a long-term 20% reduction in energy demand by 2020 across the economy through energy efficiency measures (as required by the EU Energy Services Directive). Nearly 50% of these energy savings are earmarked to come from the residential sector, half of which (i.e. 25% of the total 20% target) will be delivered from space and water heating and cooling. The main means by which these reductions aim to be achieved is through the use of efficient boilers, fuel switching to cleaner and renewable
solutions and mass energy efficiency upgrades for households. In ROI in 2010, the
government pledged €90 million for home energy efficiency retrofits, €36 million of which was
allocated for lower income houses (Casey, 2010). The aim is to retrofit one million homes by
2020. However at a cost of between €3,000-8,000 per home, achieving financing by
government and homeowners continues to be problematic (McGee, 2012). (See Appendix D
for a full list of home retrofit schemes available in ROI).

To disincentivise fossil fuel usage, a carbon tax was introduced in ROI in 2009 amounting to
down the carbon tax was met with a
frosty response in particular from the Irish rural community who felt that the tax would have a
negative impact on rural dwellers who have no public transport alternatives and would affect
those already living in fuel poverty (Irish Rural Link, 2009). As required by the EU End-Use
Efficiency and Energy Services Directive, the National Smart Meter Programme foresees the
rollout of gas and electricity smart meters to households across Ireland between 2015-2019
(CER, 2009). In a pilot of these meters, the CER reported reductions of 2.9% in gas usage,
2.6% reductions in electricity consumption and an overall 8.8% reduction in peak electricity
consumption (CER, 2012). However, their roll out is a financially intensive strategy, estimated
to require investment of €1 billion and agencies concerned with fuel poverty have cautioned
that smart meters may lead to rationing amongst the fuel poor at the expense of health and
comfort. The Sustainable Energy Authority of Ireland have developed a Residential Energy
Roadmap to explore how energy use by the household sector could be reduced by 90% by
2050. The roadmap states that this could be achieved with “very high levels of energy
efficiency retrofit, deployment of renewable energy technologies and low and zero carbon
(LZC) technologies, high levels of electrification and decarbonisation of the grid” (SEAI,
2010b: 5). While it is encouraging that existing technological solutions could achieve these
reductions, the full deployment of these technologies and infrastructures would be hugely
capital intensive. Also, within these policies there is no attempt to outline the kinds of savings
that could be achieved by ‘softer’, potentially cheaper measures including changes in norms of
heating and washing practices.

A bias towards capital intensive, new supply and infrastructure repair solutions rather than
targeting the consumption side also characterise the Republic’s water policy. This is
encapsulated in the following statement from the Dublin Region Water Supply Project:

“Projected demand increases from 2008 to 2016 will be met by further
development of the existing water supply sources to their sustainable limits and
by further reducing leakage levels through network rehabilitation initiatives
anticipated to cost in excess of €120 million over the next five years” (Water
Supply Project, 2010).
This typical “predict and provide” strategy does little to challenge engrained consumption patterns and overlooks the capacity for evolution in water using practices towards less resource intensive forms. Within ROI policy rhetoric the language of ‘water conservation’ tends to be used to denote reduced losses in supply infrastructure rather than conservation measures by users. As the previous section showed, there are exceedingly high levels of leakage in both Northern Ireland and the Republic of Ireland. While these need to be tackled, infrastructure upgrades require extremely high levels of investment. In ROI an investment of €300 million was pledged in 2010 to fix leaks and replace damaged networks in the water system up to 2013 (DEHLG, 2010b). Likewise, a study by the Pacific Institute on water saving measures for California found that total urban water use could be cut by 30% using off the shelf technology (such as low flow toilets, taps and shower heads) at lower cost and quicker than new supply projects (Gleick et al., 2003).

As a first action in regulating for water efficiency in buildings, Part G of the National Building Regulations (1997-2009) were updated in November 2008 to include a requirement for dual flush toilets in new and existing buildings where toilets are being replaced (DEHLG, 2010b). In Ireland, households are not charged for water supply and wastewater treatment services at present (aside from Group Water Schemes which are independent, community owned sources that serve c.10% of households). In the OECD’s 2009 Review of Environmental Performance report for Ireland, they commented that the lack of charging “impedes the development of an economically, environmentally and socially efficient water services sector” (OECD, 2009: 11). Currently, Ireland is the only OECD country that does not charge households for their water use. A range of quantifications for reductions in consumption owing to water metering are found in the literature ranging from between 5 and 15% where questions of meter design, feedback systems and customer support play a large role in determining the levels of reduction achieved (Darby, 2009; Environment Agency, 2011). A commitment was therefore made for the introduction of metered water charging in the domestic sector by 2011 in the Renewed Programme for Government (Department of the Taoiseach, 2009). Progress has been slow to date however and recent statements indicate that the programme may not include advanced metering display feedback, potentially reducing the capacity of savings. Also, the national roll-out is not expected to be complete until 2016 (McBride, 2012). It is estimated that the average yearly cost to a household will be between €100 - €400 (McBride, 2012) while the costs of installing water meters and associated administration is high at €500 per household (Melia, 2012). Recently, advancements have been made to integrate energy and water metering technologies. Malta has implemented the first large-scale multi-utility smart meter programme showing both water and energy consumption. This is designed to assist consumers but also to gather information to enable correlations between the use of these resources and variables such as weather conditions, or pricing policies (Darby, 2009). Rather than opt for integrated metering programmes, the Republic of Ireland is now pursuing separate strategies for home energy
and home water metering citing “technological obstacles” together with economic concerns as reasons for avoiding an integrated programme (CER, 2012: 40).

In the Republic of Ireland, the ‘Tap Tips’ awareness campaign (2007) remains the only national water campaign to date. It was run by a consortium of local authorities in the Greater Dublin Area, and comprised mainly a website with little funding for educational programmes (www.taptips.ie). On a larger scale, was the multi-million euro ‘Change’ campaign on climate change (2008-9) and the Power of One campaign on energy efficiency (2008-ongoing) that each included dedicated websites and large advertising and PR campaigns. The Green Schools programme, run by An Táisce (the National Trust for Ireland) in cooperation with local authorities is in operation in almost 50% of the countries’ schools. The programme involves students in the development of waste, energy and water management systems and provides educational resources for climate change and other environmental issues. To date, the Green Schools programme has been heralded a success and Mathar (2006) found that green school students displayed higher scores in all environmental behaviours assessed.

Table 2.1 Summary of interventions targeting sustainable household water and energy consumption in Republic of Ireland

<table>
<thead>
<tr>
<th>Tool</th>
<th>Energy</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>• Carbon tax €20 per tonne on carbon dioxide emitted from fossil fuels.</td>
<td>• Water charges by 2016 on a metered basis above a universal allowance</td>
</tr>
<tr>
<td></td>
<td>• Retrofit grants (see Appendix D)</td>
<td></td>
</tr>
<tr>
<td>Regulatory</td>
<td>• Building regulations for carbon neutrality by 2013 in new build</td>
<td>• Part L Building Regulations require dual flush toilets</td>
</tr>
<tr>
<td></td>
<td>• Requirement for Building Energy Ratings (BER) upon sale, rental or in new build</td>
<td></td>
</tr>
<tr>
<td>Communicative &amp; educational</td>
<td>• Smart energy metering (due 2015-2019)</td>
<td>• Water metering and billing (2016)</td>
</tr>
<tr>
<td></td>
<td>• Power of One awareness campaign</td>
<td>• Tap Tips awareness campaign</td>
</tr>
<tr>
<td></td>
<td>• An Táisce Green Schools Programme</td>
<td>• An Táisce Green Schools Programme</td>
</tr>
<tr>
<td>Business supports / Market</td>
<td>• Cleaner Greener Production Programme</td>
<td></td>
</tr>
<tr>
<td>transformation</td>
<td>• Green Public Procurement (GPP)</td>
<td></td>
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<tr>
<td></td>
<td>• IBEC (Irish Business and Employer’s Confederation) environment</td>
<td></td>
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<tr>
<td></td>
<td>awards</td>
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</tbody>
</table>
Business in the Community (charity promoting responsible business practice).

<table>
<thead>
<tr>
<th>EU 20-20-20 Goals &amp; national targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 16% renewable energy by 2020 (translates into a requirement of 12% of heating from renewables by 2020)</td>
</tr>
<tr>
<td>• 20% energy savings by 2020 set out in Energy White Paper (DCENR, 2009).</td>
</tr>
<tr>
<td>• 20% reduction in greenhouse gas emissions by 2020 based on 2005 levels</td>
</tr>
<tr>
<td>• No water efficiency targets.</td>
</tr>
</tbody>
</table>

2.4.4 Northern Ireland: sustainable consumption policy (water and energy)

As with the Republic, the Northern Ireland administration has not yet produced a specific SCP Action Plan despite a statement in the National Sustainable Development Strategy that this would be delivered by 2008 (DENI, 2006). Barry (2009) proposes that the focus of policy on economic growth, policing, security, criminal justice and social policy initiatives²⁴ has pushed sustainable development down the NI Administration’s agenda such that Northern Ireland has had less advancement in sustainable development policy than the other UK devolved administrations of Wales and Scotland. However, there is mention of SCP in the NI National Sustainable Development Strategy (NSDS). The overall vision for the NSDS is for a “one planet economy”. “Sustainable consumption and production” and “learning and communication” are identified as two of the six priority areas for action. With regard to sustainable consumption and production, the focus is on the areas of: “resource efficiency”; “sustainable procurement”; and “minimising the unsustainable impacts of consumption”. A stabilisation of the NI ecological footprint and a goal of 85% resource efficiency by 2025 are also outlined in the strategy, which provides more reference to ecological limits and resource use indicators than any ROI policies. Actions to achieve these goals include the implementation of the Waste Management Strategy (which aims to reduce the quantity of waste to landfill), the Waste Resources Action Programme (promoting material recovery, reuse and recycling), the Green Technology Initiative (business loans for investment in clean technologies) and a commitment to introduce a water demand reduction strategy (DENI, 2006). In a similar vein, the Market Transformation Programme (MTP) announced in 2007 represents another support towards improving efficiency and greening markets. The MTP comprises initiatives such as guidelines for business, mandatory efficiency requirements, mandatory energy labelling and voluntary industry agreements that “encourage competition and innovation in the environmental performance of traded goods and services” (MTP, 2010).

²⁴ In Northern Ireland, 185,000 households (34% of population) are living below the poverty line, wages are at least 19% lower than in Britain, and seven of the ten lowest paid areas of the UK are in NI. More than a third of all children grow up in poor households in NI (Say No To Charges Campaign, 2010).
Given the emphasis of the Northern Ireland National Sustainable Development Strategy on supply-side policies and lack of attention to initiatives aimed at inducing pro-environmental behaviour, McClanaghan (2008: 812) asserts that it is “in keeping with the core principles of ecological modernisation”.

The NSDS commits to integrating sustainable development principles into all areas of government and to developing a Green Public Procurement Action Plan for NI. To “minimise the unsustainable impacts of consumption” measures outlined include facilitating consumers to “make responsible choices”, amendments to VAT for energy efficient buildings, and amendments to planning and building regulations (DENI, 2006: 24). With regard to the NSDS priority area of learning and communication the goal is to “provide access for all citizens to gain sustainable development skills and knowledge, and to bring about behavioural changes necessary to progress towards a sustainable society” (DENI, 2006: 117). Towards this end, the objectives of the strategy are: to embed ESD in curriculum at all stages; to promote eco-schools; to develop behavioural targets and indicators by 2009; to develop a sustainable development communications strategy; and to identify barriers and opportunities to sustainable behaviour. To generate awareness on energy saving activities, Northern Ireland citizens have been targeted by the Energy Saving Trust ‘Save Your 20% Campaign’ which encourages the public to take an online pledge to reduce their energy use. The main educational initiatives to date include the Northern Ireland Eco-schools programme (equivalent of Green Schools in ROI) and the NI Energy Agency primary schools Energy Efficiency Education Programme which conducted 160 school visits in 2008/09 (Northern Ireland Energy Agency, 2009). Through such programmes it is commonly assumed that students can be encouraged to value the environment for its intrinsic worth prompting them to lead lifestyles which are aligned to their ethical values (Gale, 2002 and Barman, 2002 in Hinton and Goodman, 2009). It is also maintained that awareness can be generated not only amongst students but in parents too through their engagement with their child’s education. A number of challenges have been identified however in delivering environmental education arising from the contested and complex nature of environmental information, the difficulties of teaching environmental attitudes and values, and the challenge of linking environmental education to children’s lives and spaces (Davies et al., 2001).

Regarding specific energy policies, the Warm Homes and Energy Conservation Act 2000 has set a target to “end fuel poverty, as far as reasonably practicable in vulnerable households by 2010 and in all other households by 2016” (HM Government, 2009: 14). To this end, the government committed to provide up to 100,000 vulnerable households with a one off fuel grant of £150 from the government (BBC, 2009). This is part of a package of subsidies, including the Warm Homes Scheme and the Boiler Efficiency Scheme that aim to alleviate

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25 No evidence of work on the communication strategy could be found by the author as of September 2012.

26 The large-scale, national ‘Act on CO2’ British climate change awareness campaign adveriters were prevented from going on air in Northern Ireland in 2009 by the then Minister for Environment, Sammy Wilson who labelled the campaign an “insidious propaganda campaign” (BBC News, 2009).
fuel poverty and improve comfort in Northern Ireland homes (See Appendix E for further details on each of these retrofit schemes). Northern Ireland Energy Action note that there now exists a variety of competing home energy grants at nation level which in their opinion “makes for a slow, expensive and overcomplicated process” (Northern Ireland Energy Agency, 2009: 1). Another cornerstone of energy policy is the installation of smart meters in every household across Great Britain (including Northern Ireland) by 2020 (HM Government, 2009). Just as the social implications have been debated in ROI, Northern Ireland Energy Action emphasise that smart metering is a relatively recent technique and call for more research on the impact of smart meters on low income and vulnerable households (National Energy Action, 2010).

As regards building codes, the NI administration has set the goal for carbon neutrality in new build by 2016 (DCENR, 2009; HM Government, 2009). As with ROI, NI has not yet introduced minimum water standards for its buildings despite recent regulations made in Wales and England for a maximum of 125 litres consumption per person per day through the various water appliances and fittings (Waterwise, 2008). Neither Northern Ireland, nor the Republic have taken great advantage of the existing systems that can reduce household consumption. For example, building to EcoHomes ‘Excellent Standard’ which involves the use of efficient devices along with rainwater capturing and re-use systems could save between 15% and 40% of average household water consumption per year (Dickie, 2005). Through the Water Reform Programme (2007) the government is investing £3bn over the next 20 years towards improving infrastructure, reducing leakage of water mains, and delivering awareness campaigns to achieve reductions in demand for potable water. Water charges were mooted for introduction in 2007 in Northern Ireland and would have resulted in an average water bill of £334 per annum, with the highest at £770 for householders of higher property value (Department for Regional Development NI, 2006). However, water charges have been postponed due to strong opposition from the Northern Ireland Consumer Council among others and the ‘Say no to Charges’ campaign on the grounds that it is neither fair nor affordable for the average citizen who are said to shoulder much of the water supply costs already through property rates rates (Consumer Council for Northern Ireland, 2010a). Given the socially regressive nature of eco-taxes, money raised from these measures has in the past been earmarked for sustainability initiatives including household energy efficiency grants, improvements to rural transport, and programmes to alleviate fuel poverty in Ireland (Casey, 2010). Reservations about the distributional and social implications of eco-taxes are widespread (e.g. Irish Rural Link, 2009; Consumer Council for Northern Ireland, 2010a) and were raised once again in relation to impending household water charges in Ireland.
Table 2.2  Summary of interventions targeting sustainable household water and energy consumption in Northern Ireland

<table>
<thead>
<tr>
<th>Tool</th>
<th>Energy</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>• Regular home energy costs (i.e. no carbon tax)</td>
<td>• Household water services remain free</td>
</tr>
<tr>
<td>Regulatory</td>
<td>• Carbon neutrality in new build by 2016</td>
<td>• No building regulations for water efficiency</td>
</tr>
<tr>
<td></td>
<td>• Required display of Energy Performance Building Certificate (EPBD) upon sale, rental or in new build</td>
<td></td>
</tr>
<tr>
<td>Communicative &amp; educational</td>
<td>• Eco-Schools NI</td>
<td>• Eco-schools NI</td>
</tr>
<tr>
<td></td>
<td>• Smart energy meters by 2020</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Energy Saving Trust, Save Your 20% campaign</td>
<td></td>
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<tr>
<td></td>
<td>• Primary Schools Energy Efficiency Education Programme</td>
<td></td>
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<tr>
<td>Business supports / Market</td>
<td>• Waste Resources Action Programme</td>
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<tr>
<td>transformation</td>
<td>• Green Technology Initiative</td>
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<td></td>
<td>• Market Transformation Programme</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Green Public Procurement Plan</td>
<td></td>
</tr>
<tr>
<td>EU 20-20-20 Goals &amp; national</td>
<td>• Legally binding target to reduce carbon emissions by 80% by 2050 (HM Government, 2009).</td>
<td></td>
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<tr>
<td>targets</td>
<td>• Plan to cut emissions levels from homes by 29% on 2008 levels by 2020 (HM Government, 2009)</td>
<td></td>
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<tr>
<td></td>
<td>• Goal for 30% of electricity from renewables by 2020 (HM Government, 2009).</td>
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</tr>
</tbody>
</table>
2.4.5 Critique of policy responses

The previous sections have reviewed European and national strategies to target consumption with special attention to the areas of water and energy use in Irish households. Policy at various scales was shown to have a bias towards cleaner production, resource efficiency and ‘win-win’ economic and regulatory measures with little success in tackling habitual household consumption practices (Hinton and Goodman, 2009; OECD, 2002; Davies et al., 2010). Economic and communicative policies are often seen as individualising responsibility, shifting the onus for fixing environmental problems from government and corporations to individual citizens (Sanne, 2002). This policy doctrine is guided by notions of consumer sovereignty and is in line with approaches based on market neo-liberalism and non-regulation which solidified in the 1980’s. However, fundamental issues have been identified in the rational actor and information deficit models that underpin economic and communicative approaches respectively.

Market based instruments are guided by the rational choice model which has its roots in neoclassical economic theory and has long been criticised for its simplistic and individualistic conceptualisation of human behaviour (Moloney et al., 2010). It contends that consumers make decisions by calculating the individual costs and benefits of different options available, ultimately choosing the benefit maximising option (with an emphasis on cost and time considerations). Self-interest is assumed to be the principal driver for consumption behaviour and decisions are considered the outcome of cognitive deliberation (Jackson, 2005). From the rational choice perspective, economic instruments such as taxes and charges are considered monetary disincentives designed to make environmentally damaging behaviour less appealing (De Young, 1993). However, the ability of monetary instruments to initiate behaviour change is questioned with some believing that its role has been over-emphasised (Guagnano et al., 1995 in Davies et al., 2012b). Critics note that many choices are based on moral, social, and emotional motivations rather than conscious or cognitive deliberation (Jackson, 2005). Overall, the rational choice model is considered to overlook the social nature of consumption and the influence of broader structural forces that constrain or enable daily practices of consumption including the availability, convenience and cost of more environmentally friendly services and goods such as green energy, public transport or local organic produce (De Young, 1993). Nevertheless, the theory remains pervasive and also underpins communicative instruments whereby individuals are viewed to make decisions on the basis of information available. Within environmental campaigns the aim is normally to inform people of the seriousness of the environmental problems facing the planet and crucially to promote small actions which can yield personal benefits while helping the environment (Moloney et al., 2010). The need to take personal responsibility is a common message as exemplified in Ireland’s Power of One energy awareness campaign:

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27 See Appendix F for diagram positioning common policy tools along the production and consumption chain illustrating their typical production focus.
“If each of us becomes aware of our own power when it comes to energy efficiency, and use it properly, we can collectively make a big difference. To ourselves, to our pockets, and to the environment. By taking individual responsibility and changing our behaviour in small ways every day, we’ll help save energy while we save money too. All we have to do is recognise our power, and use it. That’s what the Power of One is all about” (SEAI, 2010a).

Much analysis has been focused on the nature of messaging adopted in campaigns and product communications. Confusion and uncertainty in messaging and the use of scare tactics have been identified as a key reasons for inaction and lethargy (Futerra, Undated). Levels of trust in the messenger are also seen to be an important factor and have been found to be higher for state bodies than for utility companies (Brohmann, 2007). Evidence also shows that adopters of green electricity are most influenced by information from friends, family and newspapers, rather than top-down government sources (Briceno and Stagl, 2006). The consistency of information with the policy pursuits and behaviour of the messenger has also been shown to influence public responses (Fahy, 2006; Macnaghten & Urry, 1998 in Davies et al., 2012b).

Aside from nuances over messaging and issues of trust, there are more fundamental problems with information-based tools due to their reliance on the widely criticised information-deficit model. Through informing individuals of the environmental impacts associated with their lifestyles it is assumed that greener values and subsequently greener behaviour (encompassing purchasing decisions) will be adopted. However the relationship between information provision and attitude change is contested, as is the link between individual attitudes and behaviour, known as the value-action gap (Blake, 1999; Hargreaves et al., 2008). For example, a 1999 EC study (reviewed in Fahy, 2006) showed that although there was uniformity in the levels of reported environmental concern across the EU, German and Dutch respondents took the most environmental action in their daily lives. In Ireland, evidence of the value-action gap was found in Diffney, Lyons and Valeri’s (2009) study that showed the Power of One campaign adverts resulted in increased awareness of energy issues but did not result in altered behaviour to reduce energy use in the home. This research implies that problem awareness is only indirectly involved in behaviour change and strengthens the argument that external conditions, such as social influences and situational factors including the availability of finance, time and infrastructure play a vital role. As Hinton and Goodman (2009: 11) note, a fundamental flaw of the information-deficit model is that it “ignores the often unequal structural, institutional and cultural frameworks within which we make our decisions”.

The favouring of economic instruments over regulatory measures has also been criticised for downplaying the severity of environmental problems and the scale of change necessary (Jackson, 2006). It is often said that the emphasis on economic aspects of environmental action (such as money savings) in communications may lead to only weak behaviour change, susceptible to changing circumstances and undermining the cultural shift necessary for
sustainability. It is frequently asserted that prolonged transformations require active involvement and commitment from the public and intrinsic motivation based on internal values rather than those induced by an outside source such as monetary incentives (Goodman, 2007). Many commentators in the sustainable consumption arena therefore believe that conventional policy tools will fail to achieve the system-wide change that is necessary for a transition to sustainability. As Princen (2001: 13) notes current responses mean that “the operation is “improved”, made more efficient, or the impacts are softened. But the fundamental problem is skirted or displaced in time or space”. A key issue for Princen (2001), Jackson (2006) and Darby (2007) amongst others, is that notions of sufficiency are thoroughly marginalised within mainstream responses. Instead there has been a predominance of technical and infrastructural fixes in tackling over-consumption in household water and energy domains.

In Ireland this has seen attention directed to the improvement of new water supply infrastructure to meet growing demands for water usage and expensive energy retrofit solutions. While these measures are not to be entirely disregarded, little attention is paid to meaningful social and lifestyle changes, which, according to a UK Energy Research Council study have “the potential to reduce national energy use, energy system costs and carbon emissions by 35% and 30% below baseline levels” (Anable et al., 2011: iv). Likewise, Darby (2006: 5) notes that “consumption in identical homes, even those designed to be low-energy dwellings, can easily differ by a factor of two or more depending on the behaviour of the inhabitants”. However it is important to note that the kinds of lifestyle changes and social innovations that are required for such reductions are not provided in great detail in particular in policy studies which remain reluctant to build consumption reductions into long-term strategies. While the EU often uses the rhetoric of meeting basic (rather than excessive) needs, this is not consistently pursued as evidenced in the following extract from a speech by Stravos Dimas, European Commissioner for the Environment at the European Environmental Bureau (EEB) Conference, in September 2008:

“There is also strong opposition to any message that we need to compromise our quality of life and “tighten our belts” for the sake of the planet. This is especially true at a time of economic crisis. And it is especially true for developing countries, which quite legitimately are looking to build a better life for their citizens. We cannot realistically solve these problems by asking people to do less. We need to do more but in different ways. This means developing a policy framework for smarter consumption and leaner production” (Dimas, 2008: 1).

This quote perceives any strategies to “tighten our belts” or reduce consumption to be incompatible with advancing quality of life. This illustrates the continued linkage made by policy makers between economic growth and quality of life where GDP remains the mainstream measure for progress and societal wellbeing. Conventional policy making has failed to address the expanding body of research calling for fundamental economic restructuring and the development of an alternative concept of prosperity that goes beyond
the simple pursuit of rising GDP and accounts for social, environmental and economic wellbeing (SDC, 2003; SDC, 2007; Thompson, 2007; Stiglitz et al., 2008; Abdallah et al., 2009; Jackson, 2009). In ‘Prosperity Without Growth’, Jackson (2009) articulates three goals for a new model of development, echoing aspirations put forward by other researchers in this field: to build a stable macro-economy; to establish conditions for human flourishing; and to respect ecological limits. However, lock-in to what Jackson (2009: 8) terms "the iron cage of consumerism" perpetuates consumption-driven economic growth and mitigates against the exercise of deliberative choice about what to consume and the types of lifestyles to lead. Conventional strategies are often criticised for framing the environmental crisis as a function of consumer choice, and reducing environmental action to green consumerism. In this perspective, consumers have been conceptualised as ecological citizens voting with their money to transform the marketplace to greener outcomes (Goodman, 2007). However, as Maniates (2001) argues, the focus on consumer action through the traditional market economy undermines the capacity for meaningful collective action. This has already been reduced due to societal conditions of fragmentation, mobility and individualisation, which undermine the community as an area in which people can exercise their citizenry powers.

Linked to Foucauldian ideas, the government role in facilitating market conditions and in setting the infrastructure and the institutional context is considered by Spaargaren (2003) and Chappells and Shove (2004) a key constraint on the levels of sustainability permitted in home energy and water practices. Corporate powers in politico-economic systems are also said to influence consumption directly (through marketing for example) or indirectly through government lobbying (Martens and Spaargaren, 2005). The reliance of the political system on private sector driven economic growth is such that Sanne (2009: 282) states that business has “de facto power” in the political process. Additional challenges arise from the fragmented systems of governance within nation states whereby sustainable consumption policy falls between different traditional policy remits and thus sustainable consumption does not feature as a specific policy area in any department in the Irish Government Pender et al. (2007). This is a hindrance to progress as clear allocation of responsibility to government organisations is considered vital for policy success (Tukker et al., 2008a). Traditional socio-psychological and rational behaviour theories which form the foundations of conventional policy tools in Ireland and elsewhere demonstrate limited understanding of the social world and have been shown to over-emphasise the role of personal values and individual benefits. Shove (2010: 283) notes the flaw in this approach, stating that “understanding changing patterns of mobility, food consumption, heating, cooling or washing requires methods of enquiry that go way beyond the study of green consumerism, or of the relationship between environmental belief and action”. These limitations highlight the need for more sophisticated means of understanding.

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28 With reference to the washing machine, Shove (2003) comments that advertising strategies dramatise dirt, contamination risks and perpetuate the ideal type of a squeaky clean appearance.

29 For example, the Northern Ireland National Sustainable Development Strategy emphasises that businesses will be provided with advanced notice and involved in consultation in the formulation of future environmental taxes, enabling them to alter their operations to minimise negative economic impacts (McClenaghan, 2008).
consumption behaviour that may be used to inform more ambitious action across public, private and civil society spheres.

2.5 Conclusion

This chapter began by examining the evolution of sustainable consumption, noting its key concerns with contested concepts of wellbeing, ethics and needs. Domestic consumption patterns in Irish homes were discussed and it was shown that current patterns of consumption are exceeding the earth’s ecological capacity, contributing to problems of climate change and ecological degradation and also raising social justice concerns. Despite these trends, there has been no integrated research on home energy and water consumption practices in Irish households and the contextual circumstances that shape them. Typical economic, regulatory and communicative policy tools targeting sustainable consumption were outlined along with the shortcomings of the information-deficit and rational choice models which provide their conceptual foundations. It was argued that conventional strategies fail to match the urgency and magnitude of sustainability problems and the chapter draws the conclusion that larger, systemic changes are required. This viewpoint is shared by the Sustainable Consumption Research Exchange (2009: 3) who assert: “where in the past we focused more on wealth, growth and efficiency, the future will need to be about wellbeing, quality and sufficiency” (SCORE, 2009:3). In considering how more sustainable lifestyles may be encouraged and oriented around social and ecological “wellbeing, quality and sufficiency”, more systemic theories of behaviour change are required. These need to integrate micro and macro considerations including the personal, socio-cultural, political, economic, institutional and infrastructural factors that interact to shape daily consumption activities. Within the past decade, sociological approaches have posed a useful conceptualisation of consumption behaviour that considers these elements through the social practices model (Reckwitz, 2002; Shove and Warde, 2002; Spaargaren, 2003; Warde, 2005; Ropke, 2009). This research is the subject of the next chapter and although it highlights areas of lock-in to current practices of consumption and socio-technical regimes, it also reveals potential for innovation and the creation of less resource intensive scenarios of personal washing and home heating practices in the future. When linked with work on societal transitions and their commonly employed visioning tools, an alternative means of developing interventions and innovations for large-scale shifts in daily consumption practices emerges.
CHAPTER THREE:
SOCIAL PRACTICE THEORY AND VISIONING APPROACHES
3.1 Introduction

The previous chapter demonstrated the range of regulatory, communications and economic tools employed by public authorities at all levels to target sustainable consumption. It was shown that many interventions to date over-emphasise individualised conceptualisations of behaviour and technological fixes, and are unlikely to yield dramatic reductions in home energy and water use, perpetuating ‘lock-in’ to unsustainable trajectories of consumption. Although technologies are one part of the solution to improve efficiency, their concern with servicing “normal” consumption trends into the future fails to explore questions regarding how needs are constructed and reproduced and how they may be re-oriented to support more environmentally friendly consumption practices. This chapter provides a review of burgeoning literature on social practices. It is argued that social practice theory can provide a more nuanced understanding of the variety of social, technological and organisational forces that shape daily household practices which are based on the use of water and energy resources. The sustainable consumption community is now starting to have serious discussion about the role of social practice theory in contributing to understanding and solution formation around sustainability. This chapter outlines the main perspectives provided by researchers on social practices with attention devoted to literature from science and technology studies (STS) and socio-technical studies. This literature illustrates the important role that hardware, and organisational structures have in influencing the norms, meanings and procedures of daily consumption practices. In illustrating these arguments, special reference is made to the most energy and water intensive household consumption practices - home heating and personal washing - and the variety of socio-cultural, corporate and policy forces that have played a role in their governance and evolution. Traditions of visioning by the corporate sector and within academic research and transition management are outlined in detail. It is argued that these provide a potential means for generating innovations and action plans for more sustainable household consumption practices in the future. The chapter closes by clearly stating the research gaps identified through this literature review and the resultant research questions generated.

3.2 Understanding consumption behaviour: towards social practice conceptualisations

Various models of consumer behaviour and behavioural change have been proposed by researchers from different disciplinary traditions for use in studies on household water and energy consumption. The main influences have been from economic, psychology, cultural and sociology disciplines. The previous chapter showed the predominance of the economic rational actor model in guiding informational and financial interventions for sustainable consumption. Social psychological work, emphasising the role of attitudes and values in shaping human behaviour, has had much influence on sustainable consumption policy
responses. Within this field, early models such as Fishbein and Ajzen’s (1975) ‘theory of reasoned action’ emphasised attitudes and personal norms (i.e. personal beliefs about what other people think of individual behaviour). Although this theory acknowledges social influences on individual behaviour that are overlooked in rational choice models, difficulties arise with correlating and measuring attitudes and intentions with actual behaviour. In addition, the model fails to address the limitations of cognitive deliberation and the role of habit (DEFRA, 2006). The impact of broader social forces in shaping pro-environmental behaviour is increasingly recognised. More recent models emphasise the power of social norms in defining what is considered the right way to behave, think, act, or consume (Sustainable Consumption Roundtable, 2006; EU, 2009). Translated into action, a common use of the social norms approach is through the provision of normative feedback in billing - comparing a household’s consumption levels to those of its neighbours. Where this approach was trialled in a Californian neighbourhood, Nolan et al. (2008) found that significant reductions were achieved despite claims by residents that the behaviour of others was not an influencing factor.30 In response to these theoretical advances emphasising the social nature of consumption, social marketing strategies which target segmented consumer groups through alternative media and social networks are increasingly being adopted by policy makers in order to market sustainable living as an attractive lifestyle choice (WWF, 2008; Moloney et al., 2010).

Display and status related motives for consumption have long been explored by sociological and psychological discourse, typified in Veblen’s (1898) notion of “conspicuous consumption” and Hirsch’s (1977) concept of “positional goods”. This research is sometimes linked to work in evolutionary psychology which suggests that display-oriented consumption is driven in part by sexual and social competition. Sociologists often note the importance of consumer goods in contributing to social conversations which help people maintain and create social identity (Jackson, 2005). A recent study by Griskeicius et al. (2010) showed that social status was the key motivating factor in environmentally friendly purchases rather than financial or environmental considerations. It therefore recommended activating “competitive altruism” to stimulate pro-environmental behaviour. In contrast to conceptualisations that emphasise the symbolic and positional role of consumption, more recent approaches within sociology are looking at “ordinary” consumption behaviour from a social practice perspective (Gronow and Warde, 2001). This notes that consumption by households of valuable water and energy resources is mainly inconspicuous and occurs in the completion of valued social practices such as washing, heating, eating and transport. These are mostly governed by semi-automatic decisions based on social norms, values and goals, rather than conscious deliberation and rational decision-making (Reckwitz, 2002; Shove and Warde 2002; Warde 2005). Key from an environmental perspective, is that connection to the consumption of

30 Another example of use of the social norms approach in a sustainable consumption campaign is the Australian “Target 170” campaign. In this campaign, neighbourhoods were asked to compete to reduce their water consumption to 170 litres per person per day and were ‘labelled’ with billboards denoting their average water use per capita allowing comparison against neighbours (Bryx and Bromberg, 2009).
natural resources such as water, energy or other material inputs is rarely made as these are consumed as a by-process in the act of fulfilling the desired practice. The origins of social practice theory are traced to Anthony Gidden’s (1986) structuration theory and are also echoed in Pierre Bourdieu’s theory of praxis and can be considered a move away from the extremes of structural determinism and individual agency, traditionally debated in social theory (Ropke, 2009). Instead, social practices are considered the mediating link between structure and agency involving a complex interplay between various elements including:

“Forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know how, states of emotion and motivational knowledge” (Reckwitz, 2002: 249).

Social practices are therefore conceptualised as “entities” in their own right; comprising distinctive hardware and software elements as alluded to by Reckwitz. They are also conceptualised as “performances”; requiring knowledge, skills and action for their completion (Schatzki et al., 2001). Linking to structuration theory (Giddens, 1986), practices (as entities) are perpetuated and constituted through their performance, generating social stability and are distinguished by constant evolutionary processes of destabilisation, normalisation and diffusion (Shove and Pantzar, 2007). Applying Reckwitz’s definition to the example of home heating practices in Irish households, “things” would include raw energy, the heating system, radiators, heating controls and occasional use of extra clothing layers. “Bodily” and “mental activities” guide the person’s interaction with these “things” and include the physical act of operating and adjusting heating, putting on clothing and making mental decisions on when extra personal heat is required. Understandings about how, when and why to heat are often guided by contemporary societal norms of warmth, while personal states of emotion and feeling also come in to play. Thus in the performance of everyday practices, practical consciousness, linked to automated and routine behaviours, is the overwhelming driver rather than discursive consciousness, which involves individual reflection and mindfulness (Giddens,1986). Practical consciousness has been compared to Bourdieu’s (1977) notion of “habitus” which refers to an intuitive sense of how people view and understand the world. Bourdieu contends that this intuition is formed in childhood determining one’s tastes, dreams and habits and is linked to the cultural and economic capital of one’s parents. While his elevation of class position has been criticised by some (e.g. Gabriel and Lang, 1995 in Gronow and Warde, 2001), Bourdieu’s conceptualisation of how understandings are unconsciously embedded in people’s daily bodily actions from an early age, provides an important contribution to social practice studies (Gram-Hanssen, 2010).

The lifestyle of a given individual at any point in time is said to comprise an assemblage of social practices such as clothing, housing, eating, travel and leisure. Together these “represent a particular way of life and give substance to an individual’s on-going narrative of self-identity and self actualisation” (Giddens, 1991 in Evans and Abrahamse, 2009: 489). Wallenborn et al. (2009) and Warde (2005) note that the environmental impacts of the
practices an individual engages in can vary. While a person may claim to be environmentally conscious and show green traits in certain practice areas (for example cycling rather than driving) they may act less environmentally in another practice (for example taking regular baths rather than short showers). In explaining this mismatch between attitudes and behaviour, Spaargaren (2003) argues that the material elements (infrastructure and technologies) of energy and water based practices are frequently stronger determinants of consumption than individual education, values or attitudes. As articulated by Randles and Warde (2006: 229 in Ropke, 2009), “practices do not float free of technological, institutional and infrastructural contexts”. These factors are incorporated in the ‘structure’ composite of Spaargaren’s (2003) social practices model (Figure 3.1) and shape the socio-material systems of provision. Spaargaren therefore calls for an analysis of individual possibilities and inclinations towards environmental action “in conjunction with the levels and modes of green provisioning” (Spaargaren, 2003: 690). In this perspective, it is this linkage between modes of design, production and provisioning (on the production side of the chain) with modes of access, use and disposal (on the consumption side) that sets the condition for performing household tasks and determine the availability and viability of green alternatives (Spaargaren, 2003). This is also articulated by Warde (2005: 141) who states that “the effect of production on consumption is mediated through the nexus of practices”.

Figure 3.1 The analysis of transitions on the level of social practices

<table>
<thead>
<tr>
<th>Human Agents</th>
<th>Social Practices</th>
<th>Social Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discursive consciousness</td>
<td>Home Heating</td>
<td>Rules and Resources</td>
</tr>
<tr>
<td>Practical consciousness</td>
<td>Personal Washing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home Lighting</td>
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<tr>
<td></td>
<td>Cooking</td>
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<tr>
<td></td>
<td>Cleaning</td>
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Transitions: Socio-technical innovations within production-consumption chains

(after Spaargaren, 2003: 691)
It is important to note that variances exist amongst dominant thinkers on social practices in how they deconstruct the different elements of a social practice. Spaargaren (2003) shows a macro-perspective of social practices, emphasising how social practices are governed by the interplay between structure and agency, especially modes of access and provision. In contrast, others have paid more attention to the practice as an entity in itself, deconstructing it into more simplified categories. This school of thought would maintain that Spaargaren’s interpretation overlooks the role of “practices as dynamic entities in their own right” (Shove, 2010: 1279). This is exemplified in work by Warde (2005), Shove (2003) and Reckwitz (2002) who break practices down into roughly similar elements according to: the artefacts involved; practical knowledge and bodily actions to fulfil the practice; and the socio-cultural meanings of that particular practice. Taking the case of personal washing, artefacts include showers, baths, water and washing products. Socio-cultural elements include norms and expectations of cleanliness and freshness often shaped by institutional factors, and practical skills include knowledge on when and how to wash.

Variance is exhibited in what researchers perceive to be a practice entity. Whilst many studies employ conventional units of practice such as personal travel, cooking, heating, lighting, and clothes washing, a more micro lens is adopted in recent literature. This is exemplified by Gram-Hanssen (2010) who considers the act of leaving televisions on standby a practice in its own right31. Despite these differences in the scale and boundaries of practice entities, commonalities can be found in ways of classifying their constituent components as reviewed in Table 3.1. For example, many design studies reference Shove’s (2003) ‘skills-images-stuff’ breakdown of social practices as exemplified in Scott et al.’s (2011) research on bathing practices. Gram-Hanssen’s (2011) study on practices of electricity standby draws on work by Reckwitz (2002) and differentiates between: know-how and embodied habits; institutional knowledge; engagements; and technologies. Likewise, Brezet (2001) suggests that when designing sustainable home-services to fulfill household practices, innovation can occur in the devices or artefacts applied, the physical and institutional infrastructure, and in user practices involving learning and behaviour.

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31 From a different angle, this “practice of standby” could also be considered as part of the performance of the practice of home entertainment. This reveals the problems encountered in defining household practices and conceptualising the linkages between them.
Table 3.1  Social practice elements

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<tbody>
<tr>
<td>Procedures</td>
<td>Competencies (or “skills”)</td>
<td>User-practice</td>
<td>Know-how &amp; embodied habit</td>
<td>Practical know-how to accomplish the practice; competence in meeting moral, aesthetic, and normative social expectations</td>
</tr>
<tr>
<td>Understandings</td>
<td>Meanings (or “images”)</td>
<td>Infrastructure</td>
<td>Institutional knowledge</td>
<td>Social meanings, understandings and rationale of the practice; often shaped by engagement with institutional, regulatory and provision arrangements</td>
</tr>
<tr>
<td>Engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Items of consumption</td>
<td>Material artefacts (or “stuff”)</td>
<td>Device</td>
<td>Technologies</td>
<td>Tools, devices, technologies and resources</td>
</tr>
</tbody>
</table>

These researchers show a common concern with the role of artefacts, technologies and systems of provision in shaping a “normal” practice through time. The two way influence is often stressed between hardware practice components and software dimensions including socio-cultural meanings, values and expectations. Given the variance in cultural norms through time and space, socio-technical studies question the assumption that current habits and future demand for utilities (such as energy and water) are taken as a given (Redclift 1996 and Shove 2006 in Southerton et al., 2004; Jackson, 2006). While the requirement for dominant practices such as washing or bathing is not disputed, there is dynamism in practices, as Ropke (2009: 2494) puts it; “new practices emerge, and others die out when practitioners can no longer be recruited”. A body of research (Shove, 2003; Southerton et al., 2004; Shove et al., 2008b) has been examining the evolution of practices by incorporating sociological perspectives to avoid traditional technology / user dichotomies and technological determinism, commonly adopted by evolutionary economists (such as David, 1985 and Arthur, 1988 in Elzen et al., 2004; or Utterback, 1994 in Ropke, 2009). Much work examining the domestication of technology into everyday user contexts demonstrates that innovations in practice do not solely involve technical and industrial change but also changes in cultural conditions, and the role of socio-cultural meanings, values, and expecta
tions.

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32 Technological determinism emphasises technological path dependency leading to the entrenching of particular technologies regardless of their social or environmental qualities (Weaver et al., 2000).
meanings and user contexts (Sorrel, 2007 in Brohmann, 2007; Kline and Pinch, 1996 in Elzen, Geels and Green, 2004; Schwartz-Cowan, 1983).

Various concepts for analysing the dynamics of practice change through time have been proposed. Shove et al. (2008b) state that practice innovation occurs due to changes in the tools we use (materiality), how we use them (technical know-how), and when and why we carry out a practice (cultural meaning). Studies such as Rubik et al., (2009), Chappells et al., (2000) and Spaargaren (2003) draw attention to the re-organisation of infrastructure and provision systems in changing daily practices. By adding this focus on systems of provision, social structures are no longer treated as external variables but are brought into the centre of the analysis (Shove and Chappells, 1999). These studies recognise the importance of material aspects, especially in water and energy based household consumption practices where users are reliant on supply infrastructure and technical devices (such as heating systems or showers) to provide the desired function. In western societies, the provision of consistent and abundant supplies of water and energy through modern infrastructure has been said to allow households to develop routinised practices (Southerton et al., 2004; Medd and Shove, 2005) and to institute notions of limitless supply, feeding into expectations of convenience and speed (Guy and Shove, 2000). When considering home energy use, previously households would have had less access to fuel and this would have been used infrequently in targeted areas of the household – around a central hearth in the home for example. This shaped the design of the home and forms of social interaction within it. Direct physical engagement was required in stoking the hearth, contrasting trends for automation that are proliferating in the fulfillment of household practices. The roles of government and commercial actors are often examined in socio-technical studies as these are considered to exert strong influence over cultural and societal norms and expectations (Shove, 2003). For example, during the Victorian era it is said that state intervention through programmes of instruction on hygiene and the Health Acts contributed to associations of cleanliness with modernisation and health (Foucault, 1977 in Hand, Shove and Southerton, 2005). Similarly, both commercial interests and government have a strong influence on infrastructural, institutional and technological systems, shaping cultural norms, and influencing the conception of citizen-consumer roles and responsibilities.

The challenge of “unfreezing” routine social practices therefore requires a more holistic or systemic perspective, paying attention to internal practice dynamics and to the broader socio-technical system within which practices are situated. Shove et al. (2008b: 145) contend that innovations in practice happen when new, but mainly pre-existing ideas or products are integrated and combined in different ways. For example, cultural expectations and concerns with health have been shown to migrate across practices, as have modern conventions for freshness, comfort and convenience which pervade practices of washing and eating. Shove and Pantazar (2005) also note the increasing usage of “computer aided technology” across practices (or in the present 2012 context, smart phone apps). These technologies may
redefine the competences needed for the practice, just as they may redefine practice meanings; as is the case with burgeoning amateur iPhone photography applications. Another important dynamic is that while practices can exist across cultural boundaries, their meanings vary in different contexts. Shove (2004) therefore emphasises the “horizontal” transfer of practice elements rather than solely vertical processes of niche to mainstream innovations. The distribution of competency between the practitioner and the tools and materials required for that task is also subject to evolution through time. This is illustrated by the increase in uptake of do-it-yourself (DIY), which influenced the shift from the use of craftsmen and tradesmen to purchasing specialised tools to perform these functions (Shove et al., 2008b). Conceptually, a social practice approach requires an alternative interdisciplinary means of researching and developing action plans to promote sustainable household consumption practices. Given the important role of organisational factors (including systems of provision and regulatory frameworks) and hardware (including tools and devices) in shaping meanings and norms of daily washing and heating practices, these two dimensions are further evaluated in Sections 3.2.1 and 3.2.2 respectively.

3.2.1 Organisation: impact of systems of provision and governance on household consumption

The evolution of water and energy governance and management structures plays an influential role in shaping daily consumption practices. Ropke (2009) distinguishes between four modes of provision; market, state, communal and domestic. Network bound resource systems such as the electricity grid and water mains systems, in conjunction with innovations in bathroom and heating technologies have been credited with enabling the routinisation of home heating and personal washing practices. From the mid twentieth century, centralised provision systems have become the mainstream form of energy and water access for most industrialised households transforming ways of working and living and instituting new expectations of warmth, cleanliness, comfort and convenience (Chappells and Shove, 2004). Much work has commented on how the dominant conception of end-users changes depending on the institutional and management structures around systems of natural resource provision. At times of universal state provision, users are said to be conceptualised as citizens, following privatisation of utility companies they are conceived of as consumers, while those who are engaged in forms of self-provisioning are often framed as co-producers (Guy and Marvin, 1995; Trentman and Taylor, 2008). This has an important bearing on the remit of their influence and in shaping user relationships with a particular resource. In keeping with broader trends for the neoliberalisation of nature (Bakker, 2005; Castree, 2008) recent decades have seen a shift from traditional direct government management of water and energy supply systems towards either semi-state or private models of management. Dimensions of commercialisation within natural resource management can be seen in the increasing use of market mechanisms such as pricing and economic cost-benefit analyses.
These trends are said to contribute to the commodification of natural resources, elevating concerns of economic efficiency (based on willingness to pay principles) over those of access or equity (based on ability to pay principles). This has been the subject of much debate, especially with regards trends for privatisation in water supply, which Harvey (2001 in Bakker, 2005) comments, is akin to the enclosure of a public resource for private sector profit, reducing democratic access by raising prices and negatively impacting lower income users, especially in developing countries. Likewise, the EU’s push for a Single European Electricity Market (SEM) to break up state owned monopolies with the aim of improving competitiveness and efficiency, also raises issues of whether the liberalisation process will provide the right incentives for the long-term sustainable development of the industry (Domanico, 2007). Whilst Bakker (2005) notes that market environmentalism can lead to both environmental and economic efficiencies, a distinction is made between these institutional changes and changes in ownership, which result in a new set of power relations and interdependencies between utility providers and householders. For instance, in cases of privatisation of natural resource management, Guy and Marvin (1995) characterise householders as “captive consumers” and assert that this engrains a resource centric approach to the delivery of practice needs.

In contrast to centralised systems of provision, a wide range of innovative community-led initiatives exist that serve to fulfil basic household needs in a more environmentally friendly manner whilst also improving social sustainability (Meroni, 2008). Meroni (2008) notes that these examples vary in their levels of organisation, co-operation, and involvement and range from community laundry services, car sharing schemes, food cooperatives, and renewable energy and water cycling systems, to alternative living arrangements in specially created sustainable settlements. A common trend in community-led initiatives is the search for reduced separation between consumption and production domains, often through combining elements of co-provisioning and self-governance (Chappells and Shove, 2004; Tukker et al., 2008b). In the UK and Europe, a multitude of cases have been documented on sustainable ‘product-service systems’ set up by local non-profits, community groups, housing associations and virtual online actor networks. Bricero and Stagl (2006) and Seyfang (2006) study Local Exchange Trading Systems (LETS) such as neighbourhood laundries, appliance and tool lending schemes, and food co-ops many of which operate on the basis of sharing, leasing and pooling of resources. In these product-service-systems the product is owned by the service provider (public, private or community) and users pay for the benefit of the product without needing to own the product outright (Brezet and Van Hemel, 1997; Halme et al., 2004; Mont and Tukker, 2006). These systems are related to broader trends for “collaborative consumption” which have been mooted for their power to reduce overall levels of personal consumption and individual ownership by harnessing online network technologies to allow peer-to-peer sharing, lending, trading, renting, gifting, and swapping (Botsman and Rogers, 2010). This is exemplified in waste exchange programmes such as the dublinwaste.ie programme in Ireland which provides a platform for peer to peer gifting of unwanted household goods, and the global Zipcar car-sharing service. Aside from these product
oriented services, ‘result oriented services’, are based on the assumption that the most radical sustainability improvements can be found through taking the final results that the user desires from a practice as a starting point for innovation (Briceno and Stagl, 2006; Halme et al., 2004; Pfeiffer, 2000; Tukker and Tischner, 2006). This can lead to entirely new ways of result delivery, for example, Manzini and Vezzoli (2002) report on a ‘solar heat service’ in Germany which sells piped hot water generated from solar power (rather than selling and charging for the energy cost or the water separately). This is related to the shift from conventional energy supply companies towards ‘energy service companies’ (ESCOs) as encouraged by the EU Energy end-use Efficiency and Energy Services Directive (2006/32/EC). Rather than dealing solely in the supply of energy, ESCOs have shifted their service definition towards energy management including the implementation of energy conservation measures together with conventional infrastructure and supply systems.

On a larger scale, there are many examples of creative citizen-led eco-housing developments, villages and towns, which have been founded in an attempt to facilitate collaborative living forms and sustainable lifestyles. Some of these have been aided by organised support groups such as the Transition Towns movement, which provides advice for community groups to implement energy descent plans, moving their towns away from fossil fuel dependence to local renewable energy systems. To date, there are 186 official Transition Towns and a further 1000 communities worldwide are in the early stages of transition. A defining feature of these eco-settlements is their active resistance to the commodification and privatisation of water and energy resources (Goodman, 2007). They often attempt to achieve greater autonomy from centralised utility infrastructure through on-site green energy systems, and water treatment and distribution systems, many of which are based on community ownership and require user-involvement and maintenance. Research by Chappells and Shove (2004) showed that while self-providers are more at the mercy of weather fluctuations, they tend to adapt and configure their daily practices around the availability of resources. They were therefore actively involved in the demand management process, showing a working alternative to current systems of provision which are based on ‘predict and provide’ strategies (Chappells and Shove, 2004). These examples of action at grassroots and household level do not necessarily mean that ‘small is beautiful’ strategies are automatically the most environmentally sound way of provisioning (Southerton et al., 2004). Instead, Guy and Marvin (1996) note trends in utility services for “splintering, fragmented and differentiated” consumption and production networks where ‘captive consumers’, ‘co-providers’ and ‘self-providers’ co-exist. Extending this argument, Spaargaren (2005) argues for utility provision based on “modernised mixtures” combining a mixture of governance scales (top down/grass roots), involvement (high/low), organisation (centralised/decentralised), and levels of innovation (incremental/radical).

For example, in Sweden, there are 60 eco-villages illustrating the potential for similar eco-towns to expand to other countries in Europe. Cloughjordan is the only eco-village in Ireland (www.thevillage.ie).

http://transitiontowns.org/TransitionNetwork/TransitionNetwork
In addition, it is commonly asserted that alternative provision systems such as community renewable energy projects and collective spaces not only serve environmental goals but also regenerate social capital and satisfy non-material needs, such as autonomy, creativity and participation (Briceno and Stagl, 2006). In this way, satisfaction in carrying out everyday practices is believed to be enhanced through greater involvement, ownership and social interaction whilst lowering environmental impact. Moreover, literature on the theory of diffusion of sustainable behaviours maintains that behaviour change is more effective at group level, as social interaction and cooperation increase the rate of behaviour adoption and remove structural barriers to change. The spread of environmental campaigns adopting community engagement and co-delivery techniques can be seen to reflect this perspective rather than reliance on top-down information provision for the diffusion of environmental behaviours (Nolan et al., 2008; EU, 2009). In the UK, the Global Action Plan (GAP) uses pre-existing community groups (such as neighbourhoods, schools and workplaces) to create ‘eco-teams’ where members learn about environmental issues and are engaged in the joint design of locally relevant strategies to reduce their environmental impacts in areas such as energy and waste. The eco-team approach has been praised for being one of the most successful sustainable consumption initiatives, a key reason being its recognition of the need to empower citizens as partners (rather than passive consumers) in the joint-design of strategies and programmes relevant to local context (Hobson, 2003).

There is a connection to be made here to ‘new economics’ literature which calls for changes in lifestyles and social and economic arrangements for increased ecological citizenship and societal wellbeing (Jackson, 2009). This can be achieved through new systems of provision encouraging localisation, decreased personal ownership and community arrangements such as LETS and Time Banks. Seyfang (2006) ascertains that these initiatives tend to be founded with the aims of tackling social inclusion, and promoting equity, community spirit and economic-self reliance. So while some research projects tend to emphasise the environmental benefits of alternative provision systems, Seyfang finds social sustainability to be one of the most crucial in working examples. The widespread application of these new economics elements would be contingent on the mainstreaming of alternative development goals, cultural values, and definitions of wellbeing and wealth (Leyshon et al. 2003 in Seyfang, 2006). While this has not occurred en mass, Soper and Thomas (2006) suggest that the gathering momentum of downshifting, simplicity, and slow movements reveals a growing cultural appetite for sustainable living. Furthermore, empirical evidence suggests that simplifiers, who voluntarily reduce their daily consumption report higher levels of subjective wellbeing (Kasser, 2007; Brown and Kasser, 2005 in Jackson, 2009).

Through studying various media, Soper and Thomas (2006) note an increasing emphasis on the pleasures that can be derived from engaging in more sustainable lifestyles. This can be seen in the growing amount of TV programmes and print features on simple living, vegetable gardening, seasonal cooking, DIY and traditional crafts and skills which point to a trend for
what Soper and Thomas call “alternative hedonism”. Alternative hedonism involves the adoption of different ways of thinking about the good life and human fulfilment where enjoyment can be had from pursuing more environmentally and socially ethical lives. Drivers for alternative hedonism are said to be based on self-fulfillment, health and wellbeing rather than an overt desire for a frugal existence (Soper and Thomas, 2006). Evans and Jackson (2008) caution that although there has been a proliferation in coverage of environmental issues and lifestyles in the media, online and through celebrity endorsement, this does not signify the advancement of a green cultural revolution. Furthermore, they state that it would be naïve to assume that society at large could obtain the same level of meaning and pleasure as the minority currently pursuing sustainable lifestyles. Aside from the challenge of recruiting and maintaining active involvement, alternative community provision schemes and eco-villages face other hurdles. These include coordination inefficiencies, lack of resources, and lack of compatibility with mainstream values and structures. Many suggest building new institutions of environmental governance to support, enable and encourage the spread of and participation in such initiatives (Manzini and Jégou, 2007; Tukker and Fedrigo, 2009). However, while the importance of grass-roots initiatives is certain, alone they cannot be relied upon to bring about large-scale and urgent changes necessary to achieve sustainable consumption practices. They are, as Briceno and Stagl (2006: 1549) note “only isolated solutions, modifying the channels of service provision rather than offering holistic programmes working at system level”. Nevertheless, they represent systemic discontinuity with current socio-technical regimes, providing insight for alternative ways of carrying out everyday household practices (Manzini and Jégou, 2007; Tukker and Fedrigo, 2009).

3.2.2 Hardware: insight from practice oriented design and visioning studies

As noted previously, there is an important material dimension to social practice theory which draws upon contemporary studies in design (Fletcher and Goggin, 2001; Dewberry and Sherwin, 2002) the philosophy of technology (Verbeek, 2006) and in science and technology studies (STS) in which the work of Bruno Latour has been most influential (Akrich and Latour, 1992). These studies increasingly examine the potential mediating role of material objects in human actions, experiences and cultural meanings. They are based on the recognition that many user intentions (e.g. to be clothed or to wash the body) are enabled by material artefacts which themselves reflect and reinforce wider trends such as privacy, comfort, cleanliness and convenience, strongly valued by modern society (Shove, 2003). Technological evolution can therefore redefine the meaning of a practice. Southerton et al. (2004: 5) articulate this in relation to the evolution of showering, commenting that;

“[Showering is] not just a substitute for bathing but a practice with its own logics and requirements – power showers highlight its invigorating properties over relaxation, shower cubicles exemplify its symbolic status as a ‘private practice’, and standing up rather than lying down symbolises its brevity”.

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Hand et al. (2005) comment that it is now almost socially unacceptable to wash less than once a day in western culture and empirical studies point to increasing frequencies of showering and higher adoption of power showers (Waterwise, 2008). This literature serves to highlight that end needs of practices of space heating such as comfort and warmth, and practices of washing such as cleanliness and refreshment are “highly negotiable socio-cultural constructs”, reflecting the values and expectations of those who construct them (Shove and Chappells, 2005: 32). Far from being fixed in time, Shove and Chappells (2005; 33) note “the historical malleability” of what people take to be normal, natural or expected and observe that people have lived in diverse and variable outdoor and indoor environments for much of history. Commercial interests are seen to play a key role here. Referencing practices of heating, Parkhurst and Parnaby (2008), and Guy and Shove (2000) note the standardisation of technical specifications for heating across communities of practice relating to the built environment. This is said to have instilled increasing expectations of an idealised 22°C indoor temperature, irrespective of time and climate. Wallenborn et al. (2009) note that many technical codes and standards guiding thermal control are based on assumptions of universal physiological properties of human comfort. However, a variety of evidence suggests elasticity in conceptions of personal warmth and comfort in the built environment. For example, Nicol and Humphreys (2002) showed that inhabitants of offices in Pakistan reported comfort at ranges between 20°C to 30°C with no cooling apart from fans. Where cooling and heating technologies are more culturally engrained, this band of comfort narrows, showing the importance of cultural expectations and practical competency to take personal actions such as layering or removing clothes or modifying heating to manage temperature. Similarly, Parkhurst and Parnaby (2008) in their study of car air-conditioning in the USA, found that people did not rate air conditioning as highly as thought by manufacturers despite its widespread penetration in the automobile market. With regard to home heating, the control of indoor temperatures and the spread of lighting has also been linked to modern societal desires to exert civilising control over the environment (Ackermann (2002 in Boardman et al., 2005) reduce seasonal and time differentiation (Kellerman, 1991 in Parkhurst and Parnaby, 2008) and increase productivity (Parkhurst and Parnaby, 2008). It is therefore frequently suggested that one way in which user-behaviour can be influenced is through design considerations that go beyond typical eco-efficiency and environmental redesign strategies (Brezet and Van Hemel, 1997; Jelsma, 2003). The potential for a green moralising force of artefacts has often been posed. As Verbeek (2006: 362) articulates:

“If ethics is about the question of how to act, and technological artefacts fulfil a role in bringing about human actions – whether by directly shaping those actions or shaping interpretations on whose basis decisions can be made – then artefacts should be expected to give a ‘material answer’ to moral questions”.

Jelsma and Knot (2002, after Akrich and Latour 1992) believe this can be done through ‘design scripts’ which inscribe values (such as sustainability) and rules of practice (e.g. optimal temperature level and quantity of cleaning products) in the design of artefacts and
infrastructures (Brezet and Van Hemel, 1997). Given that much of the environmental impact of appliances using consumables such as energy, water or detergent is associated with the use phase, this phase is increasingly the locus of attention within sustainable consumption research\(^{35}\). Attention to the use phase is aligned with social practice thinking, as Shove et al., (2007 in Ropke, 2009: 2495) state; “...the focus on practices draws attention to doing rather than having in relation to consumption, and to the use, rather than the display of products”. Spaargaren (2005) and Wallenborn (2009) suggest that a crucial step is to make the consumption of resources more visible to the practitioner. One way this can be done is through smart meters which aim to reconnect users to the consumption process and empower them to monitor their consumption levels (Darby, 2006). More recent work suggests that meters using ambient lighting indicators rather than numerical or informational displays can lead to greater reductions in water use (Kuznetsov and Paulos, 2010; Rogers et al., 2010).

Another trend is for the design of structures and systems that allow people to become engaged in the activity of doing, rather than being distanced from the process (Marchand and Walker, 2008). Wallenborn et al. (2009) argue for building an “experimental ontology” into the design of objects which would allow for user involvement in the setting of personal comfort parameters and gently encourage more sustainable use. Some would characterise these solutions, including scripts, persuasive design, live feedback, and ambient design as ‘behaviour based design approaches’ not fully engaging with social practice theory (Scott et al., 2012). Therefore, a number of academic design researchers have taken up the call by Shove et al. (2008b) for the adoption of a ‘practice-oriented design’ approach which explicitly considers the relations between the material aspects of a practice (products and infrastructure), cultural conventions and emotional and practical motivations. This necessitates a shift away from the traditional product focus of the design industry towards practices that re-position design as a catalyst for systemic change towards sustainability. This is related to the broader trend whereby designers are applying their ‘design-thinking’ skills in the creation of not only technological innovations but also social and service innovations to tackle societal and environmental problems. Typical traits of design-thinking are the use of systems perspectives, engagement with a wide range of stakeholders and disciplines, the application of creative problem solving, and iterative design processes such as visioning. The UK Design Council call this new field “transformation design” and points to the rise of strategic design and innovation consulting as evidence of this emerging shift (Design Council UK, 2010). The evolving role for design is summed up by Fletcher and Goggin (2001: 15):

> “While designers have long drawn inspiration from critiques on the industrial economy; environmental policy making; alternative technology movements; systems thinking and city planning, among other subjects; it is only recently there

\(^{35}\) For example, in washing machines, 15% of environmental impact arises from production, 30% from electricity demand, and 54% from consumption of washing detergents during use (Rudenauer and Rainer 2004 in Rubik et al., 2009). Also, Graedel and Allenby (1995 in Dewberry and Sherwin, 2002) estimate that decisions made at the design stage influence up to 80% of the impacts of a product.
has been evidence of a reciprocal action: a growing interest in these quarters in design”.

Although there is little evidence for the application of a practice orientation within the commercial sector, within academia, design researchers have shown great enthusiasm for its potential and some very recent studies have sought to consider the operationalisation of a practice oriented approach in the design of interventions for sustainable consumption (Scott et al., 2009; Bakker et al., 2010; Kujer and De Jong, 2012; Scott et al., 2012) For example, Kujer and De Jong (2012) conducted a cross-cultural study into practices of thermal comfort showing different localised and direct body heating strategies were the convention in Japan rather than space heating systems. Similarly, taking the practice of personal bathing, Scott et al., (2012) used discursive analysis and real life experimentation with new “practice prototypes” involving new tools, methods and furnishings to consider potential routes for innovation in washing. Six “leverage points and design opportunities” were identified based on their user feedback: the feeling of being clean; regaining control over bathing; excessive bathing and distrust of science; stress, speed and ritual; flow versus contained water; and the obduracy of fixtures. This developed greater understanding of the qualities of bathing that could be consciously re-negotiated or directed; however these opportunities were not worked up into specific solutions or interventions. A limitation of much practice oriented design research is that it tends to retain a micro focus, developing understandings between people and products for a given practice rather than considering broader commercial and organisational forces. Unsurprisingly, the resultant interventions tend to be aligned with those in the field of product design and are often more relevant to commercial interests than policy circles. A promising characteristic of these studies however is their creative design processes, in particular their integration of user-interests early in the design phase is worthy of further exploration.

Various means have been proposed for user-integration into the design process by following “an iterative procedure between concept development and user research” (Jelsma and Knot, 2002). It has been suggested that such ‘co-design’ processes can help avoid rebound effects arising due to unintended user behaviours which militate against efficiency improvements. Furthermore, inclusive design can be promoted if perspectives of typically excluded segments of population (including elderly, disabled, or lower income) are incorporated. Following ethnographic study and a co-design process between designers and everyday householders on energy efficiency solutions, Jegou et al. (2009) found that users often adopted creative behaviours to reduce their energy consumption and many of the solutions were based on a reconfiguration of original components and technologies. Strategies of co-creation within design research reflect the broader trend for participatory creative activities such as user-generated content, open source design and open innovation, frequently enabled by new Web
2.0 platforms (Sanders and Stappers 2008 in Scott et al., 2012). These open innovation formats acknowledge the vast array of knowledge, creativity and ideas amongst the general public. By connecting them with resources including knowledge, money and expertise, they aim at the fast development of solutions to social problems.

Commercial interests have long been preoccupied with user-engagement and have invested much in tracking consumer trends, hosting focus groups and employing ethnographic discovery methods to gain insight for product development (Fulton, 2005). Increasingly, they are drawing upon creative means for user involvement ranging from open innovation solutions to simulated living labs. Living labs aim to garner insight similar to that gained in ethnographic work in a less resource intensive and obtrusive manner. They are based on the recreation of realistic environments (such as a home, shop or office) for researchers to observe participants going about everyday activities and interacting with new technologies. For example, through their ‘Home Lab’, Philips Electronics claim that they “can fine-tune technologies so that they genuinely improve people’s lives in ways that they themselves say they experience as relevant, meaningful and simple” (Royal Philips Electronics, 2010). Ever since Philip’s ‘Vision of the Future’ research in the early 90s, the company has led a range of in-depth, forward-looking exploration projects aimed at the delivery of insights for strategic business development. Although Philips’ professed strategy is to “genuinely improve people’s lives” claiming that “people’s needs are at the heart of our innovations, now and in the future” (Philips, 2012b), profit motives are the underlying driver and by the nature of the company, materialised solutions dominate, questioning the overall sustainability of such strategies. Nevertheless, the visioning techniques used by these companies reveal interesting design processes for the generation of socio-technical innovations that could be applied in other research contexts.

Commercial technology research often seeks to draw upon emerging societal trends to consider how they could be elaborated in the future with the aim of providing space for exploration and reflection rather than the generation of production prototypes. This is exemplified in Philips ‘Design Probes’ research that resulted in a range of videos depicting life in the year 2020. One of these was the ‘Off the Grid Sustainable Habitat’ that explored the integration of electronics and bio-chemical functionalities into the built environment to provide self-sufficient energy and water functions. Another depicted a ‘Microbial Home’ where the house was viewed “as a biological machine to filter, process and recycle what we conventionally think of as waste – sewage, effluent, garbage, waste water” (Philips, 2012a). Sony conducted similar visioning research in their ‘Future Scapes’ project. This involved a

36 These are often grassroots led, however a number of private sector sponsored charity initiatives have been set up too. Examples include: “Simpl Challenges” (Social Innovation Marketplace) to promote innovation in the public sector through open source idea harvesting with the general public set up by the FutureGov change management consultancy; IDEO Open Innovation contest run by Barclays and The Work Foundation which aimed at getting solutions to help young people move into employment; Hacking events that bring together software developers and designers with people to help build web, mobile and product solutions to social challenges (www.sicamp.org); One Planet initiative run by WWF and Sony was another crowdsourcing challenge where people were invited to submit ideas to create sustainable lifestyles harnessing existing social media technologies.
creative collaboration of engineers, designers, artists, futurologists, scientists, authors and the public in "exploring how technology and entertainment can create a better, more sustainable future for everyone". Videos show the day in the life of an inhabitant in the year 2025 in four different scenarios. ‘Hyper Innovation’ is a high-tech future based on constant invention and research and development to maintain existing standards of living. ‘Centralised Survival’ depicts tougher regulations to get the planet “back on track” to sustainability. ‘Shared Ownership’ draws upon collaborative consumption and intelligent technologies, while ‘Prosperity Redefined’ is based on “new age thinking coupled with next-gen tech” (Sony, 2012). Additionally, both IBM (2012) in its ‘Imagine the World in 2050’ project and Intel in its ‘Tomorrow Project Anthology’ have also conducted futures research involving science fiction authors in the exploration of how science and technology might fuel novel solutions to societal problems including ones of sustainability (Doctorow et al., 2011). Additionally, both IBM (2012) in its ‘Imagine the World in 2050’ project and Intel in its ‘Tomorrow Project Anthology’ have also conducted futures research involving science fiction authors in the exploration of how science and technology might fuel novel solutions to societal problems including ones of sustainability (Doctorow et al., 2011). Another example is the IDEO37 ‘Living Climate Change’ project where members of the public were asked to submit video sketches of daily life in the future with the aims of stretching “beyond doom and gloom and policy discussions that have dominated debate” to develop “human centred scenarios that create new possibilities for business and society” (Living Climate Change, 2010). These research projects represent the rich variety of methodologies and perspectives used for the exploration of the future that are growing in popularity in recent years amongst a variety of commercial, governmental and civil society actors aimed at the generation of socio-technical innovations for sustainability. Many of these have taken place within the field of transition studies. These are explored in next section as their perspectives and approaches are useful when considering practice innovations.

3.3 Futures studies: backcasting, sustainability transitions and learning

Throughout history, humankind has endeavoured to foresee coming events and to form visions of better worlds. This is clearly exemplified in early work by Plato (The Republic c.380 BC), in the literary utopian visions of Thomas Moore (Utopia 1516) and William Morris (News from Nowhere 1891) through to the work of urban planners such as Ebenezer Howard (Garden Cities of Tomorrow 1902) who portrayed a vision of towns free of slums combining the best of city and country living. The origins of systematic futures research can be traced to the scenario planning tools used by the US Air Force in World War II to imagine enemy plans and develop strategies to combat them. Following this, scenario planning was used in military and industrial management fields with a primary focus on forecasting scientific and technological trends and developments. The 1950’s saw the use of ‘critical futurology’ by the growing social movements of the time38 while the field of creativity research that often

37 IDEO is an international design and innovation consultancy
38 In this instance, futures techniques were used to demonstrate the undesirable future characterised by injustice and poverty that would be realised if socio-political trends continued unchecked (Jungk and Mullert, 1987).
employed futures brainstorming techniques grew in popularity amongst business and technology interests in processes of strategy and new product development (Jungk and Mullert, 1987). According to Dreborg (1996), most futures studies of the mid twentieth century can be categorised as predictive scenario studies, based on the use of quantitative methods to predict likely futures by extrapolating from current trends. Börjeson et al. (2006) distinguish three main scenario typologies: 1) ‘predictive’ (aiming to discover what will happen by developing likely future scenarios); 2) ‘explorative’ (exploring what could happen through the development of possible scenarios); and 3) ‘normative’ (considering what should happen by developing desirable future scenarios). After the oil crises of the 1970’s there was a proliferation of energy based futures studies in the ‘explorative’ tradition as ‘predictive’ studies fell out of favour as they were unable to account for conditions of uncertainty and unpredictability. Shell played a leading role in these developments launching comprehensive scenario planning studies to explore the possible impacts of emerging technologies, geopolitical relations, political decisions (such as new economic policy or legislation) and macro trends (such as globalisation and demographic change) on energy supply. Based on considering different combinations of these variables, the aim was to plan for future energy shocks and to track long-term trends in energy resource supply and consumption (Dreborg, 2004). Other predominant examples of explorative scenarios in the present day include the climate change scenario research conducted by the Intergovernmental Panel on Climate Change and the UNEP (2007) Global Environmental Outlook scenarios.

Scenario studies of the normative tradition are exemplified in ‘backcasting’ research. With its origins in Lovin’s (1976) ‘backwards looking analysis’ for energy planning, backcasting is characterised by its development of desirable future visions followed by looking back to the present to see how they might be achieved. Proponents of backcasting attest that predictive and exploratory scenarios are unlikely to yield transition-inducing innovations given their focus on extrapolating from current trends and are critical of their deterministic view of the future and of technological change (Geels and Smit, 2000; Smil, 2000). By contrast, backcasting studies advocate creative visioning processes that are exemplified in the commercial studies outlined in Section 3.2.2 and draw upon modes of thought exhibited by early utopian thinkers. Taking a particular point in the future as a starting point is said to provide freedom from present socio-cultural norms and technological and institutional constraints to create visions that can illuminate opportunities for more radical change compared with thinking from the present situation (Jungk and Mullert, 1987; Quist, 2007). According to Dreborg (1996) this form of futures technique is of particular use in the case of deeply engrained, ‘wicked’ sustainability problems including those relating to unsustainable production and consumption systems. Backcasting typically begins with some form of problem orientation, followed by the development and assessment of alternative future scenarios which are intended to serve as a

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39 Within the literature, the resultant future visions from backcasting studies are variously called visions, images or scenarios. Although these nuances are not addressed in the literature, it appears that the terminology ‘visions’ is only used in backcasting studies while in exploratory and predictive studies ‘scenarios’ predominate. Both terms (scenarios and visions) are used interchangeably in this thesis.
background for decision-making and opinion forming (Quist and Vergragt 2006). The ultimate step is to ‘backcast’ from the future scenarios to the present, developing short-term implementation plans and actions that, in the long-term, can culminate in trend-breaking changes (Quist, 2007; Quist and Vergragt, 2006).

Backcasting has been characterised as an ambiguous concept given the wide variety of aims and procedural approaches applied between studies from academic, commercial, government and civil society fields (Börjeson et al., 2006; Quist, 2007; Höjer et al., 2011; Wangel, 2011). Comparing studies, Wangel (2011) notes that differences typically arise along the lines of: what the unit of study is (for example, the focus of scenario development may be on a geographical location or on physical or technical infrastructure such as energy supply systems); how societal change is conceived to take place (for example how, if at all, are social structure dimensions included, what kinds of measures are employed and are they top-down, or multi-level); and who is involved (i.e. does the process include laymen or experts and are agents of change identified).

Beginning with the question of the unit of study, one example of backcasting within the water sector is the Georgia Basin Futures project that considered sustainable water futures (mixing variables relating to supply and demand) at a bioregional scale around Vancouver (Tansey et al., 2002). This project combined public values and preferences with expert knowledge to produce future scenarios using a computer based, interactive scenario generation tool that included qualitative and quantitative techniques. The pan-European SCENES project combined participatory backcasting with existing scenarios on freshwater futures up to 2025 to anticipate emerging problems and develop plans for the successful implementation of the Water Framework Directive (Kok et al., 2011b). In keeping with visioning traditions within urban design, many backcasting studies have taken place at the city level (such as VEIL, 2010 and Höjer et al., 2011) along with smaller area based studies involving local communities including the SuScit project (Eames and Egosme, 2011) and the ToolSust project (Carlsson-Kanyama et al., 3003 and Tite and Gatersleben 2003). In the target oriented backcasting tradition, Svenfelt et al., (2011) developed a range of scenarios depicting solutions including housing innovations, collective living and new renewable energies to meet the goal of decreasing energy use in buildings by 50% by 2050. Many of these studies however contain more of a macro lens looking at sustainability on a community or area level, or from the perspective of resource production and consumption rather than focusing on social practices as the unit of study.

Considering the question of who is involved as per Wangel’s (2011) categorisation of backcasting studies, Quist (2007) notes an increasing usage of participatory backcasting approaches reflecting broader shifts away from expert-led to participatory processes since the 1990’s, especially within the realms of environmental decision-making to embrace and represent diverse knowledge, opinions and values (Reed, 2008). Many researchers (e.g. Guy and Shove, 2000; Van Vliet et al., 2005) often note that a key contributor to socio-technical
lock-in and system inertia is the lack of dialogue between actors loosely related to a particular socio-technical system (such as public transport, water or energy). Participatory backcasting exercises therefore aim to integrate diverse actors, sometimes with non-expert participation at various points in the process, to vary the range of inputs, mind-sets and interests represented and, importantly, to stimulate learning amongst participants (Quist, 2007; Meadowcroft, 2009). Through collective visioning procedures, it is often asserted that ‘higher order learning’ can be stimulated; defined as “learning processes not only on the cognitive level, but also with respect to values, attitudes and underlying convictions” (Quist and Vergragt, 2006: 1035).

Higher order learning is distinguished from ‘lower order learning’ which involves technical learning based on the acquisition of new knowledge and procedures, whilst high-level objectives remain unquestioned (Brown et al., 2003). By contrast, higher order learning can lead to both problem and goal redefinition, and on a disciplinary / professional level, changes in norms and mindsets can be provoked, allowing space for new solutions, including behavioural or procedural alternatives (Brown and Vergragt, 2003; Robinson, 2003; Quist et al., 1999). Owing to these qualities, Jungk and Mullert (1987: 72) state that “the success of a workshop is not of course to be measured solely in terms of the schemes or catalogues of proposals it generates but also by how it subsequently affects the participant’s minds and behaviour”. Reference to higher order learning is found in structured visioning or backcasting exercises held within different settings from those applied within organisations (Senge, 1990b) as part of transitions governance (van de Kerkhof and Wieczorek, 2005) and within Bounded Socio-Technical Experiments that focus on the small scale implementation of socio-technical innovations within experimental niches (Brown et al., 2003). However, to date, there has been little formal empirical analysis or monitoring of learning processes (Brown et al., 2003) leading to recent calls for more in-depth empirical research on this subject (Vergragt and Quist, 2011).

The most prolific use of backcasting has been within the field of sustainability transition studies within policy and academic circles. Transitions are considered “large-scale transformations in the way societal functions such as transportation, communication, housing, feeding are fulfilled” and are interchangeably referred to as ‘industrial transformations’, ‘sustainable system innovation’ and ‘transitions towards sustainability’ (Geels, et al., 2004: 19). Bringing about a transition is said to require ‘system innovations’, variously called shifts in socio-technical regimes that are said to comprise technological artefacts, markets, user practices, regulations, infrastructure, maintenance and supply networks, and cultural meanings (Elzen et al., 2004). Social practices such as washing and heating are considered to be nested within socio-technical water and energy regimes and thus system level transitions necessarily involve transitions in practice (Geels and Schot, 2007). Transitions research is founded upon the recognition that singular innovations (such as eco-efficiency improvements or end-of life take back schemes) can change only elements of production-consumption chains but do not tackle the systemic nature of sustainability problems (Tukker and Butler, 2007 in Diaz-lopez et al., 2009). While subject to aspects of path dependency,
inertia and lock-in, transitions theory notes that socio-technical regimes are dynamic and large-scale ‘system-innovations’ can promote transitions over time (Vergragt, 2000; Brezet et al., 2001; Tukker and Tischner, 2004). Using Brezet’s (1997) classification, system innovation (in which technological, institutional and social changes are combined), represents the fourth rung of innovation and the highest level of societal change. This is in contrast to lower order forms of innovation ranging from product redesign at the most basic level, to product innovation, to function innovation, which leads to a change in the way the functions of an activity are fulfilled (such as recent trends for a switch to leasing and product-service systems outlined in Section 3.2.1). Studies in this area offer theoretical and methodological insight for academics and policy-makers concerned with instigating sustainability shifts in socio-technically mediated consumption practices. To provide a model of governance for fostering large-scale system changes, or ‘transitions’, transition management techniques were developed in the Netherlands in the 1990’s of which collective visioning and / or backcasting exercises are a cornerstone (Geels, 2002; Kemp et al., 2006; Meadowcroft, 2009).

To date, these studies have aimed to encourage long-term socio-technical transitions within the water, energy and transport sectors (Kemp et al., 2006) rather than looking specifically at the particular practices these systems support. Transition studies are often founded on the Multi-Level Perspective (MLP) framework (Geels, 2002) that offers a conceptual means for examining the interactions and co-evolutionary forces between micro, meso and macro level aspects of a system (see Figure 3.2). The highest level is the macro, or landscape level consisting of meta-trends, values, structures and shocks and is said to be slower and more resistant to change. After this comes the meso-level, or socio-technical regime, followed by the micro-level consisting of a variety of niches where most innovations in technology and organisation are said to take place. Pressures at macro-level such as climate change, or economic crisis are believed to open up possibilities for system transition while micro-level innovations and experiments can also help foster change if they are upscaled. As will be shown in the next section, a key criticism to date of transition management studies and the application of the MLP tool is that they prioritise technological changes and large scale shifts in provision systems with limited attention to consumption practices and local communities.
3.3.1 Backcasting: emerging gaps

In terms of practical applications, the Transition Management model of policy making has been most heavily employed in the Netherlands. The Fourth Dutch Environmental Policy Plan pioneered this approach stating that: “solving the major environmental problems requires system innovation...long drawn-out transformation processes comprising technological, economic, socio-cultural and institutional changes” (VROM, 2001: 30 in Kern and Smith, 2008). Likewise, the Dutch Ministry of Economic Affairs’ ‘Energy Transition’ project (2001-present) uses visioning and collaboration techniques in the creation of an annual ‘Transition Action Plan’ outlining strategy and individual actions (EZ and ETTF, 2006 in Diaz-Lopez et al., 2009). Most recently, the UK government funded a Foresight Programme, employing exploratory scenarios techniques to consider how the UK built environment could evolve to manage the “transition over the next five decades, to secure sustainable, low carbon energy systems” (Foresight, 2008: 9). Indeed, the rhetoric of ‘transitions’ and ‘visions’ has become pervasive in national policy-making and can be seen within both the Irish and UK contexts. Despite this rhetoric, Ireland has not employed any transition management tools such as backcasting within policy. Internationally most work in this field has been limited to the research community with less practical application in government policy making (Diaz-Lopez et al. 2009).
To date, many existing transition studies have tended to be dominated by an ‘innovation systems approach’ that favours supply-side, technology based transformations with little participation of the final user. Loorbach (2007 in Meadowcroft, 2009) maintains that societal demands and issues of consumption are often ignored in transitions research and policy with similar conclusions drawn by Van der Duin, and Sabellis (2007) who found that wrong predictions in futures research were often due to too much emphasis on technology to the neglect of social change. Further, Geels and Smit (2000) note that the attention of future innovations is often on the functional role of household consumption with insufficient consideration given to the social and psychological elements of engaging in such activities, or to issues surrounding the societal embedding of technology. In addition, Wangel (2011, 881) attests that it is difficult to assess whether the presence or absence of social structures and agency in scenario development is “a result of these not being included in the methodology, or whether social structures were sought, but not identified” given that few publications outline precise details on these matters in scenario development.

Nevertheless, some academic research, rather than adopting a resource based lens, looks at the services, practices and functions that resources like energy enable and consider socio-technical innovations to serve these needs more sustainably. The SusHouse (Towards Sustainable Living in Households) project is a unique example. Involving a consortium of five research institutions across Europe, it used a participatory backcasting approach to generate future scenarios for the sustainable fulfilment of home shelter, food and clothing functions in the year 2050 (Quist et al., 2001). The aim was to achieve factor 20 improvements in resource efficiency across each of these key household functions by the year 2050 (Green and Vergragt, 2002). Some scenarios were based on the development of high-tech devices with lower user involvement, such as intelligent automated appliances or automatic energy control systems. Other scenarios involved submission of control to external service providers or greater cultural change and self-sufficiency. Specific proposals included flexible building units that can be adapted to seasonal variation, highly durable and dirt resistant clothes, sharing of items (e.g. clothes exchange) and sharing of space (collective living, or collective rooms) (Young et al., 2001). Similarly, SPREAD (2012) an on-going EU FP7 backcasting project, is aiming to integrate stakeholders from civil society, business and policy in the design of visions for sustainable lifestyles. Although neither SusHouse, nor SPREAD explicitly focus on practices, these studies do aim to look at socio-technical innovations and interventions based on an understanding of the fluidity and subjectivity in needs, habits and attitudes rather than looking at engineering and technological solutions to meet existing demand. Brandes and Brooks (2010: 11) adopt a similar stance with respect to water policy arguing that this resource should be:

“…viewed as a means to accomplish certain tasks. This perspective liberates water planners and managers from the constraints of merely supplying more water and permits them to innovative with alternatives to water-based services”.
In this way, the needs and desired results of a practice are taken as the starting point for designing interventions. It is argued that this can lead to the generation of “soft” policy responses to resource management rather than typical “hard” predict and provide strategies (Brandes and Brooks, 2010). Despite the growing number of experiments using backcasting techniques by commercial, academic and policy governance circles, the majority of these fail to give adequate attention to the social implications of sustainability. Thus Shove (2004, 79) asserts: “a selective blending of theories of practice and of technological transition promises to be of real value in describing and analysing the transformation of entire complexes of activity”. This section has pointed to the potential that participatory backcasting techniques may have for the conception, exploration and promotion of solutions for more sustainable household consumption; a process which could be improved through infusing social practice theoretical insight.

3.4 Conclusion

Drawing on recent sociological studies, this chapter began by outlining an alternative way of conceptualising daily water and energy use by viewing these activities as social practices (Parkhurst and Parnaby, 2008; Guy and Shove, 2000; Shove, 2003b). This approach provides room for thinking systematically and focuses attention on the material, social, cultural and infrastructural elements that co-evolve to create a dominant practice. Crucially, it shows that user behaviour and needs are not static and predetermined, but are constructed and dynamic, varying through time and space together with changes in technology and relations of engagement. Such a perspective reveals insight for the challenge of innovation in daily water and energy using practices by demonstrating the potential for the institutionalisation of alternative, less resource demanding norms and behaviours in the future. In the design of socio-technical innovations for more sustainable consumption practices, it was noted that most room for innovation is enabled by viewing practices according to their desired result or function. In this way, there is a shift from product improvements or redesign to innovation at function or system levels, which can involve entirely new ways of delivering the desired end-result of a practice. Combinations of technological and cultural change and also different configurations in systems of provision are likely to be involved in these shifts.

This chapter showed that to date, much social practice research has focused on theoretical insight. While studies within the field of design have had a more practical orientation, there has been less research on how to generate and evaluate alternative practice configurations. Simultaneously, research was presented showing the potential of participatory backcasting studies to develop innovative solutions, widening possibilities for long-term action towards sustainability and promoting transformative learning processes. Based on the gaps identified in this chapter, it is established that a pertinent study would be to consider how theoretical advances in social practice studies may be incorporated into the application of a backcasting
process for sustainable consumption. Chapter two identified household water and energy consumption as two key problems areas for the achievement of sustainable consumption in Ireland and selected their most resource consumptive practices, personal washing and home heating as appropriate test beds for a practice oriented, participatory backcasting study. This research approach would be a unique and creative alternative to current approaches to studying, conceptualising and developing solutions for problems of unsustainable daily consumption practices in an Irish context. Whilst backcasting is clearly a distinct methodology, it is simultaneously characterised as an underlying approach given its constructivist perspective and assumptions on the need for system innovation. The insights developed in the literature review chapters have led to the positioning of this research as presented in Table 3.2. The next chapter provides an outline of the design of the practice oriented, participatory backcasting process.

Table 3.2  Thesis research positioning

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Conventional policy approaches</th>
<th>Thesis research positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of change required</strong></td>
<td>Incremental change</td>
<td>System innovation</td>
</tr>
<tr>
<td><strong>Timeframe</strong></td>
<td>Short-term political cycles</td>
<td>Long-term planning</td>
</tr>
<tr>
<td><strong>Sustainability goal</strong></td>
<td>“Win-win”, whereby economic development and sustainability are compatible. Ecological modernisation paradigm prevails.</td>
<td>Respecting ecological limits integrating social, economic and environmental goals of sustainability.</td>
</tr>
<tr>
<td><strong>Sustainable water / energy consumption strategy</strong></td>
<td>Efficiency, technocentric, infrastructure focus. Meeting projected demand in the case of Irish water strategy. Demand management for home energy use based on saving money whilst helping the environment.</td>
<td>Sufficiency and cultural change. Re-evaluating cultural norms and looking for socio-technical innovations for dramatic reductions in water and energy use (in the magnitude of Factor 10-20 changes).</td>
</tr>
<tr>
<td><strong>Model of behaviour change</strong></td>
<td>Rational actor model; information deficit model; focus on individual attitudes and values.</td>
<td>Social practices model</td>
</tr>
<tr>
<td><strong>Key discipline</strong></td>
<td>Engineering, economics, psychology</td>
<td>Multi-disciplinary, emphasis on social sciences</td>
</tr>
<tr>
<td><strong>Policy ethos</strong></td>
<td>Top-down policy-making based on cost benefit analyses</td>
<td>Participatory, exploratory governance processes</td>
</tr>
<tr>
<td><strong>Long-term planning tools</strong></td>
<td>Forecasting and scenario development based on extrapolation from current trends</td>
<td>Participatory backcasting: Co-development of desirable future practices and development of actions for their achievement.</td>
</tr>
</tbody>
</table>
CHAPTER FOUR:
METHODOLOGY
4.1 Introduction

The methodological approach adopted in this research is considered a fundamental part of the final product. This chapter therefore provides an overview of the design of the practice oriented, participatory backcasting process while further detail and reflective discussion on each phase is integrated into the results chapters. The previous chapter outlined the theoretical positioning of this research, arguing that futures studies involving creative, interdisciplinary, long-term and systems thinking processes are needed to consider how large-scale sustainability shifts may be encouraged in household consumption practices. It was asserted that participatory backcasting represents a promising tool and when coupled with social practice theory, could produce useful insight into how more dramatic shifts towards sustainability may be encouraged in household energy and water consumption practices. To test this proposition, the overarching research aim is: to design, apply and analyse a practice oriented, participatory backcasting process for more sustainable home heating and personal washing practices in Irish households. This chapter outlines the methodology used to address this aim and the three key research questions:

1. How might a practice oriented, participatory backcasting process be operationalised targeting sustainable consumption?
2. What outputs can be developed from the participatory backcasting process as applied to sustainable home heating and personal washing practices in Irish households?
3. What are the benefits and limitations of the practice oriented, participatory backcasting procedure as reflected in participant feedback and in the levels of learning it stimulated amongst them?

Answering these questions necessitates the application of a full backcasting process. The previous chapter showed that participatory backcasting approaches typically differ in terms of what the unit of study is, who is involved, and how processes of change are conceived (Wangel, 2011). It was noted that the unit of analysis (or, the what of backcasting studies) is frequently a given geographical area or system of resource provision (such as energy or transport systems), with less attention to questions of consumption. For this research, key social practices associated with energy and water consumption in Irish households - home heating and personal washing respectively - are selected as the units of study. Social practice theory informs the question of how change is conceived and the kinds of interventions and innovations that could be designed. Considering the question of who, this research employs a participatory backcasting approach involving laymen and strategic stakeholders related to the water and energy sectors. With its emphasis on stakeholder learning processes, creativity and action, participatory backcasting is often distinguished from ‘path oriented backcasting’ (where the emphasis lies on the development of action plans, sometimes towards pre-existing visions (Robinson, 1990)) and ‘target fulfilling backcasting’ (which aims to develop quantifiable
advancements towards targets often relating to technology or decarbonisation goals (Höjer et al., 2011)).

This chapter is structured around the key phases of the practice oriented, participatory backcasting process. Although participatory backcasting studies vary in their design, there is continuity in the core phases applied across studies. These typically involve phases of: problem orientation; future scenario development and analysis; the development of backcasting action plans; and the embedding of results. An important dimension is that this is an iterative process, where there is continuous feedback between phases and learning amongst stakeholders. Quist et al. (2011: 886) summarise the process as follows:

“In the backcasting experiment stakeholders meet and are involved in developing, assessing, discussing and adjusting future visions...Learning may not only result in increased awareness of and support for these sustainable futures, but also lead to formulating follow-up agendas or transition paths. It may also lead to increased understanding how these futures link to strategic opportunities for stakeholders, as well as to alternatives for current practices and activities that may contribute to bringing about the future vision”.

A diagrammatic representation of the key phases and sub-phases of the practice oriented, participatory backcasting process as designed for this research is found in Figure 4.1. This same backcasting procedure was conducted in parallel for the home heating and personal washing topics of study. This means that separate workshops and focus groups took place with different attendees and that separate scenarios and transition plans were developed for home heating and personal washing. This chapter is broken into three main sections corresponding to the key phases of the backcasting process: the Visioning; Citizen-consumer; and Transition Phases. The aims of each phase are listed, after which details are provided on their methodological design. The methodological approach is rationalised, drawing upon and extending information provided on backcasting techniques and social practice research presented in the previous chapter. Given the complex and iterative nature of the practice oriented, participatory backcasting process, a full description of the nuances of each phase would be rather abstract and meaningless without reference to its resultant outputs. This chapter therefore focuses attention on practical dimensions, including participant recruitment and workshop formats. A more nuanced description of each phase, especially relating to the conceptual practice orientation, is provided in the empirical results chapters (chapters five to eight). This chapter concludes with a discussion of issues around researcher reflexivity and the epistemological positioning of the practice oriented, participatory backcasting process.
Figure 4.1  Practice oriented participatory backcasting process

Practice-oriented participatory backcasting process

Visioning Phase
Chapter 5

Visioning Workshop → Scenario Elaboration → Scenario Sustainability Evaluation

Citizen-Consumer Phase
Chapter 6

Citizen-Consumer Focus Group → Transition Workshop

Transition Phase
Chapter 7

Transition Framework

Learning and Backcasting Evaluation  Chapter 8

Process conducted in parallel for washing & heating

Stakeholder engagement  Back-office

Personal Washing  Home Heating
4.2 Visioning Phase

The goals of the Visioning Phase were:

- To develop concepts for future home heating / personal washing practices through a stakeholder Visioning Workshop
- To create interaction and collaboration between stakeholders at the Visioning Workshop and to evaluate their feedback on the process
- To use Visioning Workshop material to create future heating / washing scenarios and to obtain stakeholder feedback on these
- To evaluate the scenarios for their sustainability potential

4.2.1 Visioning Workshop: participant selection and recruitment

As demonstrated in the previous chapter, standardisation, a focus on eco-efficiency, engrained norms of practice, and a lack of cross-sectoral and inter-disciplinary collaboration all serve to stifle the development of novel solutions for more sustainable household consumption practices. To address these challenges, participatory backcasting implies stakeholder involvement across a range of spheres, tiers and disciplines. For the heating and washing Visioning Workshops, the aim was therefore to recruit a spectrum of attendees from different disciplinary backgrounds and organisations across public, private and civil society sectors. This would help to ensure that a range of perspectives, values and skillsets were represented contributing to idea sharing and improved output (Quist and Vergragt, 2006). Aside from considerations relating to the quality of output, in order to enhance follow-up and spin-off from backcasting experiments, Quist et al. (2011) note the importance of recruiting a variety of stakeholders to enhance opportunities for social learning. They also emphasise the benefits of improving follow-up by recruiting participants from positions of power and influence within their organisations and the wider sectoral field. In their recommendations on how to improve learning in backcasting procedures, this research also draws upon advice by van de Kerkhof and Wieczorek (2005: 739) who assert that “it may be wise to, next to visionary people, also involve participants with more practical, strategic, executor and near-term thinking styles’. Drawing upon these recommendations, a comprehensive process of stakeholder identification and recruitment was conducted for this research. This process is outlined in detail below in light of criticism by Eames and MaDowall (2006) that a common pitfall of previous backcasting studies is the absence of transparency surrounding their recruitment processes. Drawing upon insight from socio-technical studies and literature on social practices as reviewed in chapter three, Figure 4.2 provides a basic outline of the actors deemed to have a stake in household washing and heating practices. These include: representatives that shape the products and technologies used in heating and washing...
practices; stakeholders with an understanding of socio-cultural change and education; actors shaping the built environment and water and energy supply networks; and those related to broader organisational institutions and processes of governance.

**Figure 4.2 Stakeholder map used to identify participants for the Visioning Workshops**

A broad-spectrum process was used to recruit and identify participants representing these interests from the Republic of Ireland and Northern Ireland. This included reading key policy documents in order to establish those who had participated in their drafting, shaping or consulting. In addition to public documents, websites of state, semi-state, non-governmental and research organisations were examined and industry lists of private sector actors such as consultants, designers, entrepreneurs, and architects were consulted. An “iterative” process was used to access these stakeholders (Reed, 2008: 14) combining cold calling with the use of existing personal networks followed by processes of snowball sampling. To begin with, invites were distributed, outlining the workshop aim and why it might be of interest (See Appendix G). Once participants were recruited, this was followed with a further brief, providing greater detail on the structure and aims of the workshop (See Appendix H). A high\(^\text{40}\) response rate was achieved and 57% of those contacted took part with 21 attendees secured for each workshop (washing and heating). Tables 4.1 and 4.2 detail the number of workshop participants present (indicated by figure in brackets) according to their sector (public, private or civil society), the agency they were representing and their field of expertise.

\(^{40}\) This response rate demonstrated a very high level of interest by comparison with the SusHouse experience, where between 15 to 25% of those contacted took part (Anderson, 2000b).
Table 4.1  Washing Visioning Workshop: participants according to profession and sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Representatives and number present</th>
</tr>
</thead>
</table>
| Public & semi-state | County Council, architect (2)  
|                  | County Council, water services (2)  
|                  | County Council, planner (1)  
|                  | Department of Environment, architect (1)  
|                  | Department of Environment, water services (1)  
|                  | Department of Environment, sustainable communities (1)  
|                  | Group Water Scheme, water supply (1)  
|                  | Northern Ireland Water (1)  
|                  | Utility Regulator (NI) (1)  
|                  | Consumer Council (NI) (1)  
|                  | TOTAL: 12                                                                                           |
| Private         | Washing products industry (2)  
|                  | Product design (1)  
|                  | Engineer (1)  
|                  | Architect (2)                                                                                       |
|                  | TOTAL: 6                                                                                           |
| NGO / Research  | NGO, planning & policy (1)  
|                  | NGO, environmental awareness (2)  
|                  | TOTAL: 3                                                                                           |
| Total           | 21                                                                                                  |

Table 4.2  Heating Visioning Workshop: participants according to profession and sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Representatives and number present</th>
</tr>
</thead>
</table>
| Public & semi-state | County Council, environmental awareness (1)  
|                  | County Council, engineering (1)  
|                  | Energy Regulation (1)  
|                  | Energy Efficiency Agency (2)  
|                  | Housing Executive (NI) (1)  
|                  | County Council, architect (1)  
|                  | Energy Supply (1)  
|                  | Total: 8                                                                                           |
Table 4.2 shows a relatively even spread across sectors in the Heating Visioning Workshop. By contrast, NGO and research interests were relatively under-represented in the Washing Visioning Workshop where public sector stakeholders dominated. This in part reflects the fewer non-governmental organisations and research groups devoted to water issues in Ireland and the low feedback rates from those few stakeholders that were contacted. With regard to policy actors, it proved difficult to recruit those directly involved in high-level energy and water policy making at Department level while county council representatives were more responsive. A variety of reasons could have accounted for this slight under-representation, in particular, the preoccupation with immediate policy goals on the part of government officials with less room for exploratory processes. In addition, technology and manufacturing companies were less responsive, perhaps because they did not see the workshops as being of direct relevance to their company and also due to the culture of guarded intellectual property within industry. With regard to spread between Northern Ireland and ROI attendees, ROI stakeholders, especially those from the Dublin hinterland were more represented. A fundamental reason for this was the proximity of the workshops to a high number of private, public and non-governmental offices and thus the ease of attendance was greatly increased for these attendees. At both workshops, Northern Ireland representatives accounted for 19% of attendees, many of whom travelled by train from Belfast. In terms of disciplines, there was slightly higher interest and attendance from those within architecture and engineering disciplines. The implications of the participant profiles at the Visioning Workshops and issues of involvement and representation are further explored in the results chapters of this thesis.

4.2.2 Visioning Workshop process

A fundamental feature of any visioning workshop is that the given problem should be rethought by disregarding norms, rules and regulations allowing for the creation of radical solutions compared with thinking from the present situation (Jungk and Mullert, 1987). For this
research, the basic aim of the Visioning Workshops was to generate a large number of concepts that may enable more sustainable personal washing or home heating practices in the year 2050. The date 2050 was selected as it permits thinking outside current frameworks and the imagination of new behavioural norms without being too far into the future such that participants may be overwhelmed or inhibited (Vergragt, 2000). The workshops were held in Autumn 2011 in a suite of meeting rooms within a newly constructed building in Trinity College Dublin. With the exception of the researchers co-ordinating the project, this was not a space that the invited participants had been to before. One benefit of the location was that it was not explicitly linked to government, private sector or civil society affiliations. After holding a pilot workshop in order to test aspects relating to timing and process design, a refined format was developed for a three-hour workshop. This was considered a sufficient length to permit interaction and idea generation whilst not deterring participants due to excessive time demands. The workshop began with an introductory presentation outlining the agenda and the current unsustainabilities associated with heating / washing activities. Participants were then divided into three sub-groups and with facilitation by a Consensus team member, idea generation proceeded using a collaborative brainstorm format where all ideas are considered legitimate and criticism is withheld to promote the open expression of views (Michalko, 2006). Each sub-group contained seven individuals following recommendations by Anderson (2000a) that this is the optimum number for creativity sessions. Following the visioning brainstorm, the entire group reconvened and reported on their ideas in a process of clustering. The workshop closed with a short critical discussion amongst participants on the visioning process and the completion of workshop evaluation forms (details of which are provided in Section 4.5 of this chapter). A summary table showing a schedule of workshop activities is found in Appendix J. Further details on the heating and washing problem orientation are found in chapter five where processes of visioning and clustering are also elaborated.

4.2.3 Scenario Elaboration

Following the Visioning Workshops, the next phase was to use the data produced as a basis for the formulation of scenarios depicting alternative practices of washing and heating in the future. Within backcasting literature a range of scenario generation techniques are put forward. One of the most common methodologies is the “scenario crosses” technique. This is based on the identification of two key dimensions in visioning ideas (either before or after the visioning process) that then form a grid of four quadrants, each representing one scenario

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41 See Appendix I for workshop brainstorm rules
42 Data from the Visioning Workshops comprised: post-it notes recording participant generated ideas produced in the brainstorm sessions; photography of the ‘cluster’ wall - showing how participants grouped ideas; and verbatim taken by note-takers on the day. In contrast to focus groups where the focus is on in-depth discussion, leading to the identification of meaning and themes, brainstorms formed the basis of the Visioning Workshops where the focus is on fast paced, idea generation rather than discussion processes. The brainstorm sessions were therefore not dictaphone recorded, and post-its together with note-taker verbatim proved adequate for the analysis of the workshops and the development of scenarios in the ensuing phases.
(van Asselt et al., 2010; Kok et al., 2011a). Visioning workshop ideas are then grouped according to these four quadrants. Based on a review of existing scenario studies, Kok et al. (2011a, 5-17) report that the bulk of their scenario dimensions correspond to polarities of global versus regional, and self-interest versus solidarity (see Appendix K). A ‘techno-cultural options matrix’ was used for scenario creation in the SusHouse project on sustainable lifestyles (which remains the most closely aligned backcasting study to this research due to its consumption focus) (Young et al., 2001). This scenario structuring framework led to the creation of four scenarios based on combinations of high or low cultural and technological changes. A key drawback of the scenario crosses approach however is that it can lead to a forcing of ideas into polarised categories when ideas put forward are not necessarily mutually exclusive, nor might they be an exact fit for that category (Tite and Gatersleben, 2003; Hughes, 2009). This is articulated by Tite and Gatersleben (2003: 22), reporting on their experience with backcasting for sustainable future cities who commented:

“In trying to find dimensions we were trying to find ideas that fall into polarities, however most of the ideas put forward are not mutually exclusive, thus making the scenarios we constructed somewhat arbitrary…In all, we feel that the use of dimensions complicated the process of constructing scenarios whilst diluting the resultant images of future lifestyles”.

In order to overcome this potential forced reductionism, this research drew upon Tite and Gatersleben’s (2003) recommendations to use structured visioning brainstorms with similar ideation categories as the basis for a schematic, scenario construction process. This will be described in the Visioning Chapter. Following the clustering and theming of Visioning Workshop ideas in this way, three scenarios were developed, each presented in both written and visual format. The goals and design of the scenarios drew upon work by Jegou and Manzini (2000) on ‘design orienting scenarios’. As opposed to ‘policy-orienting-scenarios’ ‘design orienting scenarios’ are developed for more focused aspects of a socio-technical system and importantly, aim to inform not only the policy making process, but also business, design and social innovation. This is an important angle to adopt in practice oriented research which recognises the complexity of forces governing daily consumption practices. Within backcasting studies, pre and post workshop stakeholder management is strongly recommended (Green and Vergragt, 2002). However it is a feature that appears to be lacking in many studies, possibly due to resource and time constraints. The scenarios were therefore made available for commentary from stakeholders in the Visioning Workshops through a specially designed online SurveyMonkey tool (further details of which are provided in the chapter five).
4.2.4 Sustainability Evaluation

In backcasting research, it is common for scenarios to be subjected to some level of sustainability evaluation to assess their strong and weak points against a set of sustainability indicators. This provides a deeper understanding of their sustainability implications and allows comparison of the relative merits across scenarios which may be used to inform subsequent phases of the backcasting process. A variety of indicators for sustainability have been proposed by various bodies and researchers, for example, OECD (2001), and UNEP Sustainable Consumption Indicators (Bentley and de Leeuw, 2001). These mainly contain macro-level indicators suited to high-level national analyses and are typically concerned with the sustainable achievement of basic needs. They are therefore of less relevance to household practices within developed countries and, to date, no coherent indicators for sustainable household consumption have been established (Lorek and Spangenberg, 2001; Davies et al., 2010).

Within backcasting studies, more attention has been focused on environmental indicators such as life-cycle analysis or ecological footprinting rather than social and economic dimensions of sustainability. Environmental indicators typically measure aspects relating to material use, water consumption, energy use, waste and emissions, space use, and transport patterns (Lorek and Spangenberg, 2001). After utilising a life-cycle-analysis to assess the environmental implications of the SusHouse scenarios, Bras-Klapwijk (2000: 10) observe that this led to an excessive focus on the environmental burden of the scenarios’ products. This overlooked environmental impacts arising from transport, travel, durables and consumables also involved in carrying out household services. In addition, Bras-Klapwijk (2000) emphasise the difficulty in making these calculations due to the lack of available data and future uncertainties (holding implications for research validity) along with time, knowledge and resource constraints. A qualitative sustainability assessment is therefore strongly recommended by many of the SusHouse researchers (Anderson, 2000b; Bras-Klapwijk, 2000; Vergragt, 2000). Vergragt (2000: 43) makes the following key conclusion relating to the qualitative versus quantitative dilemma when it comes to scenario assessment:

“Given the nature of the task and the timescale involved, the qualitative methods employed seemed to give both interesting and credible results and deserve further investigation. However, it must be said that it took a large number of person-hours to identify what little data were available and to carry out even the semi-quantitative analyses. Whilst useful and non-intuitive results were obtained...they were seldom the subject of debate in the second workshops. It is likely therefore that simpler, entirely qualitative methods could have been used without adverse influence on the project overall.

The disadvantages of quantitative analysis are therefore considered more significant than the advantages of a qualitative evaluation to fulfill the required purpose of the sustainability evaluation for this PhD research. As backcasting is an iterative process, a qualitative evaluation has the added benefit of making the scenarios more malleable for the ensuing
citizen-consumer workshops, allowing for recommended improvements and modifications to be taken on board without resorting to entirely new quantifications.

An integrated, qualitative framework was therefore developed for the evaluation of the future washing and heating scenarios. This was based largely on Seyfang’s (2006) criteria for the evaluation of sustainable consumption initiatives from a ‘new economics’ perspective. In studies of sustainable consumption initiatives including eco-housing, local exchange trading systems and community currencies, Seyfang (2006, 2009) presents a multi-criteria evaluation tool to assess these initiatives from a new economics perspective. At present, new economics approaches are not widely reflected in practices of consumption, nor are they evident in mainstream sustainability policy approaches. However, new economics strategies for sustainable consumption are increasingly found within successful grassroots initiatives, and its principles of economic restructuring coupled with large-scale social changes to encourage societal wellbeing within ecological limits are gaining traction within academic circles (Ekins and Ekins, 1986; Jackson, 2006). It was therefore considered pertinent to elaborate and trial Seyfang’s (2009) set of new economics indicators for sustainable consumption in this research context. Given the need for dramatic socio-technical transformations in daily practices in order to achieve stringent sustainability goals, there is a case to be made for more normative assessments against future frames of reference rather than assessing scenarios against mainstream sustainability principles. Seyfang identifies four key sustainable consumption criteria: localisation; reducing ecological footprints; community building and collective action; and building new infrastructures of provision. These are outlined in Table 4.3. An important quality is their integration of social, economic and environmental dimensions of sustainability, which are often overlooked in assessments that tend to emphasise environmental impacts. Halme et al. (2004) and Gaterleben (2001) also call for the inclusion of personal indicators in assessing home eco-efficiency services including dimensions relating to equity, health, safety and comfort. Following these recommendations, the indicator “individual wellbeing” was added to Seyfang’s indicator set. In addition, to assess broader economic considerations, “economic sustainability” was added to consider implications for employment structure, job creation, economic stability, competitiveness, and sectoral impacts. Details of how this evaluation framework was applied can be found within the chapter five and in Doyle and Davies (Forthcoming).
Table 4.3 Scenario sustainability evaluation framework indicators & examples of initiatives embodying these principles.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Reference</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localisation</td>
<td>Making local economies more self-sufficient; reducing the length of supply chains; localisation of utility provision.</td>
<td>Seyfang, (2006)</td>
<td>Supporting local businesses; using locally available resources (e.g. local water and renewable energy); DIY; ‘buy local’ campaigns; local labour.</td>
</tr>
<tr>
<td>Reducing ecological footprints</td>
<td>Shifting consumption to reduce social and environmental impacts; overall demand reduction; low consumption lifestyles based on ecological citizenship; equitable distribution of resources and consumption patterns.</td>
<td>Seyfang, (2006)</td>
<td>Voluntary simplicity and downshifting movements; natural, biodegradable, or carbon-neutral materials; energy efficient devices and measures; shared ownership of goods; purchase of ethical, fair trade, organic or low carbon goods; awareness and education to encourage ecological citizenship.</td>
</tr>
<tr>
<td>Community building and collective action</td>
<td>Nurturing inclusive, cohesive communities; improving support networks; encouraging participation and collective decision making; new norms of active citizenship; collective ownership / production.</td>
<td>Seyfang, (2006)</td>
<td>Developing social networks around low consumption activities (e.g. community organised retrofitting / green building projects); local provisioning (e.g. community owned windfarm); local exchange centres; community volunteering; engagement with local and central government policy-making.</td>
</tr>
<tr>
<td>Individual wellbeing</td>
<td>Promotion of healthy lifestyles; enhanced psychological and physical wellbeing; improving comfort, convenience, safety and security. Equity in resource access.</td>
<td>Modified from Halme et al. (2004)</td>
<td>Innovations for the reduction of pollution and emissions associated with consumption; measures to combat fuel poverty; enhanced energy and water supply security; successful delivery of ‘needs’ (e.g. warmth, comfort).</td>
</tr>
<tr>
<td>Economic sustainability</td>
<td>Creation of new jobs; securing existing employment; Tackling long-term unemployment; enhanced economic competitiveness and new market opportunities.</td>
<td>Modified from Halme et al. (2004) and Young and Simms (2000)</td>
<td>New market opportunities associated with green innovations; improved employment opportunities with equitable distribution in employment; enhanced economic stability.</td>
</tr>
<tr>
<td>Building new infrastructures of provision</td>
<td>New social and economic institutions; alternative systems of provision allowing independence from the mainstream.</td>
<td>Seyfang (2006)</td>
<td>Autonomous, ‘off-grid’ housing’ new systems of exchange rewarding sustainable consumption (e.g. local currencies).</td>
</tr>
</tbody>
</table>
4.3 Citizen-consumer Phase

The goals of the Citizen-consumer Phase were:

- To establish citizen-consumer positive and negative evaluations of future scenarios
- To consider scenario modifications that may enhance acceptability of their proposals amongst citizen-consumers
- To gain greater understanding of the dynamics of heating and washing practices through in-depth qualitative analysis

4.3.1 Focus group methodology

Along with the inclusion of professional stakeholders, the public are often engaged in various ways in participatory backcasting processes. This reflects broader democratic arguments for citizen consultation in all aspects of environmental governance and decision-making (Macnaghten and Jacobs, 1997; SDC, 2010). Where the emphasis is on the generation of creative output or local visioning studies, the public are often involved exclusively in the visioning phase (Carlsson-Kanyama et al., 2003; Carlsson-Kanyama et al., 2008). Where learning and spin-off outcomes are important, as in the case of this PhD research, stakeholders tend to be involved in scenario creation while the general public may be involved further along the process (Quist et al., 2001; Kok et al., 2011b). In the SusHouse backcasting project “consumer” focus groups were held as part of the scenario evaluation phase which took place after stakeholder visioning workshops and the back-office scenario elaboration phase. Reporting on the rationale for these focus groups, Bode (2000: 34) highlights that they serve as a “reality check” for the scenario proposals, potentially improving the quality of solutions proposed and the likelihood of their adoption. This methodological step was highly rated by SusHouse researchers, as reflected in Vergragt (2000: 44):

“The focus groups produced some of the most interesting assessments of the DOS’s [design-orienting scenarios]. There is no doubt amongst the researchers that studies of consumer acceptability are of great importance to considerations of strategies for sustainability”.

Within SusHouse research, the public focus group exercise was cast as “consumer acceptance” research and reflected traditions of marketing research. This overlooks the role of everyday citizens transforming and shaping consumption outside of market interactions (Seyfang, 2005; Smith, 2005). It further obscures their role as “practitioners” and active designers in their own worlds, involved in the making and re-making of everyday practices (Shove et al., 2007). For the backcasting process employed in this PhD research, “citizen-consumer” focus groups were therefore held after the scenario development phase. These aimed to evaluate citizen-consumer feedback on the scenarios whilst adding room for the
contribution of additional ideas and scenario modifications. The focus groups therefore aimed to stretch beyond simple consumer acceptance research to permit deeper thematic analysis to contribute understanding on the dynamics of heating and washing practices in an Irish context.

According to Kreuger (1994), the basic format of a focus group is one in which a focused discussion takes place on a topic of research interest amongst a group of individuals selected and assembled by the researcher, in a non-threatening environment. While focus groups are structured, a key advantage is that they allow flexibility for new ideas and points of view to emerge. This is not possible in more rigidly structured research methods (such as questionnaires) (Krueger, 1994). Therefore, as Cook and Crang (1995 in Flowerdew and Martin, 1997) note, while questionnaires reveal individual insights, focus groups are a more socially oriented research method and are based on the standpoint that a satisfactory explanation of the social world requires an appreciation of the culture, perspectives and worldviews of the actors involved. They are thus suited to the study of everyday practices such as washing, lighting or heating which can be considered dynamic social phenomena. The origins of focus groups are in the ‘focused interview’ methodologies employed in market research conducted in the US in the 1940’s (Davies, 1999b). It was not until the 1980’s that focus groups became a prominent method in the social sciences and increased in popularity in human geography (Flowerdew and Martin, 1997). They have since come to play an important role in qualitative social science research examining reasons for the adoption or non-adoption of sustainable behaviours (Hargreaves et al., 2008) and are commonly used to explore the gap between environmental values and actions (Davies et al., 2001; Fahy, 2006). While it was considered that focus groups were the most appropriate means of involving citizen-consumers in the backcasting research it is important to note that, as with all methodological approaches, focus groups too have their own disadvantages. Critique particularly focuses on questions regarding their subjectivity, generalisability, replicability and positionality (Davies 2001). Much of this criticism centres on questions of the influence of the researcher on the process and findings. This will be reflected upon in the conclusion of this chapter.

4.3.2 Focus group recruitment

Generally focus groups have some level of homogeneity according to a factor deemed important to the research – for example socio-demographic profile, profession or personal value orientation (Flowerdew and Martin, 1997). To test people’s responses to possible sustainability solutions, Umweltbundesamt, (1997 in Bode, 2000) emphasises the need to take into account existing lifestyle groups. As was explained in chapter three of this thesis,

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43 However it is a recognised limitation that focus groups still rely on ‘self-reported’ values and actions and therefore may not yield as accurate a picture as direct observation (Flowerdew and Martin, 1997).
individual lifestyles comprise an assemblage of social practices such as clothing, housing, food, travel, or washing. Adopting the lifestyle approach to everyday behaviour contrasts traditional perspectives that emphasise individual and psychological factors in explaining the relationship between environmental attitudes and behaviours (Warde, 2005). Social research has shown that lifestyle groupings can be identified that share objective (e.g. socio-demographic) and subjective traits (e.g. interests, attitudes, opinions, activities) with respect to their tendency towards environmentally friendly lifestyles (Spaargaren and Van Vliet, 2000; DEFRA, 2008). Bode (2000) outlines three broad environmental lifestyle groups, which were utilised for the focus groups conducted as part of this backcasting research project:

1. **Green**: The ‘green’ lifestyle grouping represents those most likely to adopt environmentally friendly options. Members tend to be younger and lead active and culturally interested lifestyles, holding jobs that are relevant for self-actualisation. They are a more homogenous group with all members having active eco-orientation.

2. **Dynamic**: This lifestyle grouping consists of those willing to adopt environmentally friendly behaviours in the future. ‘Dynamic’ people tend to lead lifestyles oriented towards health and the home, and are environmentally conscious without active eco-orientation.

3. **Mainstream**: This group represents late/non-adopters of sustainable innovations. Members tend to be heterogeneous including those who are partially environmentally oriented and those who show little interest in ecological topics.

The aim was to hold one focus group with each of these three environmental lifestyle groups for both the heating and the washing research (i.e. six focus groups in total). Focus groups took place in three locations; Dublin, Belfast and Galway to gain an all-island perspective and to include a mixture of rural and urban geographical backgrounds. To recruit representatives from these defined lifestyle groups, pre-existing, or “natural” social groupings were targeted (Kreuger and Casey, 2000). This is a more intuitive form of sampling over quantitative sampling methods and natural groupings are not intended to form a representative sample of the population. Instead, they offer indicative views from different sections of society – which, in the case of this research, were grouped into Bode’s (2000) environmental lifestyle groupings. A benefit of using pre-existing groups is that it promotes ease of discussion, and that acquaintances can relate to each other’s comments and may be more able to challenge one another (Barbour and Kitzinger, 1999). Despite these positive qualities of natural focus group methods, Krueger and Casey (2009) note that problems can arise due to existing internal dynamics and hierarchies that prevent all opinions from being voiced equally. Nevertheless, facilitation techniques can be employed to help overcome this common problem and to encourage all opinions to come through equally.

44 By contrast, an “assembled” focus group, where individuals have not met before does not have to deal with such issues. However in this type of workshop participants may be more inhibited, making facilitation of conversation more difficult (Krueger, 1994).
Focus groups were identified using snowball techniques and by accessing ‘gatekeepers’ such as community development officers or through making direct contact with local community centres and universities. Each grouping had some common interest. For example, one focus group was held with members of a reading group, another with third level students of environmental studies, and another with office workers. After obtaining the support of a group ‘champion’, these were provided with invites to forward to other members or friends who may be interested in participating in the proposed focus group (See Appendix L). Research has shown that the ideal focus group size is between six to ten participants. This size is said to foster dialogue and openness amongst participants to discuss their personal beliefs, ideas, feelings and behaviour (Bode, 2000). As an incentive to participate, lunch and refreshments was provided to each attendee along with a token of €10 to particular groups. Although downsides have been identified with the use of monetary incentives - mainly that they skew the profile of participants (Kreuger and Casey, 2000), the monetary voucher was intended not as a fundamental reason for attendance, but as a token of appreciation – in particular for groups that were harder to access. Table 4.4 provides a profile of each focus group according to location, group affiliation and number of attendees. The next section outlines the ultimate focus group format, developed following a pilot focus group which helped refine and clarify the process.

### Table 4.4 Focus group profiles

<table>
<thead>
<tr>
<th>Focus Groups</th>
<th>County</th>
<th>Location</th>
<th>Group Profile</th>
<th>Number of Attendees</th>
<th>Age &amp; Gender Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASHING: Green</td>
<td>Galway</td>
<td>National University of Ireland Galway (NUIG)</td>
<td>NUIG Geography Department students and researchers; NUIG Environment Society; and Green Party representatives</td>
<td>6</td>
<td>18 – 40 (mixed gender)</td>
</tr>
<tr>
<td>WASHING: Mainstream</td>
<td>Wicklow</td>
<td>Bray Community Centre</td>
<td>Bray Reading Group; community centre representatives</td>
<td>6</td>
<td>50 - 70 (mixed gender)</td>
</tr>
<tr>
<td>WASHING: Dynamic</td>
<td>Belfast</td>
<td>British Council</td>
<td>British Council staff and acquaintances</td>
<td>7</td>
<td>25 – 45 (mixed gender)</td>
</tr>
<tr>
<td>HEATING: Green</td>
<td>Belfast</td>
<td>Queens University Belfast</td>
<td>Queens University students from a range of courses with green interest (mainly from Masters in Sustainable Development)</td>
<td>7</td>
<td>18 – 40 (mixed gender)</td>
</tr>
<tr>
<td>HEATING: Mainstream</td>
<td>Galway</td>
<td>Rosscahill</td>
<td>Kinnevey's Pub residents and locals</td>
<td>6</td>
<td>40 – 65 (mixed gender)</td>
</tr>
<tr>
<td>---------------------</td>
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</tr>
</tbody>
</table>

4.3.3 Focus group format and analysis

Each focus group began within a basic introduction and ice-breaker exercise whereby participants were asked to provide their names, where they were from and to say the first word that came to mind when they thought of practices of personal washing or home heating. After this ice-breaker came the presentation and discussion of each scenario, taking one at a time. The researcher began by reading the scenario narrative out loud with participants reading and taking notes against their own personal hardcopies of the scenarios. The scenario images were printed on large A1 size boards, placed at the centre of the focus group table for constant visual reference. After familiarising themselves with the scenario, each participant was asked to reflect and to write down (in shorthand on post-its) two or three dimensions of the scenario that they found most appealing, and another two or three things they found least appealing. These appealing / unappealing dimensions could be an underlying feeling of the scenario or relate to a specific concept it contained. The intention of this was to record initial personal reactions to the scenarios (without group influence), to encourage participation by everybody in the group, and to allow a spectrum of feedback to come through. The researcher (acting as facilitator) then encouraged participants to share what they had listed on their ‘appealing’ post-its and why. The reasons behind their evaluations were probed and attendees were also asked to make recommendations to improve the attractiveness of the scenarios.

After going through this questioning format for each scenario, the focus group closed with a voting exercise. In this, each scenario A1 image board was placed on display and participants were asked to review and compare them, distributing ten green dots to their favourite scenario concepts (placing them next to the relevant image) and ten red dots to those they found least appealing. Each person had one ‘star’ sticker to give to the scenario that they would like to inhabit themselves in the year 2050. Cross-verification of data from initial post-it evaluations, through to focus group discussions, and the final voting exercises, allowed for the discovery of inconsistency between findings and for the exploration of reasons underlying these. This can be considered a form of triangulation which involves the study of a phenomenon from a variety of angles and positions and is valued for its potential to improve the credibility and validity of the research (Kitchen and Tate, 2000). A short survey was distributed at the end of the day.

45 Upon arrival, each participant was provided with a hand-out containing the aims of the workshop, along with scenario images and narratives.
the focus groups which aimed to capture participant profiles with respect to gender, geographical location, age, occupation and environmental orientation. This survey can be found in Appendix M while the basic structure applied in each focus group is outlined in Appendix N.

For each focus group, analysis began with a process of recording post-it material, votes from the ultimate voting exercise, and survey responses. For the qualitative data, analysis began with recalling research notes and observations from the workshop discussions. Next, the audio files of each focus group were transcribed into Microsoft Word, providing raw data for analysis. The transcription process was conducted in two steps. In the first step the entire focus group was transcribed and in the second, the audio file was listened to with transcribed texts to improve precision and to capture the tone and emphasis of participants’ remarks. Next a process of familiarisation took place reading the focus group transcripts in their entirety several times, cross-checking them with researcher notes and voting preferences. The aim was to get a sense of the whole data before a more in-depth coding process. This proceeded drawing upon Krueger’s (1994: 149-151) guidelines for processing focus group data which recommend paying attention to:

- The words (what was said and what was meant)
- The context (what triggered the response - spontaneity/forced)
- Internal consistency (opinions static/shift, when and how did this occur)
- Frequency versus intensity of comments
- Basis upon which comments are made

The NVivo qualitative software package was used to assist in the practical organisation of the coding process. NVivo permits the overlay of multiple coding layers and themes which were elaborated as necessary throughout the analysis process (Bazeley, 2007). Initial coding sought to identify citizen-consumer opinions with respect to specific scenario concepts, noting differences and similarities between participants within each focus group and across the different focus group profiles. Suggested improvements to the scenarios were also noted at this point. Next an “inductive analysis” (Patton, 1990: 390) took place which means that patterns, categories and themes of analysis “emerge out of the data rather than being imposed on them prior to data collection and analysis”. In finding this meaning, several resources were drawn upon including “inferences from the data, initial or emergent research questions, substantive, policy and theoretical issues, and imagination, intuition and previous knowledge” (Dey, 1993: 100). This interpretive and conceptual task was the researcher’s responsibility and was an iterative process aided by in-depth familiarity with relevant literature. The “constant comparison method” (Lincoln and Guba, 1985) was drawn upon here whereby comparative analysis across workshop data aided identification of statements and repetitive signs of behaviour, stimulating the generation of both descriptive and explanatory categories.

Participant responses to questions of environmental orientation verified the accuracy of the assigned green, mainstream and dynamic group categories.
The ultimate aim of this analysis process was to reduce the complexity of the large volume of descriptive data generated in the focus groups in order to find meaning relevant to the research project and the broader sustainable consumption, backcasting, and social practice fields.

4.4 Transition Phase

The goals of the Transition Phase were:

- To develop 2050 ‘Promising Practices’ from the future scenarios taking into account the results of the sustainability assessment and citizen-consumer workshops
- To engage stakeholders in the design of interventions ‘Transition Frameworks’ to build towards the 2050 Promising Practices
- To identify actors for their implementation together with potential challenges and enablers

4.4.1 Transition workshops: participant recruitment and structure

The Transition Phase represented the final phase in the backcasting process. This aimed to crystallise the knowledge and insight from the earlier phases, leading to the development of long-term action plans, or ‘Transition Frameworks’ for sustainable heating and washing practices. It is this phase where the intellectual act of ‘backcasting’ from the future to the present takes place.\(^47\) In order to represent advancements since the Scenario Elaboration phase, another iteration of the future scenarios took place after the citizen-consumer workshops to reflect their feedback. This iterative process is described in detail in chapter seven and ultimately led to the development of three sets of ‘Promising Practices’ for sustainable heating and washing in the year 2050. These were used as the end points to work towards at the Transition Workshops. All those who participated in the initial Heating and Washing Visioning Workshops were invited in the first round of workshop recruitment, including those who had expressed interest but could not ultimately take part. Additional stakeholders were identified, placing slightly more emphasis on those with expertise in policy, strategy and planning rather than those from creative fields, as was the case in the Visioning Phase (See Appendix O for a copy of the Transition Workshop invite). A response rate of 48% was achieved, with ultimately 19 attendees secured for the washing workshop and 17 for the heating workshop. Of the heating attendees, 41% (or 8 people) had taken part in the previous Visioning Workshop. This number was lower at 32% (6 people) for the Washing Transition

\(^{47}\) Within previous backcasting studies, this phase is often termed the ‘backcasting phase’ however here it was termed the ‘transition phase’ to avoid confusion, given that the entire process itself is a ‘backcasting’ process.
Workshop, due to four last minute cancellations from previous participants. Tables 4.5 and 4.6 present an outline of the number and type of stakeholders according to profession and sector at the Transition Workshops.

### Table 4.5 Washing Transition Workshop Participants

<table>
<thead>
<tr>
<th>Sector</th>
<th>Representatives and number present (* = repeat attendee)</th>
</tr>
</thead>
</table>
| **Public & semi-state**    | County Council, environmental communications (2)  
Department of Environment, water services (1)  
Department of Environment, sustainable communities (1)  
Department of Environment, architect (1)  
Consumer Council (NI) (1) |
| **Private**                | Green IT & Software (2)  
Rainwater harvesting (1)  
Water engineering consultancy (1) |
| **NGO / Research**         | Energy & built environment research agency (1)  
University research (2)  
Irish Environmental Network (1)  
NGO, planning & policy (1)  
NGO, environmental awareness (1) |

**Total**: 19

**Repeat attendees (*)**: 6

### Table 4.6 Heating Transition Workshop Participants

<table>
<thead>
<tr>
<th>Sector</th>
<th>Representatives and number present (* = repeat attendee)</th>
</tr>
</thead>
</table>
| **Public & semi-state**    | Department of energy, policy development (1)  
Department of environment, architect (1)  
City Council, architect (1)  
Energy Efficiency Agency (1)  
Housing Executive (NI) (1) |

**Total**: 5
One week prior to the workshops, participants were sent a ‘briefing document’ so that they could familiarise themselves with the Promising Practices and goals of the workshop. This paid heed to recommendations from Carlsson-Kanyama (2003) and Vergragt (2000) on the need for continuous stakeholder contact to build support and understanding. In other backcasting studies, the precise processes and exercises behind transition (or backcasting workshops) often remain relatively obscured, perhaps even more so than those relating to visioning workshops. In general, they comprise some element of presentation and/or voting on scenarios, intervention development and consideration of barriers and enablers. Backcasting workshops often start with some form of ranking and prioritising scenarios amongst participants. One extensive suggestion for how this could work is provided by Foresight (2010) who outline an exercise whereby scenarios are voted on according to the following attributes: most favourable from their organisation’s perspective; closest to now; closest to the future that each participant aspires to; closest to the future that their organisation is pursuing; and closest to the future that government policy is espousing. However, as the workshops were scheduled for three hours, time did not allow for a complex voting process. Moreover, a form of participant screening took place through the online scenario feedback forum and in the process of developing the Promising Practices based on citizen-consumer insight. Time in the three-hour workshop was therefore devoted to the development of concrete ‘interventions’ comprising educational, communications, regulatory, R&D, and business measures that could pave the way to the 2050 Promising Practices. This followed a brainstorm format whereby three sub-groups were established, one for each Promising Practice. Participants spent 20-25 minutes at each group, prior to moving to the next one. As with the Visioning Workshop, groups were pre-assigned to reduce time and promote efficiency and to ensure an equal cross-section of stakeholders in each group.

After the intervention brainstorms, participants selected one Promising Practice group to return to. Interventions were then planned out over time considering barriers and enablers.
and allowing for more critical discussion (named the transition timeline session). In this session, participants prioritised those interventions they favoured the most and were requested to arrange them physically on a timeline (consisting of three A1 sheets of paper). The consideration of barriers, enablers, drivers and trends is a common phase in transition planning in order to allow a greater contextual consideration and critical evaluation of interventions (Quist and van der Wel 1999 in Quist et al., 2000). The timing of this exercise is sometimes placed prior to intervention brainstorm exercises in other research (e.g. Foresight, 2010) where the focus is then on devising strategies to minimise barriers and optimise enablers. For this research to retain focus on solution generation rather than in-depth discussion on general energy or water problems, the barriers and enablers exercise was held after interventions had been proposed. Appendix P provides an outline of the timing and structure of the Transition Workshop activities. Following suggestions by Vergragt (2000) and Quist et al. (2000), an additional results processing step was added after the Transition Workshop. This was to build upon and elaborate the intervention proposals given that time constraints mitigated against the consolidation of detailed plans. In addition, it was necessary to organise and arrange the workshop data in an understandable format to communicate the results to participants and other stakeholders.

4.5 Workshop and learning evaluation

A key feature of backcasting processes is said to be the learning it stimulates amongst its attendees. This is understood to improve the likelihood of the adoption of recommendations produced from the research and can lead to other forms of spin-off (van de Kerkhof and Wieczorek, 2005). Given that this is an understudied area (Vergragt and Quist, 2011), another facet of this research was to examine the stimulants to and kinds of learning produced in the practice oriented, participatory backcasting process. It was also necessary to consider participant evaluations of the backcasting process to identify its procedural benefits and limitations and more broadly, to assess participant perspectives on the merit of the procedure as a tool for governance and innovation to achieve more sustainable household consumption.

Given the time constraints of the workshops (and indeed of the entire research process itself) the most appropriate format to probe these questions was through evaluation surveys distributed at the end of each workshop. Despite the limitations of surveys including their lack of flexibility once collection starts, this form of research is one of the most widely used primary data collection methods in social sciences, in particular human geography (Flowerdew and Martin 1997). The surveys asked whether participants agreed to remain involved in the research and contained questions designed to assess their opinions on three key dimensions:

1. Workshop output
2. Backcasting methodology
3. Stimulants to learning
Survey questions were predominantly open-ended, as these tend to inspire spontaneous and more honest responses due to their more engaging nature (Flowerdew and Martin, 1997). Closed questions can be simpler and less time intensive to respond to and were applied in the Transition Workshop survey to obtain more quantifiable results with respect to specific dimensions of the practice oriented, participatory backcasting process. Appendix Q lists the survey questions according to the above three identified dimensions of interest. In addition, participant perspectives were explored in the short ‘wrap-up’ sessions at the end of each workshop where participants were invited to provide feedback to the group. Researcher observation during the workshops and a review of note-taker scripts provided additional insight. Careful analysis of the qualitative survey data allowed for the identification of patterns and themes. This resulted in a rich set of findings regarding participant perspectives on the backcasting process and the learning it promoted.

4.6 Conclusion

This chapter has outlined the design of the practice oriented participatory backcasting methodology used in this research. The selection of the backcasting methodology was informed by theoretical positions and assumptions outlined in the previous literature review chapters. In these chapters it was asserted that collaborative, system innovation processes are required to consider how shifts may be encouraged in domains of daily consumption to achieve more rapid advancements towards sustainable living. At this stage it is worth briefly mentioning issues regarding the reflexivity and positionality of the researcher in this study. Given the process concern of this PhD research, further critical reflection on these issues and on the benefits and limitations of the methodology are provided in the ensuing results chapters.

Backcasting by its nature is based on identifying and investigating real world problems (emphasising their social construction) and also on constructing alternative future realities as a means of scientific enquiry. Given these qualities, it is positioned along the more creative and generative spectrum of deliberative techniques (Quist and Vergragt, 2006; Fuller and Loogma, 2009). The research is therefore situated away from positivist traditions, towards critical theory, underpinned by constructivist epistemology. In positivist traditions, the researcher is considered independent to the subject of research and not seen to influence the object of study. In this sense, objective criteria should define the topic of study, rather than human interests or needs. From this perspective, researchers are seen as “neutral technicians and not reformers, neutral observers and not philosophers or analysts” and their “personal views and value judgements should be kept out of research” (Sarantakos, 1998:

48 Epistemology is the study or a theory of the nature and grounds of knowledge, in particular with reference to its validity and relevance. It is often considered as the relationship between reality and the researcher, whilst methodology is the technique used by the researcher to investigate that reality (Healy and Perry, 2000 in Mont, 2004).
Objectivity is concerned with the reduction of personal bias and prejudice in order to present social reality as it really is rather than how the researcher constructs it (Sarantakos, 1998; Kitchen and Tate, 2000). Positivist social science studies argue that quantitative methods are less inclined to research bias. However, this argument is counteracted by those who emphasise that quantitative processes are also open to interpretation in as many ways as qualitative data can be. In addition, it is often conceived that objectivity is neither possible, nor is it desirable within qualitative research (Davies, 2011).

A fundamental characteristic of qualitative research is that standardised results are not possible, nor is it possible for the researcher to remain distant and neutral in the design, implementation and analysis of qualitative research processes (Patton, 1990). This was especially the case in the backcasting research process. With its normative qualities, based on the social construction of alternative, desirable future realities, the researcher played a fundamental guiding and interpretive role throughout the backcasting procedure. In the context of this PhD research, the researcher is therefore viewed as part of what is being studied, playing a role in defining the perspective and scope of the study. Although this raises questions of replicability, pertaining to the extent to which different methodologies would produce different pictures of the social phenomena under study, as Mont (2004: 45) notes, this "does not mean that numerous realities exist; it simply means that there are different sides of reality that are explored and revealed by different methods". Indeed, an important advantage of the qualitative nature of the backcasting process was its flexibility that suited the iterative requirements of the backcasting process and allowed the researcher to build upon emergent themes based on participant feedback.

The role and level of involvement of the researcher varied according to the different phases of the backcasting research. For example, at the literature review phase, a position of non-involvement dominated, while during the Visioning and Transition Phases there was a shift from exploring existing reality to the active engagement with stakeholders in the design of future visions. During these stages, data validity and reliability were important concerns, as they are with any research methodology. The researcher therefore aimed to conduct the process as objectively as possible applying rigour, openness and transparency in data collection and analysis methods to strengthen the validity of the research. In addition, the researcher employed reflexive processes, said to be important in order to consider how one’s personal interpretive lens, identity and experience (or positionality) may shape research outcomes (England, 1984; Rose, 1996). This involves self-conscious analytical scrutiny (reflexivity) and is especially required when interacting with others, as was the case in the workshop and focus group contexts.

For the Visioning and Transition Workshops, it was found that the shared professional interest in the topic amongst attendees had a positive effect on building rapport, leading to dynamic interaction and rich discussion. By contrast, in one focus group in particular, a more oppositional dynamic was experienced between the researcher and focus group participants.
This appeared to be linked to scepticism perpetuated by one dominant individual that the research had a commercial agenda and was shaped around personal gain on the part of the researcher. In all workshops and focus groups, the researcher employed strategies to encourage positive relationships between attendees and the researcher, engaging in informal conversation and creating a relaxed, informal atmosphere whilst being open to questions to improve transparency. In recruiting focus group attendees, there was also an attempt to balance any potential power, age and gender imbalances to cultivate a positive, open environment conducive to opinion sharing and debate. Issues of recruitment, participation and representation within the Visioning and Transition Workshops are also of vital importance to this study. Just as questions arise over the researcher role in guiding processes of scenario and transition plan development, it is clear that the make-up of participants too had an influencing factor on the results. As Quist and Vergragt (2006: 1035) note “future visions in backcasting are not only analytical constructs, but also social constructs”. These themes of participation and representation will be further explored in the results chapters of this thesis.

The backcasting process as outlined in this chapter led to the generation of a remarkably varied and rich data set for evaluation, the results of which are presented in the next chapters along with further detail on associated evaluation processes. Results are reported chronologically according to the key backcasting phases as presented in Figure 4.1. As noted previously, the backcasting procedure was conducted separately for the washing and heating topics. In some cases, the output from the heating and washing backcasting processes is reported separately and where continuity was found in results, an integrated discussion is provided.
CHAPTER FIVE:
VISIONING PHASE
5.1 Introduction

As detailed in the literature review chapters, a fundamental aspect of backcasting is the creation of future visions to serve as “counter images” to broaden perceptions of a given problem and of the potential solutions available (Dreborg, 1996; Janssens, 2008: 10). The participatory development of future scenarios depicting alternative, more sustainable ways of carrying out space heating and personal washing practices was therefore a core aim and a first step in the backcasting process. Three discrete phases of the backcasting process were oriented around achieving this aim - the Visioning Workshop, Scenario Elaboration and Sustainability Evaluation phases. In relation to these phases, this chapter seeks to address the research question of how a practice oriented, participatory backcasting process might be operationalised, and what outputs it might produce. While the basic methodological structure of these preliminary phases was briefly outlined in the previous chapter, their precise workings are presented and critically analysed here.

The chapter begins with a brief summary of the key sustainability problems associated with present home heating and personal washing practices as already elaborated in the chapter two (Section 2.3). Problem orientation serves as a fundamental first step in any backcasting exercise in order to establish a reference point against which solutions can be developed (Quist, 2007). The infusion of practice theory within the process of scenario development is then elaborated, followed by a discussion of the concepts proposed by stakeholders in both the Heating and Washing Visioning Workshops. These concepts are evaluated in detail as they reveal much about current frameworks for approaching sustainable consumption and the extent to which the visioning process can produce novel solutions. This evaluation is also important because of the fundamental influence of the visioning concepts on the proceeding backcasting phases. The back-office Scenario Elaboration process is explained next and the resultant future washing and heating scenario narratives and visualisations are presented. The final section of the chapter is devoted to analysing the potential implications of each scenario according to a qualitative new economics sustainability evaluation framework. This framework facilitates comparison across scenarios in terms of their benefits and limitations against new economics principles. To conclude, the chapter provides critical reflection on the Visioning Workshop, Scenario Elaboration and Scenario Sustainability Evaluation phases, evaluating their conceptual and procedural merits and limitations.

5.2 Visioning Workshops

5.2.1 Problem orientation and developing the practice oriented approach

An in-depth assessment of socio-cultural, economic and environmental issues relating to current personal washing and home heating practices was conducted at the literature review
phase of this research. This drew upon work from the fields of behavioural science, sociology of technology, science and technology studies, and environmental policy. This resulted in the creation of a refined list of key sustainability problems associated with heating and washing practices to use as a point of departure at the Visioning Workshops. Reflecting the role that problem framing had on delineating the boundaries of the study and shaping the way participants thought about future solutions at the workshops, these are presented in Table 5.1.

Table 5.1  Problem orientation: personal washing and home heating practices

<table>
<thead>
<tr>
<th>Problem orientation: personal washing and home heating practices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common issues for both home heating and personal washing practices:</strong></td>
<td>- Poor understanding amongst the public of the environmental need to reduce daily water and energy consumption (Lavelle et al., 2012b; Lavelle et al., 2012a).</td>
</tr>
<tr>
<td></td>
<td>- Low visibility / intangibility of resource usage in daily practices (Darby, 2009; Wallenborn et al., 2009).</td>
</tr>
<tr>
<td></td>
<td>- Unconsciousness / routinisation in heating and washing practices (Hand et al., 2005; Jackson, 2005).</td>
</tr>
<tr>
<td></td>
<td>- Rebound effects whereby technological efficiency advances can be cancelled out by absolute consumption increases (Hertwich, 2005).</td>
</tr>
<tr>
<td><strong>Home heating:</strong></td>
<td>- Trends for larger household sizes with fewer occupants (EEA, 2005).</td>
</tr>
<tr>
<td></td>
<td>- Societal expectations for higher, standardised indoor temperatures (Guy and Shove, 2000).</td>
</tr>
<tr>
<td></td>
<td>- Less than 10% of home heating is powered by renewable energy sources in ROI and NI (Kema, 2008; DETINI, 2009).</td>
</tr>
<tr>
<td></td>
<td>- Fuel poverty at 34% in NI and 19.4% in ROI (McAvoy, 2007; DCENR, 2009).</td>
</tr>
<tr>
<td></td>
<td>- Poorly insulated housing stock.</td>
</tr>
<tr>
<td><strong>Personal washing:</strong></td>
<td>- Escalating expectations of cleanliness and conventions of increased frequency of showering (Hand et al., 2005).</td>
</tr>
<tr>
<td></td>
<td>- Predicted scarcity and fluctuation in water supplies from climate change (Irish Committee on Climate Change, 2010).</td>
</tr>
<tr>
<td></td>
<td>- All water supply treated to drinking water standards.</td>
</tr>
<tr>
<td></td>
<td>- High levels of water-mains leakage at c. 41% (DECLG, 2012b).</td>
</tr>
<tr>
<td></td>
<td>- High usage of energy in water provision and in washing activities (Maas, 2010).</td>
</tr>
<tr>
<td></td>
<td>- High costs of water provision and treatment at c. €650 per person (OECD, 2009).</td>
</tr>
</tbody>
</table>

Simplified ‘Problem Orientation’ slides were developed for inclusion in participant briefing packs in advance of the workshops and in the introductory presentation at the workshop (the Visioning Workshop introductory presentations can be found in Appendix R).
Against this background, the key question posed to participants was; *How might heating [or washing] practices be fulfilled more sustainably in the year 2050?* This raises two key immediate queries: 1) what is the meaning of “sustainability” in the context of these practices? and 2) what are the desired end results or functions of heating and washing practices? Beginning with sustainability, the problem orientation served to highlight the key problems that need to be addressed now and into the future in order to achieve more sustainable consumption practices. In addition, an indication of the desired magnitude of reduction in water and energy consumption by 2050 was provided. For the Heating Visioning Workshop, the target of an 80-95% reduction in residential energy consumption was proposed corresponding with EU greenhouse gas emissions targets. Indeed, indications by SEAI (2011) suggest that an 85% reduction in residential carbon emissions is possible by 2050 with large-scale deployment of renewable energy technologies and home efficiency retrofits. With regard to water consumption, average daily personal usage is between 148-158 litres, c. 38% of which goes towards personal washing (i.e. c. 59 litres) (EPA, 2006; Northern Ireland Water, 2010). However, with the best eco-home standards overall personal water consumption can be reduced by almost 60% (Dickie, 2005), while the basic minimum requirement for personal washing as set by the UN is 15 litres (73% less than current levels) (Gleik, 1996).

Although these figures show the potential of existing solutions to contribute to consumption reductions, this technical potentiality has not been translated into action to date. Reasons for this are complex, owing to engrained industrial relations, vested interests and a range of institutional, planning, political, cultural and economic barriers. Workshop participants were asked to think of socio-technical innovations for the year 2050 that would meet or exceed the target of a 90-95% reduction in energy consumption and achieve a reduction in water consumption in the magnitude of 60-73% (representing the range between the highest eco-home standard and the basic minimum standard of water for washing). Rather than serving as precise end-targets, these figures aimed to illustrate the magnitude of change that is required and potentially achievable. 50 The year 2050 was selected as the end date for the backcasting process because it permitted the assumption that by this year technological limitations could be overcome, and increased environmental regulations are likely to have been introduced along with organisational and socio-cultural changes to remain within planetary limits.

To demonstrate the potential for practice evolution into the future, image boards were presented showing snap-shots of heating and washing practices in the past. For example, images showing the practice of well water collection or open-hearth fires in the home demonstrated the previous manual connection people had with resources — and the associated skills, expectations and meanings that these invoked. Images of past practices were contrasted with imagery showing trends in present day heating and washing practices to demonstrate that consumer demand and “needs” are not fixed in time, but rather are malleable constructs. The exercise was therefore designed to encourage attendees to think of

50 These targets roughly correspond to a Factor 10 improvement in efficiency.
both societal evolution (and indeed backcasting itself) as “an ongoing, open-ended process rather than as a fixed, pre-determined end-state” in the traditional utopian sense of visioning (Tight et al., 2011: 1581). In addition, imagery is also recognised as a valuable tool for stimulating creativity in visioning processes (Boulding and Boulding, 1995; Carlsson-Kanyama et al., 2008). A selection of the imagery used in the Visioning Workshops can be found in Figures 5.1 and 5.2.

As noted in chapter three, a range of different ways for categorising practices into their constituent elements have been put forward (Reckwitz, 2002; Shove, 2003; Warde, 2005; Ropke, 2009). Drawing upon social practice theory that emerged as most relevant and useful in the context of this research, three key practice elements - ‘people’, ‘organisation’, and ‘hardware’ were outlined for consideration as routes for innovation at the Visioning Workshops:

1. **‘People’** involves practical know-how and procedures (e.g. knowledge on how to use heating / showers), along with expectations and norms of practice (e.g. standardised indoor warmth, or cleanliness and convenience). These considerations draw upon Shove et al.’s (2008b) “skills” and “images” concepts and Warde’s (2005) “procedures” and “understandings” elements.

2. **‘Organisation’** relates to institutional and regulatory structures said to have a large hand in influencing societal and cultural norms of practice (Hand et al., 2005). It also includes systems of resource provision, including forms of access and ownership (Spaargaren, 2005). These overarching features are often excluded from focused social practice conceptualisations which tend to emphasise direct ‘people’ and ‘hardware’ elements, however these too are shaped by organisational factors and it was important to include this dimension to examine embedded features of heating and washing practices.

3. **‘Hardware’** denotes the “stuff” of practices, in this case, the devices and products used in heating and personal washing including the architectural form of the home. Hardware is a commonly included feature of social practice conceptualisations.

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51 Throughout the rest of the thesis these practice elements (variously called categories) are referred to in single inverted commas to ensure they are distinguishable ('people', 'organisation', 'hardware'). Likewise, any of the concepts generated in the Visioning Workshops are presented in single inverted commas using participants’ wording.
Figure 5.1  Washing through time – workshop imagery

Then

Now

www.consensus.ie
Figure 5.2  Heating through time – workshop imagery

Then

www.consensus.ie

www.consensus.ie

Now
5.2.2 Visioning Workshop Process

The Heating and Washing Visioning Workshops drew together a broad spectrum of interdisciplinary stakeholders from public, private and non-governmental sectors loosely related to the energy and water fields. Following the practice orientation outlined above, the guiding question for the workshops was; What ‘people’, ‘organisation’ and ‘hardware’ innovations can we imagine that might encourage more sustainable personal washing [or home heating] practices in the year 2050? Three sub-groups were created for a facilitated brainstorm session with the aim of generating a range of proposals in response to this question. For example, under the ‘people’ category facilitators asked: what alternative values and motivations can we imagine in the year 2050 that may place less demands on water or energy? What kinds of educational initiatives and incentives might exist to shape a better awareness of resource usage? For ‘organisation’, participants were prompted to think of potential new systems of water / energy provision or rules of governance and engagement which might encourage reduced and more mindful use of resources in consumption practices. With regard to ‘hardware’, participants were asked to imagine building innovations which might deliver comfortable indoor temperatures, or assist in efficient water usage. Breaking down the practices in this way aimed to develop a precise set of proposals which could then be reintegrated into coherent practices in the Scenario Elaboration phase.

Drawing upon needs based design (Brezet et al., 2001), results oriented services (Halme et al., 2004) and softpath planning approaches (Brooks et al., 2009), it was emphasised that focusing on the desired end-result of a practice (such as warmth or cleanliness) can lead to the imagination of entirely alternative ways for achieving its delivery. Participants were also asked to bear in mind that end-results and consumer demands may evolve through time (as demonstrated in the images exercise). Heating practices have been shown to serve a wide range of needs not only warmth but also comfort, security and even status in the case of conspicuous heating technologies (Pfeiffer, 2000). Likewise, washing serves cleanliness, refreshment, hygiene and therapeutic needs, whilst also serving social functions through its delivery of “normal” levels of cleanliness (Shove, 2003). Although there are physical requirements of heating and washing, a social practice conception presents the various needs of these practices including cleanliness, refreshment, hygiene, comfort and warmth as malleable socio-cultural constructs (Shove and Warde, 2002). This demonstrates that normal practices are open to influence and can be shaped towards more socially sustainable, environmentally benign, and less resource intensive practices in the future. Participants were therefore asked if they could imagine products or norms of heat or cleanliness that drastically reduce (or entirely do away with) energy or water requirements.

The visioning brainstorms led to the conception of 133 individual concepts for the Heating Workshop and 143 for the Washing Workshop. These were spread across ‘people’, ‘hardware’ and ‘organisation’ categories. The facilitators performed a rapid preliminary
clustering of similar post-it ideas during a short break period prior to the formal clustering and rating session where facilitators and a designated participant of each sub-group provided feedback to the entire group. This was done whilst simultaneously clustering similar ideas on a display wall in front of the group (as per the metaplan technique). Devised by Schnelle (1979), and applied in similar visioning research by Carlsson-Kanyama et al. (2008), the metaplan process began with a member of each subgroup placing their visioning ideas (on post-its) on a large wall in the workshop space. Within each of the three key brainstorm categories (‘people’, ‘organisation’ and ‘hardware’), between 10-15 clusters of ideas were generated. Clusters represented broad strategies (such as ‘communal bathing solutions’, or ‘closed loop energy systems’) containing a number of specific, similar concepts. Participants then gathered around the metaplan wall, viewed and discussed the ideas amongst themselves and had the opportunity to vote by distributing 10 green dots amongst their preferred individual concepts (as depicted in Figure 5.3). This is a common phase in visioning processes and aims to promote reflection amongst participants and to stimulate some sort of prioritisation of concepts (Jungk and Mullert, 1987; Carlsson-Kanyama et al., 2008). The voting session was followed by a short fifteen-minute group discussion of the ideas proposed and participant voting patterns. The next two sections of the thesis present the results from the visioning brainstorms separated into heating and washing. Each section begins with a presentation of a cross-section of some of the more popular concepts and clusters (Tables 5.2 and 5.3). This is followed by a detailed analysis of the visioning concepts, drawing upon participant comments captured in note-taker reports, referencing results from the voting and clustering sessions.

**Figure 5.3** Visioning Workshop: metaplan wall and voting activity
5.2.3 Heating Visioning Workshop

<table>
<thead>
<tr>
<th>Practice categories and clusters</th>
<th>Concept</th>
<th>Votes</th>
<th>Total number of concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational programmes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandatory eco-service</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back to basics learning programmes</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifelong learning for professionals</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications &amp; awards:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community based energy awards</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Targeted communication campaigns - tailored to lifestyle or social group</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy visibility:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levels of home energy use made public</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive comfort:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More suitable clothing - wooly jumpers etc.</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-sleeping for warmth</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological control - learning about body temperature</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Votes:</strong></td>
<td></td>
<td></td>
<td><strong>55</strong></td>
</tr>
<tr>
<td><strong>Organisation</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Quotas &amp; restrictions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon quotas - Individual</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy crash courses</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No new build - maximise/adapt existing stock</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home floor space limits</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative power / provision:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable energy and wind power - communities &amp; homes</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geothermal heat pumps - for homes</td>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>Building regulations:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive homes for all - retrofit programme improves housing stock</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Votes:</strong></td>
<td></td>
<td></td>
<td><strong>44</strong></td>
</tr>
<tr>
<td><strong>Hardware</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Direct heating:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intelligent clothing - with bio-indicators</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal power pack [attached to individuals] storing kinetic &amp; solar energy for body warmth</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home fabric &amp; design:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smart homes</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External, permeable membrane over home [to create micro-climate]</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pod living - super-insulated living / working place in the home</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novel energy:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological power - from home waste</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Votes:</strong></td>
<td></td>
<td></td>
<td><strong>48</strong></td>
</tr>
<tr>
<td><strong>Total number of concepts:</strong></td>
<td></td>
<td></td>
<td><strong>133</strong></td>
</tr>
</tbody>
</table>

Within the heating brainstorm, 23% of all ideas proposed came under the ‘organisation’ category, 27% under the ‘people’ category while the ‘hardware’ category contained the highest quantity of ideas at 48%. Beginning with those in the ‘people’ category, one of the most common suggestions was the simple act of putting on additional layers indoors, with the
growing trend for slankets\textsuperscript{52} mentioned. Shifting away from sedentary lifestyles towards higher levels of physical activity inside and outside the home was seen as a way of improving physical health and, by association, generating body warmth. This type of strategy is strengthened by evidence showing that environmental action can be enhanced when it is aligned with personal health or other societal benefits (Evans and Abrahamse, 2009). Many proposed upscaling shared community spaces including libraries, offices and kitchens as a strategy to minimise the need for energy to heat individual spaces. Denser living within the home and practices of ‘co-sleeping’ for body warmth were mentioned to reduce overall energy requirements. Participants also reasoned that greater flexibility in live-work routines would relieve peak energy pressures, echoing strategies proposed by Darby (2007: 111) for “cyclical rest periods” that are shaped by “social and ecological logic”. This strategy, along with a reduced working week, is often promoted by new economics advocates as a means to curb consumption. It is supposed that the ensuing reductions in personal income and increases in spare time would encourage and enable citizens to engage in more sustainable forms of self-provisioning (Spratt et al., 2009).

Although unaware of the term, a cluster of participant proposals were developed which drew upon Humphries and Nicol (1998) concept of “adaptive comfort”. This advocates moving away from restrictive building models that stipulate indoor temperature ranges of between 18°C to 22°C, towards more variable temperatures owing to research that shows personal comfort is reported at a wide range\textsuperscript{53} of indoor temperatures (Nicol and Humphreys, 2002). Participants envisaged a future where greater opportunities existed for householders to make themselves comfortable (especially using non-technical means) and where inhabitant’s indoor temperature preferences were more aligned with natural outdoor temperature variations, reducing demand for fossil fuel powered heating or cooling technologies. Another ‘people’ cluster emerged around strategies to enhance visibility of energy consumption at point of use (as is currently being pursued through energy and water metering technologies) and at individual, household and neighbourhood levels. ‘Levels of home energy use made public’ was one of the highest scoring concepts, receiving ten votes, and suggestions were made to provide live energy data using holograms in prominent locations in the city. Others proposed publishing personal consumption details to social media, echoing the current Tweet-a-Watt monitor whereby home electricity usage is posted to twitter.\textsuperscript{54} It was felt that education would have to advance beyond formal school learning with proposals for ‘lifelong learning for professionals’ along with courses of up-skilling and education for broader members of society on how to live sustainable lifestyles.

\textsuperscript{52} Slankets are gigantic fleece blankets with sleeves that can be worn around the home. See: www.theslanket.com

\textsuperscript{53} Although there are variances across research, most studies in this area show an acceptable indoor range of between 15-31°C. However temperature variances within a single day of greater than 2°C have been shown to cause discomfort, thus the temperature at which people report comfort changes with the weather (Nicol and Humphreys, 2002). This contrasts World Health Organisation (WHO) recommendations for safe temperature ranges of between 18-22°C, depending on room function.

\textsuperscript{54} For details on Tweet-a-Watt see: https://twitter.com/tweetawatt
The ‘organisation’ category contained the highest rated concept - ‘passive homes for all’, which received 14 votes. This concept signified the development of retrofit schemes to improve insulation amongst the existing housing stock and the advancement of building regulations to passive house standards. Both of these proposals are enshrined within existing policy (DCLG, 2006; DEHLG, 2010a) and typify the trend in idea generation and voting whereby concepts that were considered inevitable, or those that were already in the policy pipeline, were reiterated in the visioning brainstorms and assigned higher rankings in the voting session. For example, other highly rated ideas within the Heating Visioning Workshop included ‘targeted communications campaigns’ (within the ‘people’ category), and ‘smart gadgets’ (from the ‘hardware’ category), neither of which imply dramatic changes but rather an upscaling of existing general strategies. Many of the ‘organisation’ proposals related to alternative regulatory regimes for personal energy usage. Irrespective of any non-fossil fuel solutions developed for the delivery of personal warmth needs, most participants assumed that fossil fuels would remain integral to home energy consumption in the coming decades. In line with this mode of thought, there were many proposals for mechanisms to reduce or cap energy consumption levels (including energy used for home heating), along with financial incentives and rewards for sustainable energy use. ‘Carbon quotas’ and ‘energy crash courses’ for over-users of carbon were among the highest ranked heating concepts. Contrasting the typically reported aversion amongst the general public and policy makers towards such stringent regulatory mechanisms (Kallbekken and Sælen, 2011). This illustrates that what is considered a controversial strategy at present, given its opposition to current politico-economic structures, was thought of as being desirable or implementable in the future. Indeed, the language of limits, allowances, penalties and restrictions prevailed in the brainstorms, the reason given by an energy regulator representative was that “people need to have no chance but to change”. It was considered that these tighter restrictions on personal energy consumption would shape how and when people use fossil fuels for goods and services in the future, thus raising their “practical consciousness” (Giddens, 1986) in routine energy practices including heating. It was also supposed that ‘time of use’ costs and ‘variable rates’ would be commonplace to engage householders in demand management. Also within the ‘organisation’ category was a range of ‘planning’ concepts. Poor planning was seen to be responsible for excessive housing development and for over-sized homes which have high levels of embodied energy and require large amounts of energy to heat.

A cluster emerged containing ideas for ‘local energy management’, including concepts for apartment, street or district level renewable energy systems. Such alternative scales of governance were explored in both Heating and Washing Visioning Workshops as participants often felt these would remove the need to maintain expensive centralised infrastructure systems. Although less often articulated, there was an implicit assumption that collective management might lead to more measured and responsible usage by individuals. Other ‘organisation’ concepts suggested the upscaling of existing renewables such as wind and geothermal at household, community and electricity grid levels. ‘Feed-in’ systems were also
proposed that would allow householders to redistribute their excess energy to the grid, inspiring a more altruistic, reciprocal system whereby all citizen-consumers have a stake in the energy supply system. These strategies are supported by empirical evidence that shows community resource management strategies using participatory decision making, community monitoring, and sanctions can lead to more environmentally responsible usage (Gardner and Stern, 2002). These proposals were included in the ‘organisation’ category as implementation barriers tend to arise from organisational and institutional hurdles rather than the inadequacy of existing technology. Other concepts for new or novel energy generation solutions, mainly at the household level, were attributed to the ‘hardware’ category.

The ‘hardware’ category contained the highest number of concepts (48%), due mainly to the large quantity of concepts for ‘smart’ devices and novel heating proposals. This perhaps reflects the inherence of “stuff” (Shove et al., 2007) - fuel, heating technologies and operating systems - in performing personal heating functions. It may also be a reflection of the cross-section of attendees at the Heating Visioning Workshop, with perhaps those from architecture, design and engineering fields more represented than participants who would be inclined to think of social innovations, educational and behaviour change concepts. Within the ‘hardware’ category, proposals for ‘smart homes’ and ‘smart gadgets’ were the highest ranked despite their vague meanings. The attraction of these eco-efficiency solutions reflects current policy discourse and technology industry trends for “smart” energy systems including smart grids and smart meters, currently at embryonic stages of roll-out in the Republic of Ireland and Northern Ireland (Commission for Energy Regulation, 2009; HM Government, 2009). Suggestions were also made for ‘motion sensors’ and ‘master switches’ to avoid heating and lighting usage in the absence of occupants and for ease of control. When these technological trends were explored in the closing workshop discussion, one person commented, “I favoured solutions in technical areas, we don’t want to be moving backwards – the back to basics idea”.

This suggests the predominance of technological visions of the future in the public imagination. This could be influenced by science fiction media where technology is often depicted as the distinguishing feature of societal development, while technological failure characterises dystopian visions (Murphy, 2011).

Over half of the ‘hardware’ concepts related to novel energy sources. Participants sensed that a variety of latent possibilities exist for harnessing untapped power from all home waste products (food and human waste). These ideas drew upon trends for biodigestors (Crowfoot, 2011) and algae fuel cells (Gartner, 2002; Farmer, 2009) and there were proposals for merging these systems to generate energy at household and community scales. Another large cluster of ideas was proposed to capture and store lost and residual energy from home devices through ‘closed loop’ and ‘energy and heat transfer’ systems. This is reflected in a comment by an architect in relation to lost oven heat; “there’s so much wasted, [it] should be recycled and used for something else”. This notion of energy capture was expanded to include concepts for the use and exchange of heat between buildings, especially using
residual energy from industrial processes. In doing so, a futures researcher agreed that “stronger community spirit might make it easier on a cultural level to exchange and share your heat”, to the retort of another; “but its culture change that’s the harder change”. This exchange reveals the variance in ideological outlook amongst participants at the Visioning Workshops. While one participant integrates cultural change with new forms of energy generation, the other embodies the traditional dichotomised form of thinking in polarities of either technological or behavioural strategies.

Many participants imagined greater changes in clothing styles and materials in the year 2050. A significant cluster of ideas emerged around concepts for direct body heating that extend existing technologies for air activated heat packs and outdoor heated clothing. Direct body heating strategies are said to have been the dominant form of insulation in the past before the “shift from insulation by clothes to insulation by the building envelope” brought about with new advancements in building engineering (Kujer and De Jong, 2012: 75). In Japanese culture, localised and personal heating remains prevalent. This is delivered through the use of electric carpets, the ‘yuutampo’ (a type of hot water bottle), the habit of heating the toilet seat rather than the bathroom space, and portable heaters (Kujer and De Jong, 2012). Although heating a range of spaces, things, or people with different technologies may result in rebound effects, this strategy embodies flexibility in the mode of heat delivery which participants touched upon in visioning brainstorms. A number of proposals were made for the use of additional layers (assigned to the ‘people’ category for its non-technological emphasis) and for heated body vests powered by kinetic energy from physical activity. In one brainstorm group it was commented that the concept of heated clothing was a “very 1950’s vision” and conjured images of spaceman-style “silver suits”. This shows the omnipotence of quintessential images of the future. Although some concepts from past visions of the future have been more directly translated into reality - such as the video calling depicted in Hoyle’s (1972) ‘2010:Living in the Future’ - others, such as Hoyle’s (1972) vision of the smart body suit have not. However participants noted that dimensions of smart clothing are present in certain guises, especially in sophisticated outdoor wear. By the year 2050, many envisaged stylish ‘intelligent clothing materials’ with sophisticated indicators monitoring medical and warmth needs. As a participant from an energy authority suggested: “change materials so that they absorb or emit heat depending on external and internal temperatures.”

Another key ‘hardware’ cluster centred on concepts relating to ‘home fabric and design’. Some envisaged a more permeable, breathable building fabric with a blurring of the dichotomy between inside and outside spaces to remove the need for fossil fuel heating. These ideas evoked ‘living building’ principles and concepts for bio-mimetic architecture (International Living Future Institute, 2012) and echo recent proposals from Philips and Arups research showing solar powered, perforated exterior building fabrics (Philips, 2009;

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55 Gerbing create outdoor heated sportswear powered by rechargeable, lightweight, lithium battery or electricity (See: http://gerbing.com/).
inhabit.com, 2012). Other suggestions were for the use of adaptable interior walls, modular home structures that can be adjusted to suit the number of occupants, and ‘pod living’ implying the insulation of only one central living space. These reflect new architectural solutions for ‘transformer’ apartments in densely populated cities to maximize space availability (Said, 2012) and would require a re-organisation of daily activities and interactions in the home. These ideas all built towards the goal of intensification of living space as articulated by a planner who commented: “why when the size of families is getting smaller, houses are getting bigger. By 2050, we’ll all live in a small cube - maybe in 400 years though as the apartment living experiment isn’t really working in Ireland”. This participant highlights the cultural challenge of shifting to denser living forms in Ireland given the enduring preference for detached homes and private land ownership. As well as the more futuristic ideas, reference was also made to older strategies of construction and solar gain. This showed that participants did not always conceive of the future as being predicated on the new, but also as involving a reinstatement of clever solutions of the past: “old country cottages were always east to west facing, dark inside, solid stone masonry – they were far more energy efficient”.

### 5.2.4 Washing Visioning Workshop

#### Table 5.3 Washing Visioning Workshop: categories, clusters, concepts and votes

<table>
<thead>
<tr>
<th>Practice categories and clusters</th>
<th>Concept</th>
<th>Votes</th>
<th>Total number of Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared water use:</td>
<td>Swedish sauna / communal bathing system</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Connecting with nature:</td>
<td>Video stream to water source - live updates</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experience learning / field trips to water plant</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Lifestyle and conventions:</td>
<td>Work from home - changes to lifestyles, less need to bother with strict hygiene</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dirt is fashionable</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Consumption visibility</td>
<td>Light up home to show community that you are using lots of water</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Washing procedures:</td>
<td>Targeted cleaning for dirty / smelly parts `spot cleaning’</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45 (31%)</td>
</tr>
<tr>
<td><strong>Organisation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory control:</td>
<td>Water restrictions after too much usage - change in water pressure</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water metering</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal water quotas</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Alternative systems of provision:</td>
<td>Blue bin – [drinking] water delivery</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separation of water types – drinking, washing, rinsing etc.</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Upgrade:</td>
<td>Nationwide water retrofit on existing buildings</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Design regulations:</td>
<td>Ban inefficient devices</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>48 (34%)</td>
</tr>
<tr>
<td><strong>Hardware</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low water solutions:</td>
<td>Gel clean</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sprinklers / steam clean / mist</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Cleaning aids:</td>
<td>De-productise - develop natural products and education</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Special soap that allows use of seawater for personal washing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Wash detectors:</td>
<td>Infra-red to show location of dirt on body so [you] know where to wash</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On-body smart device that monitors if you smell bad / need to wash</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Odour eaters:</td>
<td>Deodorising / self-cleaning clothes - could use anti-bacterial fabric, or clothes that disguise dirt</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Water re-use:</td>
<td>Closed water system in home</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50 (35%)</td>
</tr>
<tr>
<td><strong>Total Votes:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>143</td>
</tr>
</tbody>
</table>

By comparison to the Heating Visioning Workshop, the Washing Visioning Workshop produced a very even spread of ideas across categories. The ‘hardware’ category accounted for 35% of all ideas proposed, ‘organisation’ contained 34% of ideas, and ‘people’ accounted...
for 31% of concepts generated. The ‘people’ cluster contained two of the most highly rated concepts, which were ‘úisce gardai’\textsuperscript{56} and ‘sustainability education on the curriculum’ - both of which received eight votes. ‘Úisce gardai’ was a concept for the creation of in-school water champions to manage water efficiency retrofits and awareness campaigns and it was often repeated that sustainability would have to be integrated into all school curricula to encourage environmental values and behaviour change. Some participants envisaged a future where our connection to the natural world would be enhanced with technologies such as webcams placed in water bodies and reservoirs so householders could view water life and water levels. These ideas relate to those advanced mainly in critical design and ecological art domains where physical installations or “ambient displays” have been developed “to represent invisible dynamic processes, such as changes in weather” and are designed to “inform in subtle and playful ways, and in doing so nudge people to change their behaviour” (Rogers et al., 2010, 261). As with the Heating Visioning Workshop, participants envisioned an upscaling of devices to improve visibility in the levels of water consumption in public and private domains using numerical or lighting displays. In explaining these ideas, participants referred to existing ‘shower pebbles’ and ‘gro-egg’ room temperature gauges that operate with traffic light indicator systems.\textsuperscript{57}

Another key ‘people’ cluster that emerged was based on notions of ‘shared water use’ both inside and outside the home, challenging conventional conceptions of washing as a privatised activity and some suggested re-institating bathing in natural water bodies. ‘Swedish sauna / communal bathing’ received seven votes and participants often commented on the therapeutic and social dimensions that would be served through these solutions. Within the home, concepts were proposed for ‘co-showering’ to reduce overall water usage and ‘targeted bathing’ (washing using a basin and cloth, or bidet washing), rather than full showering. To challenge escalating trends for cleanliness and excessive washing, some envisaged a future where ‘dirt is fashionable’ and shorter hair and fashion trends support ease of grooming. Suggestions were also made for the active cultivation of lifestyles that ‘build [the] immune system for resilience to dirt’. These concepts showed a recognition of the cultural construction of hygiene and modern cleanliness paranoia, raising the possibility of developing interventions to shape these trends. Also within this cluster were ideas based on changes to live-work patterns. It was suggested that increasing opportunities to work from home would relieve social pressure for personal grooming, potentially reducing water usage. Another more vague proposition was to ‘break the link between water and pleasure’. However how this might be realised was not articulated. One person suggested that a reduction of water usage in spiritual occasions would be a step in creating disassociation between water and ceremonial practices.

With regard to ‘organisational’ concepts, the highest rated idea was ‘water metering’ at eight votes. While this is already confirmed for implementation by 2016 in ROI (McBride, 2012), this

\textsuperscript{56} Úisce gardai is an Irish term meaning “water policemen”

\textsuperscript{57} More information on water pebble can be found at: www.waterpebble.com; and information on the gro-egg is available at: http://gro.co.uk/gro-egg.
voting pattern is indicative of the strong feeling that economic measures have been underutilised for water conservation in Ireland and that this was a key barrier to more mindful water usage in daily washing practices. This was reflected in references to the “culture of free water” in Ireland, while a city council planner commented; “hitting people in the pocket seems to be the best approach”. Participants felt that this could be elaborated to a system of water quotas to impose equal limits on personal water usage. Accompanying this was the suggestion for ‘water restrictions’ during periods of drought or in cases of excess personal water consumption - a concept that received six votes. A high number of proposals were developed for matching the quality of water to its ultimate end-use within the home. In achieving this, many envisioned a large shift from current water mains infrastructure systems to the development of dual water provision systems; one for grey-water and another for potable drinking water. While dual distribution systems have been realised in urban areas, especially in communities in the Netherlands (Okun, 1997; Oesterholt et al., 2007), such dual systems have not been implemented in Ireland. Others conceived of a public mains system where greywater was the only quality of water provided, complemented by ‘blue bin’ deliveries of drinking water to households. The logic of the ‘blue bin’ concept was that it would provide a tangible impression of quantities of water consumed and would challenge conceptions of free flowing water. The ‘blue bin’ concept was born out of references to streamed waste collection services, illustrating the role of policy transfer (Taylor and Horan, 2001) and existing strategies in shaping vision proposals.

Rainwater harvesting was a very popular concept. Its potential to supplement water supply and relieve pressure on the centralised water mains was repeatedly mentioned. It was felt that reliance on rainwater might aid people to “separate luxury and necessity” and become more connected to natural rain variations in their washing routines: “the bath becomes a luxury…and there’s no need to shower every day, so you change a habit”. Participants also envisioned an advanced ‘smart grid’ rainwater harvesting system whereby rain could be harvested by individual homes and sold back to the system. This shows the influencing role that efficiency advancements in energy systems had in shaping the kinds of innovations that participants proposed for water efficiency. In the year 2050, it was envisaged that the option to have free flowing devices would be removed and the population would support design regulations stipulating minimum water efficiency requirements. Participants called for ‘push taps only’ and there were suggestions for ‘small bath-tubs’, and a ‘ban [on] inefficient showers’. With an amendment currently proposed to the EU Eco-Design directive and Building Regulations to include water efficiency standards, this trend looks likely to grow in momentum (EU, 2012).

Lastly, hardware accounted for 35% of all concepts generated at the Washing Visioning Workshop. These ranged from entirely novel devices to fulfill washing functions and water re-use in the home, to those based on slight improvements to existing devices. A number of concepts drew upon and elaborated existing shower efficiency devices including low-flow
showerheads (for details of similar products see Waterwise, 2012) and ambient or numerical displays providing live consumption feedback (Rogers et al., 2010). A concept for a ‘two-stage shower’ based on differing steam and rinse cycles got the highest number of votes in the ‘hardware’ category at seven, followed closely by washing with ‘sprinklers / steam clean / mist’. Great enthusiasm was shown for the idea of filtering and re-using water multiple times. This was embodied in a suggestion for a ‘wet room’, where there would be a closed loop of water supply between washing devices. Suggestions were made for instantaneous hot water to avoid running of taps, potentially using geothermal energy. Others proposed greatly reduced usage of harmful cleaning products through a shift to more natural eco-products with seaweed baths and natural oils mentioned. It was felt that these would not only reduce chemical run-off but also improve human health. Other suggestions were made for dry shampoo or cleaning agents that activate with small amounts of water. Indeed, one representative from Unilever noted that the company is currently developing such products for water stressed countries (Unilever, 2010).

A number of novel cleaning systems were proposed including ‘nano-showers’ that provide cleaning without the use of water, drawing on proliferating nano-technology trends (Ho et al., 2011). One participant suggested that we learn from the “astronaut model” in order to make dramatic efficiency improvements in our usage of resources including water. Another unusual suggestion was for the development of an alarm that was tuned into the body’s sleeping patterns and induced wakefulness at the optimum time to reduce showering for the purposes of waking up. This appears to draw upon existing Ubiquitous Computing (UbiComp) trends based on the use of intelligent and embedded sensors for monitoring human health conditions (Kuznetsov and Paulos, 2010). Lastly, participants conjured a future of ‘closed loop’ systems at household level whereby the generation, use, re-use, and purification of water could all be performed within the home plot. As one person said: “the idea of a zero carbon house, could you have a zero water house…as in it all comes from rainwater harvesting, and it’s off grid”.

5.3 Scenario Elaboration

The Visioning Workshops provided ample material to work with in the Scenario Elaboration phase. Implemented on their own, many of the ‘people’, ‘organisation’ and ‘hardware’ concepts imply only minor changes to conventional practices. However, when combined in complementary and creative ways, more drastically alternative practices are seen to emerge. The scenario elaboration phase can therefore be seen as a process of reconstructing these deconstructed practice concepts into a set of distinctive scenarios depicting how washing or heating practices are carried out in the year 2050. Drawing upon recommendations by Tite and Gatersleben (2003) and Manzini and Jégou (2003), a schematic process of scenario creation was developed, structured around the practice oriented focus of the research. In particular, its design drew upon processes outlined in Manzini and Jégou (2003) whereby
concepts are clustered according to ‘goals’, ‘strategies’ and ‘proposals’ (not dissimilar to the categories, clusters and concepts matrix presented in Tables 5.1 and 5.2). Rather than continuing with a dualistic ‘scenario crosses’ process, another categorisation process took place. Each concept developed at the Visioning Workshop (143 for washing and 133 for heating) was evaluated separately for its implications for three key axes of change shown to be important shapers of social practices: 1) socio-cultural, 2) regulatory and, 3) technological change. Concepts were each rated on a scale of one (low) to three (high) for their supposed levels of change across these three axes. For example, the concept for ‘intelligent clothing’ requires high levels of technological advancement to bring to fruition and was therefore assigned a ‘three’ for this axis. More intangibly, the concept was also seen to be predicated upon socio-cultural changes, given the need for people to accept and enact the new bodily heating practices that the device would require. It was therefore assigned a ‘two’ for this axis of change. In this way, many of the concepts embodied simultaneous shifts of varying degrees across technological, socio-cultural and regulatory dimensions.

After carrying out this analysis for each Visioning Workshop concept, those that ranked similarly according to these three axes of change were grouped, until three distinct future scenarios were created for the washing and heating studies - each distinguished by its high levels of either socio-cultural, technological, or regulatory change. Despite this primary emphasis, it is important to note that every scenario did imply changes of varying degrees across these axes, along with the inclusion of a complementary mix of ‘people’, ‘organisation’ and ‘hardware’ concepts in order to provide a complete picture of all the elements shaping the future practices. Effort was also made to prioritise concepts with a high number of participant votes and to keep clusters of concepts together to help build internal scenario coherence. For heating, one scenario was characterised by concepts consistent with higher levels of householder and community engagement in the delivery of personal warmth and in self-provisioning (Community Core). Another heating scenario was distinguished by the replacement of central heating with direct body heat and architectural advancements (Second Skin), and a final scenario showed heating activities conducted in accordance with carbon quotas assisted through greater efficiency in existing technologies (Carbon Control). For washing, a scenario of adaptive washing within natural rainfall limits was created (Aqua Adapt), another depicted a future of dramatic reductions in water consumption enabled by the substitution of conventional washing with waterless solutions (De-Waterise). The final washing scenario was characterised by regulatory enforcement of water consumption limits and greywater usage (Efficiency-Sufficiency).

Preliminary sketches of the scenarios were developed by the researcher to depict their distinguishing proposals and to provide a visual impression of what it would be like to inhabit

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58 For each topic (washing and heating) it was decided that it was appropriate to develop three scenarios to illustrate a breadth of different possibilities and to demonstrate change emphasising differing drivers (socio-cultural, technological and regulatory). For any scenario study, the development of between two to four scenarios is a common number (Robinson et al., 2011).
that future. The ultimate images were drawn by a professional designer with close guidance from the researcher. Each image details how heating or washing practices are performed in that scenario with its supporting devices, lifestyles, norms and regulations. Written descriptions were developed initially, a shortened version of which is presented in Tables 5.4 and 5.5 to provide a high-level overview of each scenario’s essential characteristics. The chapter then presents ‘day in the life’ narratives (see figures 5.4 – 5.9) which were developed for each scenario to provide a comprehensive picture of what it would be like to live in that scenario for those involved in the proceeding backcasting phases. Following the scenario narratives and images comes a short analysis of the comments garnered through the online scenario feedback survey that Visioning Workshop participants were requested to complete. Chronologically the online feedback came prior to the final development of the final scenario narratives. However, in this chapter, participant feedback is presented afterwards so that the reader is familiar with the scenarios prior to reading the associated feedback.
## Heating scenarios

### Community Core

This is a scenario combining high levels of cultural change with moderate technological and architectural advancement. It is characterised by the elimination of whole home heating with fossil fuels. Instead, targeted heat is provided to certain rooms - the main living 'pod' has extra insulation, while householders can generate their own biogas for targeted home heating through stoking their ‘biological core’ with waste and organisms. Space is used more smartly through shared and adaptable units, reducing energy needs and householders are quick to put on extra clothing for direct warmth. Householders are engaged in managing comfortable temperatures and are more ecologically aware and self-sufficient in their lifestyles.

<table>
<thead>
<tr>
<th>Socio-cultural change</th>
<th>Regulatory change</th>
<th>Technological change</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### Carbon Control

This is a scenario of tighter regulation with individual carbon quotas. Energy is highly valued and there is a moral citizenry duty to reduce environmental impacts in all areas of life including home heating. Households rely on micro-generated and renewable energy from the smart grid to power their heating, which remains similar to existing central heating systems. They intensively manage their energy consumption through advanced energy management systems and there is relatively distributed competency between people and hardware in this scenario. Carbon quota leagues display details of district energy consumption online while community green credit systems can be pooled towards local green make-overs.

<table>
<thead>
<tr>
<th>Socio-cultural change</th>
<th>Regulatory change</th>
<th>Technological change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>HIGH</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Second Skin

This scenario is characterised by high-tech, intuitive technologies that provide direct body heating rather than conventional space heating. Personal wellbeing and freshness are goals of heating which is delivered through ‘personal heat vests’ and ‘spot heating’ solutions in the home. An external ‘second skin’ is placed over existing homes (and built into the exterior of new homes) and allows more air flow with the outdoors, maintaining a comfortable, healthy indoor climate. While there is relative technological devolution in this scenario, it is predicated upon cultural change and regulatory incentives. In addition, the population must be engaged in ongoing learning for sustainable living and innovation.

<table>
<thead>
<tr>
<th>Socio-cultural change</th>
<th>Regulatory change</th>
<th>Technological change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Low</td>
<td>HIGH</td>
</tr>
</tbody>
</table>
Pete arrives home late from work. In the past, he would have immediately got out of his restrictive suit. However he is already in comfortable clothing thanks to a recent campaign that called for breathable, casual clothes for work. This means he can wear his comfy fleece in the winter and his shorts in the summer. The office doesn’t need to use excess energy for heating or cooling and he doesn’t have to worry about buying multiple sets of clothes for home and work.

This central living area of the home is super insulated with insulating paint to keep the warmth in. Pete is the only one at home tonight so he decides to adjust the modular walls so that they shrink in closer to him rather than having to heat the entire empty space. Modular walls are found in all new homes which also have to adhere to a limit on floor space according to the number of occupants to reduce heating requirements and the amount of building materials needed.

It’s cold today so Pete decides to stoke the home biological core with household organic waste. The ‘biological core’ contains a mixture of biodegradable waste, algae, and organisms that generate enough biogas to heat the main living rooms in the home. The combination of the biological core, extra clothing layers, modular walls and insulating paint has removed the need for fossil fuel heating in homes. Pete lives in a brand new apartment and this biological technology is found in the central core of the block - communally owned and maintained by the occupants. By contrast, many older homes are hooked up to district based biological core plants. Pete decides to meet some friends in the penthouse communal kitchen that evening. Communal recreational spaces like this are widespread to help compensate for the smaller home sizes. There is also an appliance bank, a collection of shared household tools and appliances that Pete bought with his neighbours enabling them to avail of the lower VAT rate for group purchasing.

Over dinner, Pete and a few friends decide to attend their monthly local green works course tomorrow. Here they can mix with community members and learn practical skills in DIY, vegetable growing, upcycling and home biological core maintenance. There is the added bonus of earning personal eco-points from attending the course. This will give Pete those extra points he needs to upgrade the heating controls for his ‘biological core’ and to buy some local produce for his Sunday Roast!
Jenny wakes up at the usual time. The first thing she does is check the home energy management system (EMS). It shows high levels of cheap, renewable energy because of the fresh, windy weather so Jenny decides to activate some appliances and programmes the heating for later on. Since the development of the smart super-grid homes are powered with a mixture of on-home renewable devices (e.g. solar / wind), community owned energy farms (e.g. wood chip district heating), and larger power sources (e.g. conventional power stations and wind farms). Homeowners who generate excess energy are happy to send this to other homes that are unable to have their own renewable energy supply.

Since the introduction of individual carbon quotas two decades ago, Jenny is more conscious of the amount of energy she consumes at home and in the products and services she uses. Every item from electronic goods to food and cuddly toys has a ‘carbon cost’. If she wants to purchase one of these, she must first scan her carbon card to reveal the product’s environmental impact. The card is then scanned again upon purchase or usage (if it is energy using) to ensure that the appropriate amount is deducted. Just after she has left home, Jenny remembers she forgot to make sure the heating and appliances were all turned off. She quickly goes back inside to turn them off. Since exceeding her carbon quota last year, Jenny is aware that she must watch her usage or she will have to attend an energy crash course again as a penalty. While she attended reluctantly, she found it quite interesting and picked up some good tips on how to heat her home more efficiently and live more sustainably.

She is now well below her quota. She decides to check the online carbon quota league tables to see how her district is performing. Their levels of energy use are low and they’re not far off winning community green credits which can go towards community upgrades such as better public transport, cycle lanes and renewable energy systems. Jenny decides she will get together with the Residents’ Association later on to see how they might encourage their fellow community members to reduce their energy use so they can avail of these awards that are nearly within their reach.

**Carbon Control**

![Diagram of Carbon Control](image)
Figure 5.6  Second Skin: narrative and imagery

Second Skin

John is walking back home from a long day at work. It’s bitterly cold out but luckily he’s wearing his personal heat vest. This lightweight, body-warming vest is worn by many people both inside and outside the home. It is powered by kinetic energy generated during daily activities (e.g. walking) and comes on automatically when the air temperature falls to a certain level.

As he walks on to his street, he can see his home’s exterior second skin from around the corner. This structure is a clear, breathable membrane encasing the home. It regulates light and air streams in and out of the house creating the ideal micro-climate. In 2050 following heavy taxes on fossil fuels and massive investment in green technologies, the home ‘second skin’ was developed and the government financed a roll-out to all houses across NI/Ireland. Coupled with direct body heating technologies, it has made old-fashioned fossil fuel heating and radiators entirely unnecessary.

The ‘second skin’ structure is covered in a layer of transparent solar cells which together with kinetic energy floor tiles, generate energy to power home appliances and lights. John goes into his home and goes straight to the living room. Normally the home second skin and personal heat vest technologies would be enough to warm him but as it is unusually cold, the spot heating is also activated. Its thermal motion sensor detects a person’s presence and heats them with a UV beam. As with the personal heat vest, spot heating is activated when a certain ambient temperature is reached; it is a responsive, ‘smart’ technology. John gets ready to go to one of the evening professional eco-cation courses that he is attending with a group of other public sector workers. Everyone in employment is required to attend eco-cation courses suited to their broad area of work to ensure they are up to date on best practice for sustainability policies, modes of working, producing and green technologies. This is linked to the broader economic strategy that focuses on green and renewable technologies. John is planning on attending an open innovation competition at the weekend with a group of friends. These are exciting grassroots events and often seed blue-sky ideas for new technologies, social and business innovations.

Second Skin

Second Skin
Clear membrane made of recycled materials covering entire home creating micro-climate – can be retrofitted to existing homes or built into fabric of new homes

Has photovoltaic cells for solar energy generation.

Smart Eco-cation
Emphasis on green tech in education. Professionals required to attend basic eco-cation courses every 5 years to update on best practice.

Open innovation events widespread.

Smart technology
‘Spot Heating’ and personal second skin actuate at certain / body / ambient temperature.

Combination of solutions, means that conventional space heating no longer exists.

Spot Heating
Thermal motion sensor camera and laser targeted UV heat

Personal Heat Vest
Light-weight, conty vest powered by kinetic energy generated during daily activities.

Kinetic tiles
Generate energy for electricity.
Table 5.5 Washing scenarios: overview

<table>
<thead>
<tr>
<th>Washing scenarios</th>
<th>Socio-cultural change</th>
<th>Regulatory change</th>
<th>Technological change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aqua Adapt</strong></td>
<td>HIGH</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>People are highly engaged in managing and adapting water use in this scenario. The scenario is distinguished by flexibility in personal washing habits according to natural fluctuations in rainwater supply. Small quantities of water are piped to homes for drinking, while home rainwater harvesting systems service other water based activities (including washing). There are reduced expectations of cleanliness and privacy in washing. In times of low water availability, washing is reduced and people can visit public Waterfall Salons where they can bath together and socialise. Basin and gel washing are common, while people can indulge in a bath in times of high rainfall.</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Efficiency-Sufficiency</th>
<th>Socio-cultural change</th>
<th>Regulatory change</th>
<th>Technological change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>HIGH</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>In this scenario water quotas are universal and overall levels of water use are lower due to advancements in water filtration technology that allow water to be recycled multiple times within the home. Washing devices are similar to those used today although there are large efficiency improvements and users are skilled in managing their water allowance - every time a person goes to shower, they must scan their thumbprint to record usage. Excessive water use is penalised with fines and restrictions. Individuals who show prudent levels of water use are rewarded with credits that can be used for eco-products and services.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>De-Waterise</th>
<th>Socio-cultural change</th>
<th>Regulatory change</th>
<th>Technological change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Low</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>Major technogical advancement has occurred and washing practices are conducted using methods that replace or dramatically reduce the need for water. The wash-monitor diagnoses bodily cleaning needs, and the revite-alarm leaves people refreshed in the morning, removing the need for showering to wake up. The smart water grid, delivers low loss water at variable rates. Most washing is conducted using a 'nano-steam clean' while deodorising clothing and eco-friendly body spray maintain freshness.</td>
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<td></td>
</tr>
</tbody>
</table>
Aqua Adapt

Claire wakes up earlier than normal. It’s the middle of the summer, and it looks like it’s going to be another warm, dry day. Not to worry, while her stock of harvested rainwater is low she knows there are a range of ways she can carry out her washing with only small amounts of water. In the year 2050, everybody has access to rainwater harvesting systems. In urban areas and apartment blocks these tanks are shared while detached and semi-detached homes have their own rainwater tanks. The collected rainwater is used for all household washing needs (personal washing, clothes and dish washing), in fact, it is the only water source for these purposes. The watermains delivers just a small amount of treated, potable water to homes - enough to cover cooking and drinking needs.

Claire adjusts her washing activities according to rainwater availability. The home water supply monitor helps householders manage their water use by displaying current and forecasted rainwater supply and suggests the type of washing that can be performed. Today the monitor shows that supply is at 5% and rain is not forecast until the weekend. Claire avoids water use and instead uses gel wash for an instant refresh. In times of average supply, she has a short, timed shower and uses targeted bathing strategies such as a sink splash wash, or uses the bidet. It’s been a few days since she had a full shower but she knows that it is not necessary to wash once or twice daily as people did a few decades ago. Government has extended control on advertising promoting excessive cleanliness and unrealistic expectations for people’s appearances, while harmful chemicals in washing products have been banned.

Claire plans to visit the Waterfall Salon (public bathhouse) tomorrow evening for a deep clean and to socialize with friends. The government ensures adequate water supply at these facilities and provides vouchers for people to attend during times of low water supply. Here people can also learn practical skills on how to reduce their water use and lead environmentally friendly lifestyles. People have become accustomed to adapting their washing behaviour as part of a broader trend of living more in tune with natural rhythms (e.g. eating in-season vegetables and fruit or avoiding electricity use at peak times). So while the country experiences a dry spell Claire is happy to adjust to low water cleaning solutions. Heavy rainfall is forecasted for next week and she is looking forward to treating herself to a nice long bath!
Efficiency-Sufficiency

It's a Saturday morning. Derek begins by making a cup of coffee and goes online to check the news and his water quota tracker to see how much water he has before performing his washing activities. In contrast to the days of his youth when water was supplied for free in endless quantities, people now receive a basic weekly water quota (covering cooking, eating and washing requirements). If people exceed their quota they must pay fines, or in incidences of repeat offence, water restrictions may be imposed.

Derek goes upstairs to the wet room, a special room in the home where all the washing appliances are kept. In the wet room, water is used for one washing function (e.g. showering) and then stored temporarily for re-use (for example in clothes washing). This allows recycling of water between devices, with water ultimately being used in toilet flushing or gardening. All of the wet room appliances are extremely efficient due to design regulations that require manufacturers to design for low water use. He just recently bought a combination steam-shower which begins with a steaming session for lathering up followed by short water bursts to allow people to rinse.

To activate the steam-shower Derek scans his thumb-print, so that the appropriate amount can be deducted from his personal quota. He decides to cut his shower a little shorter than usual as he knows he’s kept within his water quota this week and as a result is due to receive green credits. These can be used for the purchase of water efficient products or other eco-certified goods and services. If his community collectively manages to build up enough credits, they could be in with a chance of winning a green makeover. He can see online that they are near the top of the district water competition league so he has got together with friends to start a campaign for his area to encourage people to reduce water usage. If they succeed, they can finally get that new playground and bicycle lanes that they’ve been wanting for so long.

Efficiency - Sufficiency

- **Water quotas**: Limited water quotas per person for water from public mains. Quota trackers allow personal tracking of usage.
- **Fines & Restrictions if quota is exceeded**:
- **Green credits awarded to individuals who stay under quota**: used for eco-products & services
- **District Water Competitions**: Win ‘green makeover’ for area.
- **Thumb print / retina activated to monitor water quota use**
- **Efficiency - Sufficient**: All water using appliances in one room with direct piping between them to allow for cycling of water
- **District water consumption levels publicly available**
- **Fines & Regulations**
- **Design standards** promote efficient, low flow water fixtures.
Figure 5.9  De-waterise: narrative and imagery

De-Waterise

The day starts like any other day for Sarah. She is awakened by the light and pulsing given off by her revite-alarm. This intuitive technology senses when her body is at the optimum time in its sleep cycle to induce wakefulness. This leads to greater vitality in the mornings so she doesn’t feel the need to shower to wake herself up. Besides, she had a quick wash three days ago and is keen to save money on her water bills. After a basic free quantity for drinking and cooking, the cost of water increases dramatically and fluctuates with changes in demand and water availability.

This doesn’t prevent people from being clean and hygienic however as a range of waterless washing technologies have been developed which in combination reduce the need for water-based washing. For example, today Sarah uses her eco-friendly body spray for light refreshment and dresses in her work uniform that is made from advanced, deodorising clothing materials. Deodorising and bacteria eating clothing materials are widespread and are especially favoured for work activities as they leave the wearers confident and fresh all day and reduce the need for excess water use in either clothes washing, or personal washing. When Sarah gets home, she has only a short time to get ready to meet with friends that evening. She is attending an open innovation dialogue with a group of like-minded people to brainstorm ideas for socio-technical innovations that may help people to reduce their home water and energy use. Many people attend these creative and interactive forums (in person and online).

Before leaving the house, Sarah checks her wash monitor - a personal body odour and cleanliness monitor which lets her see if she needs to clean and if so, what type of cleaning to perform; gone are the days when people washed excessively due to paranoia about body odor and cleanliness. This wash monitor links up with the smart water grid, which is a low-loss efficient water delivery system that measures usage, spot trends and helps manage demand. The wash monitor lets Sarah know that she’s doing fine and suggests a short nano steam clean tomorrow evening when water costs will be less due to low demand and high abundance of water then. Very few people own showers or power showers due to high taxes on these devices because of the huge amount of water they use. However, steam showering and low-flow solutions are more widespread. The afternoon wash she has planned for tomorrow will tide her over for another few days as the combination of deodorising clothing, body sprays and revite-alarm will keep her refreshed and clean.

De-Waterise

![Diagram of De-Waterise](image)
5.3.1 Online scenario feedback survey

After the scenario images and written descriptions were developed, these were made available to the Visioning Workshop participants for comment via an online survey. This was intended to enhance opportunities for involvement of stakeholders in the scenario generation process which is said to play an important role in stimulating ownership and nurturing potential vision champions (Quist, 2007). For each scenario, respondents were asked three open ended questions:

1. “Are there any aspects of the scenario that you particularly like / dislike?”
2. “Do you feel the proposals outlined in this scenario fit well together” (are there any you would remove, or would include from the other scenarios?)”,
3. “Do you have any recommendations for strengthening some of the proposals within the scenario, or any additional ideas?”

A response rate of 38% was achieved, or 8 out of 21 attendees in the case of each Visioning Workshop. This moderate level of feedback could have been for a range of reasons including tacit support for the scenarios, off-putting time demands for its completion, or disengagement. Nevertheless, some useful recommendations were made for strengthening and modifying the scenarios in addition to critical analysis of their broader sustainability implications.

A number of comments were made on the design and operation of the energy and water quotas (within the Carbon Control and Efficiency-Sufficiency scenarios) with recommendations for basic allowances and other measures to improve their “social proofing”. Similarly, suggestions were made to provide financial incentives and vouchers to allow lower income families to access efficient heating or washing technologies depicted within the scenarios. Respondents also provided useful suggestions on how to improve the acceptability of concepts, in particular regarding their framing and the discourse and imagery employed. For example, a number of comments were made on the negative connotations embodied in the ‘mandatory sustainability-service’ concept of Community Core. Instead, participants suggested “some sort of (voluntary) incentive scheme giving people eco-points from training”, while another suggested a change in terminology to “something that instills [a] sense of responsibility, such as civic responsibility training?” These comments proved very useful and resulted in changes to the scenario descriptions, and in this example, led to the creation of the ‘green works’ concept of Community Core. Valuable comments were also made regarding the potential environmental implications of scenario concepts. For example, Heating Visioning Workshop participants emphasised the need to implement solutions that are suited to the existing housing stock to avoid excess requirements for new materials and questions were posed regarding the by-products of the ‘biological core’. These provided useful pointers for consideration in the sustainability evaluation phase.
Some participants questioned the arrangement and allocation of concepts within scenarios. For example, some wondered whether the ‘water monitor’ (for managing rainwater in Aqua Adapt) was really compatible with high cultural change given its technological underpinnings. Similarly, another commented that De-Waterise was “very individual”, asking “would a reliance on technological change instill enough motivation for behaviour change?” For these participants, the necessary cultural changes supporting the usage of the scenario technologies were imperceptible and therefore the cultural underpinnings of the more technologically oriented scenarios were drawn out in the ultimate scenario narratives. Related to this were practical suggestions to ensure the scenarios were well rounded in their mix of ‘people’, ‘organisation’, and ‘hardware’ concepts. For example suggestions were made to accompany the ‘smart’ energy management systems and personal body vest device with educational measures. Likewise, an architect commented that there was a need to include incentives with regulatory measures to “avoid coming across as water Nazis!! Grants for installing rainwater harvesting and low flush toilets etc. should be created (as secondary to education). Carrot needed with stick”. Most people tended to be complementary of the scenario compositions: “I like the mix between individual responsibility…and the sense of shared responsibility”. Additionally it was noted that some components could equally be transferred across scenarios: “I think you could link the carbon card idea to this one [Second Skin] as well”, and “shared space could be accommodated in other proposals [i.e. scenarios]”. These participants picked up on the difficulty in assigning concepts to different scenarios, as was found to be the case during the scenario elaboration phase. It is true that many of the proposals could have been shared across the scenarios. However, a deliberate attempt was made to separate strategies to ensure each scenario’s distinctiveness. Overall, the online scenario feedback phase produced useful suggestions pertaining mainly to scenario modifications, evaluations, combinations and framings. These were built into the ultimate scenario narratives and imagery utilised in the following backcasting phases and presented in the previous Figures.

5.4 Scenarios: sustainability evaluation

Having developed the future scenarios, it was necessary to further consider each scenario’s relative potential to improve the sustainability of heating and washing practices. A number of possible sustainability evaluation options were reviewed in the methodology chapter, ranging from life-cycle analysis tools, to single criteria assessment evaluations (e.g. looking at energy intensities or carbon footprints), to sustainability indices. It was asserted that many existing quantitative tools are ill equipped to cope with the diversity of human-technology-organisation interactions within the future scenarios and thus a qualitative sustainability evaluation framework was designed. This drew upon Seyfang’s (2009) indicator framework for sustainable consumption from a new economics perspective and work by Halme et al., (2004) on the inclusion of personal indicators for sustainable home services. While a new economics
approach represents one particular vision of how the transition to sustainability may be achieved, as discussed previously, its core principles of economic restructuring, coupled with socio-cultural change to encourage societal wellbeing within ecological limits, are gaining traction within environmental governance debates (Ekins and Ekins, 1986; Jackson, 2006). Furthermore, its political economy perspective and consideration of the constraints imposed by social infrastructure and institutions of provision, marry well with the practice oriented approach. An outline of the indicator framework is presented in Table 5.6 below summarising the elaborated version presented in the Methodology Chapter.

### Table 5.6 Sustainability evaluation framework

<table>
<thead>
<tr>
<th>Indicator category</th>
<th>Description and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localisation</td>
<td>Supporting local businesses and labour; localisation of utility provision (e.g. DIY, self-sufficiency and ‘buy local’ campaigns).</td>
</tr>
<tr>
<td>New systems of provision</td>
<td>Alternative systems of provision, with associated social and economic institutions and infrastructure allowing independence from the mainstream (e.g. off-grid housing; new systems of exchange rewarding sustainable consumption).</td>
</tr>
<tr>
<td>Reduced ecological Footprint</td>
<td>Shifting consumption to reduce social and environmental impacts; equitable distribution of resources and consumption levels (e.g. voluntary simplicity; information on sustainability impacts; environmentally friendly materials; renewable energy).</td>
</tr>
<tr>
<td>Community building and collective action</td>
<td>Nurturing inclusive and active communities; developing social networks around low consumption activities (e.g. community exchange projects; locally owned renewable energy).</td>
</tr>
<tr>
<td>Individual wellbeing</td>
<td>Enhanced psychological and physical wellbeing; successful and equitable delivery of ‘needs’ such as warmth and comfort (e.g. innovations for the reduction of pollution and emissions associated with consumption; measures to combat fuel poverty).</td>
</tr>
<tr>
<td>Economic Sustainability</td>
<td>Tackling long-term unemployment and improving economic competitiveness and new market opportunities (e.g. research and development for green innovations; equitable access to employment).</td>
</tr>
</tbody>
</table>

Each scenario was assessed qualitatively against this multi-criteria evaluation tool, allowing an in-depth, critical analysis of its potential sustainability benefits and limitations. Due to the variance of components within each scenario, instead of evaluating the scenario as a whole, each key cluster of concepts (people, hardware, regulation and provision) was considered separately.\(^{59}\) For each scenario, a qualitative written evaluation was conducted for each of these four clusters against the sustainability evaluation indicators. This exercise provided the basis for assigning indicative numerical ratings to allow for the creation of an aggregated

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\(^{59}\) At this stage, ‘organisation’ concepts were separated into provision and regulation categories. This was to reduce the variance of concepts within the indicator category to permit a more refined and accurate sustainability assessment.
sustainability index for each scenario. The rating system was based on a scale of -2 to +2. Scenario clusters which were considered likely to have a strong positive sustainability impact were rewarded +2, a moderately positive impact was denoted with a +1 score, and a rating of 0 denoted negligible impact. The mirror opposite was the case for negative scorings (i.e. -1 indicated a likelihood of a moderately negative sustainability impact, while -2 indicated a strong negative impact). The maximum score each sustainability indicator could receive was eight - received if it scored a +2 against each of the four scenario clusters, while the highest aggregated sustainability score a scenario could receive was 48 (if each indicator category scored eight out of eight). This rating process permitted the development of an aggregated sustainability index to aid comparison between the three heating and washing scenarios and to identify their relative merits. The results from the heating and washing scenario sustainability evaluations are presented separately in the next two sections of this chapter. Each section begins with a short summary, presenting high-level results, accompanied by a graphical index showing each scenario's ratings against the sustainability indicators. After this, a sample of the qualitative sustainability evaluation is provided to illustrate more clearly the rating process described above and to provide transparency to the assigned scenario ratings. In the case of heating, the qualitative evaluation for Community Core, the highest scoring scenario, is displayed. For washing, the qualitative analysis of the lowest scoring scenario - De-Waterise - is detailed to provide a contrast. These aim to provide transparency to the rating process and equivalent sustainability evaluations for the remaining heating and washing scenarios can be found in Appendix S. In-depth analysis of the performance of the heating and washing scenarios is then provided, structured according to the sustainability indicators.

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60 As will become clear upon viewing the sustainability evaluation tables (Tables 5.7 and 5.8) aspects of some scenario clusters were assigned a -1 owing to the possibility of minor negative impacts, however these were sometimes cancelled out (with a +1) due to the supposed positive benefit that would be achieved overall. Absolutely negative ratings were therefore more rare.
5.4.1 Heating scenarios: sustainability evaluation

Community Core achieved the highest rating against the new economics framework, receiving 28 points. Following this came Carbon Control at 24 and Second Skin received a rating of 23. Community Core’s performance arises mainly from its high ratings against the ‘localisation’, ‘new systems of provision’ and ‘ecological footprint’ indicators. These high ratings were received because the scenario’s biological core, adaptable building features and behavioural adaptation strategies were all designed to lead to greater self-sufficiency and fossil fuel-free heating. Carbon Control scored equally high against the reduced ecological footprint indicator given that its carbon quotas and associated hardware and incentives aimed to promote and enable significant cuts in carbon emissions. Second Skin scored the poorest against the evaluation indicators, with notably low ratings arising against the ‘community building and collective action’ indicator.

Figure 5.10 Heating scenarios: sustainability evaluation index

<table>
<thead>
<tr>
<th>Community Core</th>
<th>Localisation</th>
<th>New systems of provision</th>
<th>Ecological footprint</th>
<th>Community building</th>
<th>Individual wellbeing</th>
<th>Economic sustainability</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Carbon Control</td>
<td>Localisation</td>
<td>New systems of provision</td>
<td>Ecological footprint</td>
<td>Community building</td>
<td>Individual wellbeing</td>
<td>Economic sustainability</td>
<td>TOTAL</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Skin</td>
<td>Localisation</td>
<td>New systems of provision</td>
<td>Ecological footprint</td>
<td>Community building</td>
<td>Individual wellbeing</td>
<td>Economic sustainability</td>
<td>TOTAL</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td></td>
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</tbody>
</table>

RATING | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
<table>
<thead>
<tr>
<th>COMMUNITY CORE</th>
<th>Localisation</th>
<th>New systems of provision</th>
<th>Ecological footprint</th>
<th>Community building &amp; collective action</th>
<th>Individual wellbeing</th>
<th>Macro-economic sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision</td>
<td>Localisation of energy supply for heating through biological core; by-products used for fertilisation of local crops. All create high potential to enhance local self-sufficiency and resilience (2).</td>
<td>Biological core represents a new form of energy provision for heating with householders engaged in biological energy production reducing dependency on external supply infrastructure (2).</td>
<td>Removal of fossil fuels for home heating - very positive contribution towards reducing household energy consumption emissions (2). However, this may be somewhat counteracted initially by potential negative environmental impact through decommissioning current energy grid and material impacts of developing and installing biological core technology (-1).</td>
<td>Community co-operation in management of biological core energy production and pooling of by-products for local compost. Both moderately enhance community spirit (1).</td>
<td>Lower home heating costs contribute to reducing fuel poverty (1); positive contributions towards warmth and comfort in the home (1). However greater input is required on the part of individuals in the maintenance of biological core which may be perceived as an inconvenience (-1).</td>
<td>Initial likely disruptive impact to energy supply industry (-1), however new market opportunities for biological core technologies and consistency in fuel supply improves fuel security and is likely to produce largely positive benefits (2).</td>
</tr>
<tr>
<td>Regulation</td>
<td>No impact (0).</td>
<td>No impact (0).</td>
<td>Less floor space reduces the overall heating area and results in fewer material inputs for home construction</td>
<td>No impact (0).</td>
<td>Space regulations may be seen to infringe on personal freedom to determine house size as is the case in the present day (-1).</td>
<td>No impact (0).</td>
</tr>
<tr>
<td>Hardware</td>
<td>Internal space modularisation, super insulation of key living rooms &amp; cosy clothing contribute to freedom from centralised energy provision (1); adaptable home space may allow for more permanence of residency in the same locality (1).</td>
<td>Hardware solutions make strong contributions towards reducing dependency on external (centralised) fossil fuel provision for energy for heating (2).</td>
<td>Low-tech, fossil fuel free heating solutions in the form of cosy clothing and insulating paint for core living rooms (1); internal modularisation reduces the need to move home or make major renovations reducing an individual's ecological footprint over their lifetime (1).</td>
<td>No impact (0).</td>
<td>Comfort is likely to improve with insulating paint and advanced cosy clothing (1); homeowners may respond well to the possibility of adjusting home spaces (1).</td>
<td>New markets for: insulating paint, building modularisation technologies, and advanced cosy clothing (long-lasting, insulating and environmentally friendly clothing materials). All provide significant economic opportunities (2).</td>
</tr>
<tr>
<td>People</td>
<td>Personal eco-points are used for local eco-services and products promoting local business and shortening supply chains (1); Sharing of space and appliances promotes local self-reliance (1).</td>
<td>Eco-points represent new systems of exchange over typical monetary systems (1); Shared facilities and greenworks represent new social arrangements for the delivery services and self-sufficiency (1).</td>
<td>Sharing, facilities, appliances and space means overall reduction in individual energy consumption (1); Greenworks courses promote environmental responsibility and techniques for effective operation of biological core and delivery of personal warmth (1).</td>
<td>Shared spaces and facilities promote reciprocity and community cohesion (1); community building promoted through green-works courses (1).</td>
<td>Likely that shared spaces / appliances and green-works concepts will enhance psychological wellbeing from community interaction (1); Ecopoints serve as individual rewards (1).</td>
<td>No impact (0).</td>
</tr>
</tbody>
</table>

**INDICATOR RATING** | 6  | 6  | 6  | 3  | 4  | 2  | 3  | 28

**TOTAL:**
5.4.1.1 Localisation and new systems of provision

The most variance in indicator ratings between the heating scenarios was for the ‘localisation’ and ‘new systems of provision’ indicators. Community Core scored the highest against these two indicators because of the scenario’s independence from mainstream energy supply and the fulfillment of energy generation at the household and community scale through its ‘biological core’ systems. This represents an alternative, collective and localised energy provision system, while practices of wearing extra clothing and space modularisation, provide an independent means for generating warmth. Closed loop systems involving the use of by-products from the biological core for fertilisation within the locality, and the awarding of ‘community green credits’ for low energy consumption contribute to localisation affects. Additionally, ‘green-works’ and systems for shared spaces, skills and facilities promote local self-sufficiency. Second Skin scored moderately against the ‘localisation’ and ‘new systems of provision’ indicators at four and five respectively. The ‘home second skin’ and ‘personal heat vest’ solutions remove the need for centralised fossil fuel systems to deliver comfortable warmth. This contributes to more self-sufficiency, whilst also representing an alternative system of provision. Carbon Control scored the lowest at three and four respectively against the ‘localisation’ and ‘new systems of provision’ indicators. The main positives of Carbon Control against these indicators arises from the carbon quota system which promotes local products and services whilst also representing an alternative system of monetisation. Compared with the other two heating scenarios, Carbon Control implies less localisation of utility provision but rather what Southerton et al. (2004) term ‘modernised mixtures’, characterised by a combination of renewable energy from self-generation and the centralised grid.

5.4.1.2 Ecological footprint

Carbon Control yielded the highest score of all scenarios against the ecological footprint indicator with its ‘regulation’, ‘hardware’ and ‘people’ clusters each being assigned a ‘two’ for their contribution to reduced ecological footprint. For example, the carbon quota system and its related ‘energy crash courses’ and penalties were considered to encourage high awareness of individual ecological footprints and to incentivise more sustainable consumption choices. Likewise, hardware concepts including the ‘carbon quota scanner’ and ‘home energy management systems’ were judged to permit very tight control over energy usage. The Second Skin scenario achieved the lowest scoring for its contribution to reduced ecological footprint. This was due to the uncertainty surrounding the environmental impacts of the new hardware and provision innovations (i.e. ‘personal heat vest’, ‘home second skin’, and ‘spot heating’), particularly arising from the material inputs required for their development. Community Core was considered less likely to involve such negative impacts owing to its lower-tech solutions for the fulfillment of heating practices and reliance on behavioural changes.
5.4.1.3  **Community building and collective action, and individual wellbeing**

Scores for the ‘community building’ indicator were lower overall (not exceeding ‘three’ across all scenarios). The promotion of sharing within Community Core - sharing spaces, shared maintenance of the biological core, sharing biological waste, and the widespread attendance at ‘greenworks’ courses, was seen to positively contribute to the ‘community building and collective action’ indicator. In the case of Carbon Control, higher penetration of renewables and energy management systems have potential to reduce householder’s energy costs contributing to individual wellbeing. However, it was noted that the carbon quota may have a potentially negative impact on individual wellbeing due to the challenges it poses for personal routines and its penalties and restrictions. Second Skin also scored a four against this indicator - again because of the supposed reduced household energy costs it involves and the potential comfort enhancements it brings with its ‘personal heat vest’ and ‘home second skin’ technologies. Minor health concerns were raised however over the use of new technologies especially the UV beam. Unsurprisingly, the ‘people’ clusters in each heating scenario scored highly against the ‘community building and collective action’ indicator given that their main intentions were to improve sustainable energy consumption through social learning and collective action. For example, within Second Skin, ‘open innovation’, and ‘eco-cation’ courses involve interaction and participation in sustainability innovation and within Carbon Control, district energy competitions promote collective action and community solidarity.

5.4.1.4  **Economic sustainability**

In assessing the scenarios, it was also important to consider their different levels of economic impact e.g. micro-level (home), medium-level (regional), and macro-level (national and supranational). As Halme et al. (2004: 10) note: “despite the potential positive micro-level effects [of sustainable home-services] negative impacts may result in the larger system, and vice versa”. For example, in the Community Core scenario it was proposed that its greater self-reliance and decentralisation might have short-term implications for the energy industry, creating immediate macro employment and economic impacts. However, new market opportunities are created for ‘biological core’, insulating materials, and modularisation technologies which have the potential to outweigh this immediate macroeconomic impact. Other scenarios followed a common pattern of potentially disruptive economic impacts in the immediate term followed by the opening up of new markets or alternative economy systems after implementation. Scores were therefore very consistent across scenarios of between three and four for the ‘economic sustainability indicator’. With their liberation of varying degrees from fossil fuels, each scenario intended in some way to promote greater security of supply, thus contributing towards economic sustainability in the long run.
5.4.2 Washing scenarios: sustainability evaluation

Of the washing scenarios, Aqua Adapt performed the best against the new economics sustainability evaluation receiving 29 points. The others lagged further behind with Efficiency-Sufficiency receiving 21 points and De-Waterise receiving 18. Aqua Adapt's highest ratings were for the 'ecological footprint', 'localisation', 'new systems of provision' and 'individual wellbeing' indicators and its water provision and regulatory concepts scored especially well against these. Efficiency-Sufficiency scored equally high for the 'ecological footprint' indicator owing to its combination of regulatory controls, greywater re-use, efficient devices and rewards that all promote reduced water usage. However, as with De-Waterise, it scored low for 'community building and collective action' and 'individual wellbeing'. This was because it was considered that quota systems and the new technologies of De-Waterise may be resisted by some members of the population and neither proposals contribute to community building. De-Waterise was considered to make the least contribution towards reduced ecological footprint as the development of its depicted new technologies could lead to more material input, cancelling out potential benefits. However De-Waterise did receive a high score for the 'economic sustainability' indicator given the variety of new markets created in the green economy and in the development of its many novel innovations.

Figure 5.11 Washing scenarios: sustainability evaluation index

Aqua Adapt
Localisation
New systems of provision
Ecological footprint
Community building
Individual wellbeing
Economic sustainability
TOTAL
29

Efficiency-Sufficiency
Localisation
New systems of provision
Ecological footprint
Community building
Individual wellbeing
Economic sustainability
TOTAL
21

De-Waterise
Localisation
New systems of provision
Ecological footprint
Community building
Individual wellbeing
Economic sustainability
TOTAL
18

| RATING | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
Table 5.8  Sample of qualitative sustainability evaluation framework: De-Waterise

<table>
<thead>
<tr>
<th>Scenario Cluster</th>
<th>DE-WATERISE</th>
<th>Localisation</th>
<th>New systems of provision</th>
<th>Ecological footprint</th>
<th>Community building &amp; collective action</th>
<th>Individual wellbeing</th>
<th>Economic sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provision:</strong> (Smart water grid with low water leakage and demand management features).</td>
<td>No impact (0).</td>
<td>Upgrade and modification of current systems of water provision (1).</td>
<td>More efficient, low loss, responsive water supply system (2). However some minor material and energy input will be required to conduct the infrastructure upgrade (-1)</td>
<td>No impact (0).</td>
<td>Smart water grid delivers lower levels of water to each home, however it also facilitates lower water costs for households and better management of water bills (1)</td>
<td>Growth in R&amp;D in smart water grid economy (1); lower leakage and responsive smart grid helps ensure security of supply enhancing economic stability (1).</td>
<td></td>
</tr>
<tr>
<td><strong>Regulation:</strong> (pay by usage, heavy taxes on water using appliances).</td>
<td>No impact (0).</td>
<td>No impact (0).</td>
<td>Volumetric charging encourages wise water use (1). Taxes on water using products encourage efficient low flow purchases (1).</td>
<td>No impact (0).</td>
<td>Metered water charges allow control over consumption (1). Taxes on heavy water using appliances restrict choice to a degree, however they also stimulate market alternatives such that no major impact on wellbeing occurs.</td>
<td>Slight impact on water devices market but ultimately driver of innovation (1).</td>
<td></td>
</tr>
<tr>
<td><strong>Hardware:</strong> (Body wash monitor; eco-friendly body spray; steam clean; re-vie-alarm).</td>
<td>Less reliance on central water system for washing duties.</td>
<td>Hardware proposals facilitate a shift away from reliance on centralised water provision for washing functions (1).</td>
<td>Wash monitor, nano steam shower, eco-spray and re-vie alarm all designed to contribute strongly to less water use (2). However resources consumed in manufacture of advanced products may mitigate against these potential benefits (-1).</td>
<td>No impact (0).</td>
<td>Hardware proposals contribute to effective washing functions (1); however dramatic reduction in water use may be viewed negatively (-1).</td>
<td>Potential new markets for hardware proposals (1).</td>
<td></td>
</tr>
<tr>
<td><strong>People:</strong> (open innovation initiatives and smart eco-cation courses)</td>
<td>No impact (0).</td>
<td>Open-innovation represents an alternative method of involving the public in the delivery of grassroots innovations (1).</td>
<td>Aimed at devising social and technological innovations to reduce footprints and promote education on sustainability (1).</td>
<td>Civic responsibility and collective action promoted in open innovation and eco- cation however these are more individualised than other scenario ‘people’ proposals (1).</td>
<td>Participation in open-innovation may improve psychological wellbeing through societal contribution (1).</td>
<td>Aims to promote green economy activities by the population (1).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INDICATOR RATING</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>1</th>
<th>3</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL:</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.4.2.1 Localisation and new systems of provision

Aqua Adapt received the highest scores for both ‘localisation’ and ‘new systems of provision’. For example, Aqua Adapt, scored five against the ‘new systems of provision’ indicator - mainly because its decentralised rainwater harvesting (at household and community levels) represents a large shift away from current centralised water mains provision. Furthermore, the ‘waterfall salon’ can be considered an alternative means of allocating and distributing water resources for washing. Coupled with the ‘water supply monitor’, reduced washing, and targeted bathing practices, these components also serve to promote greater self-sufficiency as they improve householder abilities to consume within local rainfall levels (accounting for the high ‘localisation’ rating). Efficiency-Sufficiency received four for the indicator ‘new systems of provision’ and two for ‘localisation’. With regard to new systems of provision, the ‘water quota’ system was considered a modification of existing forms of payment and governance, while the ‘green credits’ represent an alternative monetary system. The ‘green credit’ system and its associated ‘district water competitions’ together with the ‘wet room’ which allows for grey-water re-use at the household level, strengthened Efficiency-Sufficiency’s contribution to ‘localisation’. De-Waterise scored the lowest of all scenarios for its ‘localisation’ potential. However, its hardware solutions, along with the ‘smart water grid’ network, and the ‘open-innovation’ events contributed to a moderately higher score against ‘new systems of provision’. Open-innovation programmes were seen as an alternative method of involving the public in local governance, engaging them in the design and delivery of grassroots social and technological sustainability innovations.

5.4.2.2 Reduced ecological footprint

Aqua Adapt and Efficiency-Sufficiency were both considered to make high contributions towards reducing the ecological footprint associated with personal washing activities, each receiving seven for this indicator. For Aqua Adapt the notion of living within local rainfall limits is designed to reduce pressure on ecological systems, as are the practices of reduced and targeted bathing. Efficiency-Sufficiency’s quotas, ‘green credits’ and efficient devices are also strongly geared around remaining within ecological limits. While De-Waterise’s smart water grid and new hardware components intend to achieve dramatic reductions in water consumption, more caution was exercised with their ecological footprint rating compared with the other scenarios as it was considered that their high material inputs might reduce or cancel out efficiencies in water consumption.

5.4.2.3 Community building and collective action and individual wellbeing

‘Community building and collective action’ was one of the lowest scoring indicators across all washing scenarios. As with the heating scenarios, this was mainly due to the fact that the ‘regulation’ and ‘hardware’ clusters afforded little opportunity to contribute towards this community-oriented outcome. Nevertheless, of all the three washing scenarios, Aqua Adapt
yielded the most positive outcome for the ‘community building and collective action’ indicator, mainly owing to the collective systems of rainwater harvesting and community building opportunities at the Waterfall Salon. Efficiency-Sufficiency’s ‘green credits’ and ‘district water competitions’, and De-Waterise’s ‘open innovation’ initiatives were considered to make a strong contribution towards community spirit and thus these scenarios’ ‘people’ proposals were awarded a ‘two’ each. Ratings for ‘individual wellbeing’ were moderately higher, again with Aqua Adapt achieving the highest scoring. The ‘waterfall salon’ concept was deemed to make a positive contribution to individual wellbeing due to its socialising dimension. Also Aqua Adapt provides a range of solutions for successful low water bathing (e.g. ‘rainwater monitor’, targeted and reduced bathing, and ‘gel wash’) that were not considered to impinge majorly on personal enjoyment of washing activities. It was noted that the need for active engagement in the management and monitoring of rainwater levels may be a potential inconvenience. However alternative norms might mean that people take pleasure in these activities (Soper, 2008). Efficiency-Sufficiency and De-Waterise each scored three against the ‘individual wellbeing’ indicator. For De-Waterise, its ‘open innovation’ and ‘smart eco-cation’ courses were seen to moderately improve individual wellbeing, while it was supposed that its ‘smart water grid’ and hardware proposals would improve wellbeing by facilitating personal access to effective washing solutions. Nevertheless, its ‘individual wellbeing’ score remained low as it was noted that the dramatic reduction in water use may be viewed negatively by the public. With regard to Efficiency-Sufficiency, the ‘wet room’ and its efficient devices were not seen to impinge on personal comfort or hygiene and the ‘green credits’ and ‘district water competitions’ were seen to contribute to individual wellbeing too. It was considered that the imposition of water quotas and their associated thumb print activators may provoke initial resistance amongst the population.

5.4.2.4 Economic sustainability

De-Waterise scored the highest against the economic sustainability indicator. Regarding its ‘provision’ cluster, it was supposed that the ‘smart water grid’ would lead to lower leakage and smarter water usage that would help ensure security of supply, enhancing economic sustainability. Furthermore, opportunities for economic growth arising from R&D of new technologies were also identified and the ‘open innovation’ concept was seen to make a contribution towards public involvement in the sustainable economy agenda. For Efficiency-Sufficiency, the quota system was seen as a means of securing adequate quantities of water for the entire population providing certainty to economic sectors. Aqua Adapt was considered to help with economic sustainability through rainwater harvesting providing additional water supply and sustainable usage, along with growth in the rainwater harvesting economic sector.
The sustainability evaluation provided a useful tool for scanning the potential of the scenarios against a new economics framework for sustainable consumption. Across scenarios, the lowest scorings were for the ‘economic sustainability’, ‘individual wellbeing’ and ‘community building and collective action’ indicators. For ‘economic sustainability’, this was mainly due to the supposed economic disruption upon initial implementation of scenario proposals, especially those that related to new social and economic institutions or infrastructures of provision. However given that these proposals are ultimately configured around the reduction of dependency on fossil fuels and intensive water use, it was often considered that they may ultimately lead to enhanced security of supply and potential new jobs and markets. Although it is widely accepted that the shift to the green economy will bring about changes in the nature, location and security of jobs, it must be noted that there is disagreement as to whether this will involve overall job losses or direct switching to greener employment sectors (Davies and Mullin, 2011). These uncertainties contributed to difficulty in assessing the economic implications of the scenarios, particularly given the clear temporal distinctions in impacts varying across short, medium and long-term timescales.

The comparatively lower scores for ‘individual wellbeing’, and ‘community building’ across scenarios was in part a function of the application of the indicator set to the four selected clusters (of ‘people’, ‘hardware’, ‘regulation’ and ‘provision’) within each scenario. It was found that the ‘hardware’ and ‘regulation’ clusters rarely contributed to ‘community building’ or ‘individual wellbeing’ and thus these indicators were limited to receiving marks from the ‘people’ or ‘provision’ clusters. Additionally, it was challenging to evaluate the scenarios’ implications for wellbeing and health given the subjectivity and temporal nature of these concepts. Compared with indicators of ‘new systems of provision’ or ‘localisation’, their impacts were less clear-cut. This raises the question of the perspective against which a future scenario is judged to be socially desirable or personally enjoyable in the future (an issue also raised by Tight et al., 2011 in their study of future sustainable walking practices). For this sustainability evaluation exercise, the scenarios’ implications were assessed against present day values and preferences. However, it was borne in mind that the socio-technical innovations were predicated upon value changes and thus ideas that may seem unpalatable now, may be more acceptable and desirable in the future.

As with all assessment frameworks and evaluation tools, an important issue is the extent to which its results are a function of its design (Bras-Klapwijk and Knot, 2001). For example, scenarios that were predicated on high cultural change and localised provision were on a better footing as they served to meet the new economics ‘community wellbeing’, ‘localisation’ and ‘new systems of provision’ indicators. Had a ‘new technology’ indicator been included in the assessment framework, the high-tech scenarios may have scored better. It is certain that new economics represents a distinctive strategy and philosophy and some criticism has been
directed towards its ideals especially its prioritisation of devolved governance and provision and aversion towards technical fixes (Southerton *et al.*, 2004). Attempts were made to address its localism bias through the inclusion of the ‘economic sustainability’ indicator that looked at employment and sectoral impacts in the broader macro-economy to counteract a potential “small is good, big is bad” dichotomy in the sustainability evaluation. However this brought its own tensions. Some of the identified positive ‘economic sustainability’ impacts were the creation of new markets and jobs. If producing overall economic growth, these would be in direct opposition to new economics goals of steady, or no growth, founded upon the observed difficulty in decoupling economic growth from environmental degradation. While some backcasting studies have quantified the energy impacts of future sustainable lifestyle visions based mainly on the technologies they depict (for example Bras-Klapwijk, 2000; Svenfelt *et al.*, 2011), it was considered that an in-depth quantitative analysis would not add much value at this stage. This was because the scenarios are subject to evolve in future backcasting stages. A further complication is the difficulty in uncovering unintended consequences brought about through complex user-technology interactions involved in the new heating and washing practices. Evaluations against the ‘reduced ecological footprint’ indicator were therefore informed by comparable developments in the present day as reported in sustainable consumption literature. Ultimately, the sustainability evaluation activity was not envisaged as a technical tool for establishing precise sustainability impacts; rather it successfully provided space to further explore the scenarios’ relative merits and aid in the identification of the most promising features of the scenarios for future research phases (Doyle and Davies, Forthcoming).

5.5 Conclusion

This chapter has reflected on the methodological processes and resultant outputs arising from the foundational backcasting steps aimed at the co-generation and assessment of future scenarios for more sustainable space heating and personal washing practices in the year 2050. To conclude this chapter, critical reflection is provided on the benefits and limitations of the procedures employed and the output generated with reference to participant feedback. Participant feedback presented here is concerned with operational aspects of the Visioning Workshops while an in-depth analysis of the learning benefits for participants is provided in chapter eight.

The chapter began by outlining the key sustainability problems associated with current space heating and personal washing practices. This framing clearly had an important bearing on the resultant scenario concepts, as they provided the starting point from which solutions were to be developed. For example, the problem of low visibility in resource consumption and low

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61 This theme is revisited in the Conclusion Chapter where it is stated that for further advancing the intervention proposals developed at the final stage in the backcasting process, more in-depth, assessment tools would be useful to weigh the social, environmental and financial costs of different strategies.
social motivation to reduce energy and water usage can be seen to directly correlate with ideas for publicising the consumption levels that were proposed in both Visioning Workshops. However given that the problem framing was based on a comprehensive review of literature on sustainable consumption and social practices, it provided an accurate springboard for idea generation. Building on and modifying existing theory and empirical studies on backcasting and social practices, a framework was developed to deconstruct household consumption practices into distinct; ‘people’, ‘hardware’ and ‘organisation’ categories for use in the visioning brainstorms. This permitted focused idea development and represented the start of a schematic process of scenario development characterised by stages of ‘deconstruction and reconstruction’ that ultimately led to the reconstitution of individual ideas into holistic practices in the future scenarios.

While most feedback showed a very high regard for the liberating, collaborative and creative environment fostered by the Visioning Workshops (see Davies et al., 2012a and chapter eight of this thesis) some found the practice orientation too narrow. As an architect at the Washing Visioning Workshop stated: “perhaps [the] topic was not wide enough - rather than restricting to cleaning, water saving in general might have been considered”. This highlights the tension between maintaining a refined lens of study whilst paying heed to broader environmental issues and the potential for developing synergistic solutions with other consumption practices in the home. Participants at the workshop were not accustomed to taking practices as the unit of analysis as they normally operated in fields such as policy, engineering and planning where resource centric lenses dominate. Although some participants struggled with the practice focus initially, facilitators encouraged them to think of specific solutions to problems of personal heating and washing to avoid the creation of generalised ideas. At the same time, proposals showed an appreciation for broader issues and embodied systems thinking. This was evidenced in the range of ideas for water re-use between household practices, the waste to energy concepts in the heating workshop, and the inclusion of ‘organisation’ as a category for idea generation contributed to a more situated analysis. Another observed difficulty for participants was the confusion between interventions and future images or situations. This was especially the case with the ‘organisation’ concepts, which by their nature, involved regulatory ideas that could be seen as either interventions (building towards the scenarios) or as integral components of the future scenarios themselves. Other studies report similar findings (Vergragt, 2000; Tite and Gatersleben, 2003), suggesting that this confusion is inherent in visioning studies. However, effective facilitation and priming can clearly play a role in reducing this confusion. It is also the case that most regulatory proposals were based on the assumption that the use of water and energy would dominate in future heating / washing practices and thus these regulatory proposals would be more obsolete in the context of scenario solutions that remove the requirement for these resources in the delivery of washing or heating needs.
Despite these identified difficulties, the brainstorm structure was considered successful by the researcher due to its flexibility which allowed innovative thought and systems thinking while maintaining a practice focus. The volume and variety of concepts and clusters developed during the Visioning Workshops certainly confirms previously published findings (for example (Robinson et al., 2011; Svenfelt et al., 2011) which report on the fruitfulness and innovativeness of visioning processes. A relatively even spread of concepts across ‘people’, ‘organisation’, and ‘hardware’ categories was achieved at the Washing Visioning Workshop while ‘hardware’ concepts predominated in the Heating Visioning Workshop. The skewed distribution towards ‘hardware’ ideas in the heating research is mainly due to the quantity of novel energy sources proposed and is perhaps reflective of the predominance of technology solutions within energy policy debates and discourse. This resonates with the work of Schumacher (1973: 51) who is cautious of the overly zealous search for technological breakthroughs in the environmental arena, stating that “it takes a certain flair of real insight to make things simple again”, which indeed was found to be the case with conjuring de-materialised proposals in the Visioning Workshops. Research and development within the “green-tech” sector has to date been focused on renewable energy solutions while water has received less attention. This provided more of a blank slate for washing participants to work from. In addition, by its nature, water requires less modification through technologically assisted processes before use and is still recognisable in its physical state. By contrast, although energy is implicated in the delivery of the end results of heating, it requires transformation and thus technological manipulation was more inherent in the Heating Visioning Workshops. The spread of concepts may also be related to the profile of participants at the workshops and their modes of thinking about sustainable consumption problems which perhaps tended towards ‘hardware’ rather than ‘software’ professional orientations.

The output from the Visioning Workshops provided ample material for the Scenario Elaboration phase. It could be said that as stand-alone concepts, some of the proposals did indeed conform to present day strategies (for example, home insulation or eco-school concepts), however their full value emerged upon integration of concepts into complete scenarios. A schematic process of scenario development was developed to maintain integrity and continuity in scenario generation. By comparison with ‘scenario crosses’ methods, the process represented a more organic, responsive and iterative method of scenario elaboration. Each scenario provided an impression of the kinds of ‘people’, ‘hardware’, and ‘organisation’ contexts that collectively create a unique form of washing or heating practice in the year 2050 and demonstrated a clear evolution in the underlying motivations, skills and stuff shaping these practices.

The online survey served its primary purpose, which was to promote ownership and transparency in the scenario development process. Useful recommendations were made for

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62 Although there were some issues with legibility of post-it notes and transferring of ideas to post-its during the visioning brainstorms, a sufficiently accurate representation of workshop data was recorded,
modifying and improving the sustainability of existing concepts through the online survey which was taken into account in the final scenario narratives. Following the new economics sustainability evaluation, it was found that those scenarios involving more cultural change (i.e. Aqua Adapt and Community Core) scored the highest, receiving ratings of 29 and 28 respectively. Their high scorings are due mainly to their performance against ‘ecological footprint’, ‘localisation’, and ‘new systems of provision’ indicators. By contrast, Second Skin and De-Waterise, the most technologically oriented of the heating and washing scenarios, each scored the lowest against the new economics evaluation framework. Their conservative ratings arise from the potential rebound effects of pursuing technological strategies and because they did not advance the ‘community building’ or ‘individual wellbeing’ indicators as much as the other scenarios.

It is important to note that the ultimate scenarios produced from any visioning exercise are strongly influenced by the strategy of scenario development employed and its associated forms of clustering and dimension identification (Tite and Gatersleben, 2003). This means that if another strategy had been utilised, the same data may have yielded different final scenarios and likewise regarding the influence of the profile of attendees on the final output. These key issues will be further explored in the thesis conclusions chapter, discussing potential alternative design options for future visioning workshops based on the experience of this research. The social practice oriented scenario development outlined in this chapter whilst not without its conceptual challenges, provides a novel approach compared with other backcasting studies that have tended to adopt supply-side, sectoral or area-based focuses. Although the deconstruction-reconstruction processes it involved did increase the complexity of analysis, the final suite of scenarios highlighted a range of innovative, integrated ways of approaching and intervening for sustainable water and energy consumption (Doyle and Davies, forthcoming). Recognising the centrality of citizen-consumers as carriers, adapters and innovators in daily practices (Shove, 2003; Jégou et al., 2009), their involvement was vital to the backcasting research. The next chapter reports on feedback from citizen-consumers on the scenarios from a series of public workshops in different locations around Ireland.
CHAPTER SIX:
CITIZEN-CONSUMER PHASE
6.1 Introduction

This chapter explores citizen-consumer views on the future heating and washing scenarios as revealed through six focus groups around Ireland. These engaged a total of 58 people from a spectrum of green, mainstream and dynamic environmental lifestyles groups. As outlined in the methodology chapter, engaging citizen-consumers in the backcasting process was necessary for a variety of practical, procedural and theoretical reasons. Obtaining user input is vital for practice oriented design which emphasises the need to consider the relations between material elements of a practice, cultural conventions and emotional and practical motivations (Shove et al., 2008b). On a basic level, the focus groups served two primary functions: 1) to establish citizen-consumer positive and negative evaluations of the future washing and heating scenarios and their constituent components, and 2) to explore any recommended scenario modifications. Citizen-consumer evaluations were probed through explicit questioning in the focus groups as to which scenario elements they found ‘appealing and unappealing’ and their reasoning behind this. These discussions teased out barriers and enablers to adoption of the future practices and participants often suggested modifications to the scenario concepts to make them more personally appealing, acceptable and effective.

Aside from qualitative data, a quantitative representation of citizen-consumer preferences was also attained through the results of a voting activity at the conclusion of each focus group. For this activity participants were asked to assign ten green and ten red votes to their most and least preferred concepts across the three scenarios. They also assigned one ‘star’ to the scenario they would most like to inhabit. A visual overview of these voting patterns will be presented in the next section (Sections 6.2), accompanied by a short explanatory text. This is intended to provide a rough indication of citizen-consumer evaluations of the scenarios and their individual components. Although this quantitative data appears to show a clear-cut picture of citizen-consumer perspectives, it is important to note that these figures obscure the divided opinion which was revealed in focus group discussions. For example, a number of scenario components yielded intense discussion in the focus groups yet were relatively overlooked in voting patterns, while others that remained underexplored in discussions gained more attention in the voting session. Furthermore, some concepts received only green or red votes, while the qualitative analysis showed that opinions on concepts were less clear-cut.

The bulk of the chapter therefore focuses on richer findings, drawing out the reasons and motivations for citizen-consumer preferences and responses. It was found that the future scenarios proved to be an effective way of probing conceptions of and openness to modifications in daily practices and to tap into citizen-consumers’ deeply held beliefs, fears, desires and aspirations for sustainable living in the future. Much of this debate revolved around wider issues of the division of responsibility between individuals, communities, technologies and institutions in the achievement of more sustainable consumption practices.
Through in-depth, thematic analysis of qualitative data, four recurrent themes were identified within debate from both the heating and washing focus groups:

1. The role and implications of technological advancement
2. Narratives of nature, health and wellbeing
3. Regulatory versus non-interventionist strategies
4. Personal and collective responsibility and space

The bulk of this chapter is therefore devoted to analysis of these common themes, integrating data from the washing and heating focus groups. The emergence of patterns of meaning in this way arises from the flexibility of the focus group format, recognised as a fundamental advantage over more structured research methods such as opinion polls (Krueger, 1994). Drawing upon work by Waterton and Wynne (1999) on the importance of relational dynamics in focus groups, intact extracts from the focus groups are used to illustrate the breadth of opinion and the role of interaction in the formation of stances, values and attitudes towards the scenarios. Where relevant, voting patterns and differences in feedback from Green, Mainstream and Dynamic groups will be highlighted. The chapter concludes by discussing common patterns of thought and inter group dynamics in how the participants negotiated and assessed the future scenarios. Also discussed is their perceptions on the capacity for change in consumption practices across space and time.

6.2 Citizen-consumer voting patterns

6.2.1 Washing scenarios

The Aqua Adapt scenario emerged as the strong favourite in citizen-consumer voting exercises. Apart from one ‘star’ assigned to Efficiency-Sufficiency, every participant across the Green, Mainstream and Dynamic focus groups gave their ultimate ‘star’ rating to Aqua Adapt, indicating that this was the most popular scenario. As can be seen in the Figure 6.1, Efficiency Sufficiency follows Aqua Adapt in terms of quantity of green votes - although it received an almost equal number of red votes, indicative of divided sentiment. De-Waterise received the least attention from citizen-consumers in the voting exercise and as Figure 6.1 shows, red votes prevailed for this scenario. To give a clearer conception of the spread of votes within each scenario, Figures 6.2 - 6.4 provide a visual representation of the quantity of red and green votes according to scenario concept combining votes across Green, Mainstream and Dynamic focus groups.
As Figure 6.2 shows, the majority of Aqua Adapt green votes were assigned to the ‘rainwater harvesting’ concept. Rainwater harvesting received the highest number of green votes of all concepts across the washing scenarios and as the thematic discussion will reveal, participants showed immediate enthusiasm for what they framed as the “naturalness” of Aqua Adapt. Despite mainly positive sentiment towards Aqua Adapt, there was divided opinion on the ‘waterfall salon’ and while the Dynamic group were the most positively disposed towards this concept, the Green group in particular showed more opposition for reasons of privacy and intrusion. Aqua Adapt concepts for ‘gel wash’ and ‘targeted bathing’ provoked less discussion and most negative sentiment arose over scepticism regarding their cleaning effectiveness.

After Aqua Adapt, Efficiency-Sufficiency received the most attention in the voting exercise, with a strikingly even split exhibited between green and red votes. As illustrated in Figure 6.3, the most popular Efficiency-Sufficiency concept was the ‘wet room’, particularly in the Mainstream group who formed the most positive evaluations of this scenario. Indeed the elements of Efficiency-Sufficiency that were most appealing appeared to be those that were based on improving the efficiency of existing, familiar infrastructure systems and devices involved in washing practices. While there was tension over the water quota, it was the ‘thumb print’ system that yielded the most negative sentiment and red votes, especially from the Green group who were opposed from a principles and human rights perspective. De-Waterise achieved the lowest number of green votes with greater weighting towards red votes for this scenario. The drastic water reductions implied in De-Waterise proved controversial from a
political and rights-based standpoint and also due to concerns over the depicted washing substitutes to achieve effective cleaning whilst being pleasurable at the same time. Although the novel washing practices and devices were challenging for citizen-consumers, qualitative analysis reveals that they were rarely entirely rejected and often produced considerable curiosity. De-waterise’s ‘smart water grid’ was evaluated very positively, especially by the Green group and both positive and negative assessments were made within citizen-consumer focus groups on the ‘revite-alarm’ and ‘wash monitor’ concepts as revealed in Figure 6.4.
Figure 6.2  Aqua Adapt: voting patterns

Aqua Adapt concepts: star allocation red and green votes

- **STARS**
- Rainwater harvesting
- Water supply monitor
- Short timed shower
- Waterfall Salon
- Education & comms
- Set quantity of drinking water
- Gel wash
- Targeted bathing

<table>
<thead>
<tr>
<th></th>
<th>Green</th>
<th>Red</th>
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<tbody>
<tr>
<td>STARS</td>
<td>!</td>
<td>🍃</td>
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<tr>
<td>Rainwater harvesting</td>
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<td>Water supply monitor</td>
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<td>Short timed shower</td>
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<td>Waterfall Salon</td>
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<td>Education &amp; comms</td>
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<tr>
<td>Set quantity of drinking water</td>
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<td>Gel wash</td>
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<tr>
<td>Targeted bathing</td>
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AQUA ADAPT

- **Rainwater harvesting** (individual / communal) is only source for ALL washing needs.
- **Set quantity of water from mains** = drinking / cooking use only
- **Water Supply Monitor** Shows current & predicted water levels diagnosing appropriate washing behaviour

- **Low water availability** 5%
- **Medium water availability** 50%
- **Reduced washing overall.** Gel wash can be used which is activated with minimum amounts of water.

- "Waterfall Salons" = part of trend for sharing water. Serve socialising, washing and therapy functions. Also serve as demonstration centres for sustainable living.

- **Short, timed shower**
- **Targeted bathing** (such as bidet)
- **Government regulation of advertising on beauty and hygiene**
- **Education and communication campaigns** for low water consumption
Figure 6.3  Efficiency-Sufficiency: voting patterns

Efficiency-Sufficiency concepts: star allocation, red and green votes

- **STARS**
- Wet Room
- Design standards
- Steam shower
- District water competitions
- Green credits
- Fines and restrictions
- Publicising water consumption levels
- Quotas
- Thumb print

<table>
<thead>
<tr>
<th>Number of votes</th>
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<th>Red</th>
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<tbody>
<tr>
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</table>

**Efficiency - Sufficiency**

- **Wet Room**
  - All water using appliances in one room with direct piping between them to allow for cycling of water

- **District Water Competitions**
  - Win ‘green makeover’ for area.

- **Fines & Restrictions if quota is exceeded**

- **Design standards** promote efficient, low flow water faucets

- **Green credits** awarded to individuals who stay under quota, used for eco-products & services

- **Thumb print / retina activated to monitor water quota use**

- **Combination steam shower** Reduces overall water use

- **Water quotas** Limited water quotas per person for water from public mains. Quota trackers allow personal tracking of usage.
Figure 6.4  De-Waterise: voting patterns

De-Waterise concepts: star allocation, red and green votes

<table>
<thead>
<tr>
<th>Concept</th>
<th>Green</th>
<th>Red</th>
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</thead>
<tbody>
<tr>
<td>★ STARS</td>
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<td></td>
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<tr>
<td>Revite-alarm</td>
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<tr>
<td>Smart water grid</td>
<td></td>
<td></td>
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<tr>
<td>Wash monitor</td>
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<tr>
<td>Open innovation</td>
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<tr>
<td>Pay by use</td>
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<tr>
<td>Deodorising clothes</td>
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<tr>
<td>Steam clean</td>
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<td></td>
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<tr>
<td>Body spray</td>
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</tr>
</tbody>
</table>

Number of votes

- Green
- Red

De-Waterise

- Revite-Alarm: Light & sensory pulses induce wakefulness reducing need to shower in mornings.
- Smart water grid: Low water loss, variable rates, measures usage and manages demand.
- Wash-monitor: On-body device monitors dirt / odour levels & diagnoses when a person needs to clean & which technology to use.
- Eco-friendly body spray for perfume purposes.
- Open innovation: For green social, economic, and policy innovations.
- Deodorising / bacteria eating clothing.

Nano steam clean for deep cleansing.
6.2.2 Heating scenarios

Simply tallying the stars assigned to the scenarios, Carbon Control and Second Skin emerged as the most popular heating scenarios receiving ten stars each. Community Core was assigned only two. There was a division in preferences between different focus groups where Dynamic and Green groups were more disposed towards the Second Skin scenario, whilst many of the votes for Carbon Control can be attributed to the Mainstream group. Carbon Control was the subject of the most lively debate in focus groups, reflected in its equal number of both red and green votes. It emerged that the scenario was strongly favoured for its techno-efficiency fixes and less for its regulatory dynamic. As Figure 6.5 shows, Community Core and Second Skin received similar quantities of green votes, however the supposed “communal” elements of Community Core were strongly questioned and this scenario ultimately received only two stars and the highest number of red votes across heating scenarios. By contrast, many citizen-consumers found Second Skin’s ‘personal heat vest’ and home ‘second skin’ concepts appealing owing to the dominance of green votes for this scenario.

Figure 6.5 Heating scenarios: voting overview

Within Community Core, the ‘biological core’ was the most popular concept and aside from minor concerns over smell, it was considered “useful” and “made sense” given its closed-loop qualities. ‘Insulating paint’ was attractive as an instant insulation fix and while internal modularisation yielded divided discussion in focus groups, it was ultimately rated positively in the voting exercise. Cosy and durable clothing were in the main popular however, as the following discussions will reveal there was some resistance due to potential negative implications for comfort and individuality in fashion. Of all the educational concepts, ‘green works’ was the most popular for its practical, sociable and voluntary orientation. ‘Shared facilities’ was unpopular across all focus groups and received the most number of negative
votes of any heating scenario concept at 18. 'Communal recreational space' followed close behind at 15. Many of these negative evaluations are attributed to the Dynamic and Mainstream heating groups who strongly valued privacy and ownership.

Within Carbon Control, the 'energy management system' and 'home floor plan' were the highest ranked concepts of all the heating scenarios. Closely behind these came 'renewable energy for all' and the 'smart super-grid'. These were seen as technologies of efficiency rather than control and were not considered to impinge or challenge home heating practices as they are known today. By contrast, the 'carbon quota' received more negative votes as did the associated 'energy crash course' for its punitive qualities. On principle however it was felt that some form of personal carbon restrictions may be necessary in future contexts. Second Skin was considered intriguing and attractive, and its fundamental feature – the 'home second skin' was accepted by the majority of participants across groups. In addition, the 'personal heat vest' was rated highly, receiving more votes than 'cosy clothing' within the Community Core scenario perhaps for its qualities that allow it to be worn underneath existing clothing. The least popular within Second Skin was the 'spot heating' concept due to health concerns.
Figure 6.6 Carbon Control: voting patterns

Carbon Control concepts: number of green & red votes

<table>
<thead>
<tr>
<th>Starred Item</th>
<th>Votes</th>
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<tbody>
<tr>
<td>STARS</td>
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<tr>
<td>Energy management system</td>
<td></td>
</tr>
<tr>
<td>Home floor plan</td>
<td></td>
</tr>
<tr>
<td>Renewable power for all</td>
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<tr>
<td>Smart supergrid</td>
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<tr>
<td>Carbon quota</td>
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<tr>
<td>Green credits and awards</td>
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<tr>
<td>Carbon Card</td>
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<tr>
<td>District energy display</td>
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<tr>
<td>Energy crash course</td>
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</table>

Number of Green Votes: 10
Number of Red Votes: 5

Carbon Control

- Renewable energy generation for every home. Excess energy is sent to densely populated areas that can’t generate their own renewable power.
- Smart super-grid integrates multiple supply sources: home renewable power, community-owned renewable energy farms, and central energy power.
- Energy Management System (EMS) (online & home display screen): Estimates levels of renewable supply in coming days (due to natural fluctuations).
- Carbon quota display: Allows tracking of personal carbon quota.
- Carbon Card: Swipe to use / buy carbon intensive products (e.g. heating) and services.
- Details of district energy use publicised (e.g. online carbon quota league).
- Community green credits & awards for districts with low energy consumption.
- Home floor-plan: Shows where heating/energy using appliances are on - allowing remote control.
- Compulsory attendance at energy crash course if quota is exceeded, followed by disconnection from grid.
Figure 6.7  Second Skin: voting patterns

Second Skin concepts: number of green & red votes

<table>
<thead>
<tr>
<th></th>
<th>Green Votes</th>
<th>Red Votes</th>
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<tbody>
<tr>
<td>STARS</td>
<td></td>
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</tr>
<tr>
<td>Personal second skin</td>
<td></td>
<td></td>
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<tr>
<td>Home second skin</td>
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<td></td>
</tr>
<tr>
<td>Kinetic tiles</td>
<td></td>
<td></td>
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<tr>
<td>Spot heating</td>
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<tr>
<td>Smart eco-cation</td>
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<td>Smart technology</td>
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Number

Second Skin
Clear membrane made of recycled materials covering entire home creating micro-climate - can be retrofit to existing homes or built into fabric of new homes
Has photovoltaic cells for solar energy generation.

Smart Eco-cation
Emphasis on green tech in education. Professionals required to attend basic eco-cation courses every 5 years to update on best practice.
Open innovation events widespread.

Smart technology
'Spot Heating' and 'personal second skin' activate at certain body/ambient temperature.

Kinetic tiles
Generate energy for electricity.

Personal Heat Vest
Lightweight, comfy vest powered by kinetic energy generated during daily activities.

Combination of solutions, means that conventional space heating no longer exists.
Figure 6.8  Community Core: voting patterns

Community Core concepts: number of green & red votes

- STARS
- Biological core
- Insulating paint
- Internal modularisation
- Cosy / durable clothing
- Green-works
- Regulation of space
- Shared facilities
- Communal recreational spaces
- Eco-points

Number  Green votes  Red votes

Community Core

- Limit on floor space
- Internal modularisation: Households easily add/adjust room size to maximise efficiency of space heating.
- Communal recreational spaces: Compensate for smaller house size & reduces overall energy consumption.
- District based biological core plants for homes that cannot be retrofit with individual biological cores.
- Biological core: Fed by households with waste/algae/organisms, produces biogas to power heating.
- Comfortable clothing: Cosy & durable clothes - popular in cold weather (inside home and at work).
- Shared facilities: e.g. shared appliances in basement. Low VAT for group purchasing.

Green-works: Voluntary eco-responsibility courses on DIY, GY, upcycling and core maintenance.
Participants awarded personal eco-points for purchase of eco-friendly products/services.

Super-insulation in the main living area of the home (using insulating paint).
6.3 Thematic analysis

6.3.1 The role and implications of technological advancement

The ‘hardware’ concepts within the scenarios varied greatly in terms of their function, design, user interaction and embodied values. It is therefore unsurprising that a spectrum of responses was elicited. In general, citizen-consumers seemed to consider those concepts that were based on efficiency improvements to existing technologies as attractive and acceptable. By contrast, the more novel and unproven concepts (such as the ‘wash monitor’ and ‘carbon card’), especially those that were linked to tighter regulation, or challenged current expectations of home warmth, comfort and cleanliness were viewed more warily. Amongst the heating scenario concepts, the ‘energy management system’, ‘home floor plan’, and ‘smart super-grid’ of the Carbon Control scenario yielded undisputed positive responses. Likewise, washing concepts such as the ‘smart water grid’, and the ‘water supply monitor’ were equally appealing. In the extract below, the efficiency improvements contained within Carbon Control are outlined as being immediately appealing by one citizen-consumer from the Mainstream group:

“Well I’ll tell you the things I liked about it [Carbon Control] really, was the technical side, which is the EMS idea of energy management systems, but the other thing, I think there’d probably be county-wide energy management systems at that point, yeah, and I like the idea of the apps, which are actually here already, I could actually ring home and switch on my heater if I want, now and not in the future, so I like that. The other things I hate are quotas and Big Brother” (Kevin, Mainstream, heating).

Here, Kevin considers the “technical side” of Carbon Control as pragmatic, inevitable and easily comparable to current smart meters and emerging iPhone apps. A pattern of response emerged where Carbon Control was highly valued for its familiar and “realistic” technological advancements whereas the regulatory concepts were less favoured. This is encapsulated by Kevin’s ‘knee-jerk’ negative reaction to the scenario’s carbon quota system illustrated by his Big Brother reference - a vocabulary commonly used by citizen-consumers around the Carbon Control and Efficiency-Sufficiency scenarios. Tension is revealed within this quote; despite the clear regulatory advancements and changes in power relations that would be required to accompany “country-wide energy management systems”, the implementation of upgrades in systems of provision is considered in an unpolticised light by comparison to the explicit regulatory instruments within Carbon Control. A disposition towards techno-efficiency by citizen-consumers shows consistency with dominant policy orthodoxy based on the overlay of green technologies requiring little meaningful change at the individual level, let alone an encouragement of broader cultural and individual value shifts (Markowitz and Bowerman, 2001). The exchange below shows initial responses from the Green group to the Carbon Control scenario, encapsulating this sentiment:
Shell: The floor heating plan I thought was a brilliant idea, you know as soon as you said it I just I was like

Andrea: so convenient

Shell: you know it’s something that could even be introduced now, it’s just on and off like.

Andrea: you can get those remote control things for switching your sockets on and off so it’s kind of an extension of that really, it’s easy to use and it’s, it’s not going to cause you any hassle I think

Shell: I think it’s something so, so easily added on

Claudia: this whole management system is already used in Sweden and Norway so the idea, they just open, is a box, so they get the consumption of water electricity and everything, heating at home, so I think something very, very realistic and very useful, because a friend of mine has a perfect control of her consumption at home and she can control it only by opening it and see all her consumption before and she can graduate it and everything. So that’s fantastic idea.

Andrea: that and the app would go well together wouldn’t it?

Green, heating

The above discussion demonstrates the tendency for citizen-consumers to assess the scenarios according to their likelihood or level of realism, with a preference for those that were an “extension” of existing reality. Similar findings are reported in Bode (2000: 33) on public focus groups for the SusHouse project where it was found that the “perceived unlikely changes were rated more negatively”. Positive responses were formed for concepts that were “easily added on” to current practices and based on incremental rather than radical innovation - a common finding in studies on the social shaping of technology (e.g. Shipworth, 2005) and on innovation diffusion (Rogers, 1995). Another reason for the appeal of efficiency improvements was the fewer challenges they make on existing washing and heating routines and norms. This preference for technical instruments over behavioural change is also reported in qualitative research by Poortinga et al., (2002) on household preferences for energy saving measures. In assessing the scenarios, a key observation was that citizen-consumers frequently drew upon anecdotal evidence or personal experiences with similar systems, practices or devices. This can be seen in the reference to energy management in Norway and Sweden in the previous extract and other comparisons were made between current light-based alarms and De-Waterise’s ‘revite-alarm’ and between existing thermal sports clothing and the ‘personal heat vest’ concept. The existence of points of comparison and the relay of anecdotes enabled participants to imagine the scenario proposals more vividly and made a large contribution to opinion forming, confirming the importance of peer assessments in shaping personal evaluations. This propensity to use easily accessible associations as cues upon which to make decisions and form judgments is long reported within psychology research and is known as the ‘availability heuristic’ (Tversky and Kahneman, 1982).
Along with a positive disposition towards realistic and familiar technologies, strong support was shown both in voting patterns and qualitative analysis for solutions that minimised wastage of energy and water resources. This was particularly the case in the Washing focus groups where participants made reference to the tangible and visible nature of water wastage especially in current practices of teeth cleaning and hair washing. The ‘steam clean’ device depicted in De-Waterise and Efficiency-Sufficiency’s ‘low flow showers’ and ‘wet room’ concepts therefore generated an instinctively positive reaction all around. The following selection of citizen-consumer quotes reveals this sentiment, and the strong desire to avoid wastefulness:

*Imagine the amount of water that we use when we’re just brushing our teeth when we really don’t need it.* (Patricia, Mainstream – in relation to ‘wet room’ concept)

*An awful lot just goes into the ground that we could be using instead...especially for things that it doesn’t really need to be treated.* (Andy, Green – in relation to ‘wet room’ concept)

*There’s a lot of unnecessary water used whenever you shower and I think the steam clean would probably be just fine you know.* (Aidan, Dynamic – in relation to ‘steam clean’ concept)

Such sentiment echoes work by Evans and Abrahamse (2009) who, through their qualitative fieldwork with people living ‘green’ lifestyles found that the aversion towards wastage of money and resources played a key role in dictating consumption behaviour. Lavelle et al. (2012b) report similar findings based on an all-Ireland survey where 80% of all respondents surveyed (n=1,198) stated that there was “a need to save water”. Appeals to frugality therefore sit comfortably with environmental agendas, an important finding to be exploited in strategies for the promotion of sustainable consumption practices. It must be noted however, that the high stated “need to save water” reported in Lavelle et al. (2012b) was not yet being translated into action63, illustrating the long reported mismatch between stated environmental values and intentions and personal action (Davies, 2002). The ‘smart water grid’ also appealed to thriftiness, particularly amongst Green citizen-consumers whose knowledge of existing smart energy systems facilitated their ability to recognise the potential of similar systems for water. Importantly, the ‘smart water grid’ was seen as a means to enhance the efficiency of washing practices without detracting from the washing experience – unlike concepts for the ‘steam clean’ and ‘waterfall salon’. Likewise, the ‘energy management system’ was seen as “mak[ing] more efficient use of whatever’s there” as opposed to curtailing access to resources or challenging the liberty to consume at will. This thinking is evident in the below extract regarding rainwater harvesting systems. Here it was noted that people would immediately “think it’s a great idea” given that it involves harnessing the already existent rain (“something that we have”) and using it less wastefully:

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63 Nearly two thirds of respondents stated that they had ‘not reduced their water use in the past month for environmental reasons’.
Helen: I think the whole rainwater thing, all that whole cycle there is very, very good

Patricia: it’s something that we have. You know, we have the rain

Noleen: we have

Helen: I think the fact that so much water is wasted, I think people would see that immediately, you know it’s not something you’d have to educate people about, they’d think it’s a great idea.

Group: [Agreement]

Helen: I think you wouldn’t need too much education to show that.

Joan: No, I think people are moving towards that

Helen: I love that idea, it’s really good.

Mainstream, washing

Across focus groups, citizen-consumers reasoned that common sense would dictate a positive response towards rainwater harvesting thus negating the need for the major educational drive that they often felt was necessary to accompany other scenario concepts. Another characteristic of the scenario technologies valued by citizen-consumers was their ability to enhance convenience – mainly through the delivery of personal time-savings. This is evidenced especially in discussions around the ‘wash monitor’ within the Dynamic group who found the concept most appealing for parents with large families, attempting to balance work and family responsibilities:

Lyla: I thought it was quite a good idea, letting you know, just how dirty you were, and if you needed a good scrub or not, so I thought that was quite…

Isobel: I suppose that would come in handy if you did have a lot of kids…and you could just go, come on and let me check your watch to see if you need a wash tonight

Group: [Laughter]

Karen: I think as well if you got your wash monitor, it’s gonna save you a lot of time each day if you’re not getting up and showering, washing your hair, drying your hair, and all the rest of it, you’re saving an hour a day, which would be useful

Dynamic, washing

This extract reveals that while washing rituals can be considered therapeutic and restorative at times, when pitched against modern family time pressures, these activities can be transformed into another daily chore, for which a “handy” time-saving device would be welcome. Additionally, an individual’s life-stage and physical condition was recognised as an important influencing factor for the adoption of many of the new washing and heating scenario
practices. De-Waterise and its waterless solutions were seen as potentially convenient for the elderly or those with physical impairments who have difficulty washing:

“Well, you know by 2050, I’ll be a very old woman, and I mightn’t be able to get in and out of the shower as easy as I can at the minute, so you know, a wee steam clean and you know, not having to change your clothes so often…could be handy” (Isobel, Dynamic washing).

Along with the capacity for ‘steam clean’ and ‘deodorising clothes’ to enhance convenience, Isobel hints at the potential caring, social functions that such technologies may advance. The ‘revite-alarm’ was also valued for its nurturing qualities revealed especially by one participant stating that it would “wake you up when you’re ready, kind of like a mammy”\(^{64}\). Due to these positive qualities, another Dynamic participant reasoned that the idea was “good more in terms of wellbeing rather than water”\(^{65}\). For many, the ‘revite-alarm’ was therefore considered a positive development for enhancing personal wellbeing, irrespective of its added benefits of reducing the need to shower to wake up. As with all of the scenario concepts, the ‘revite-alarm’ was seen to evoke particular ideas, values and feelings otherwise known as conceptual frames (Crompton, 2010). Although relating to work on political visions, it is interesting to reference literature by Lakoff\(^{2}\) who outlines two contrasting conceptual metaphors of “nurturing parent” and “strict father”. It could be said that certain scenario strategies (such as the ‘revite-alarm’) invoked the “nurturing parent” frame that emphasises the role of policy intervention in advancing health, wellbeing and justice. This contrasts frames embodied in other scenario strategies (such as the ‘carbon quota’ and ‘energy crash course’) which participants seemed to associate with “strict father” metaphors based on exercising authority and control, establishing moral order, and punishing dissent. This reveals the importance of the imagery and language used within scenario ‘stories’ and emergent participant vocabulary, given the power that this had to activate different frames.

Just as Nisbet et al., (2003) note the “sticky” nature of science and technology frames in media, the initial reactions of participants and the language they employed, often invoking Orwellian references, influenced ensuing perceptions of the scenarios. Discussion around the newer or more novel devices swung between polarities of excitement, arising from the potential liberation and efficiency improvements that could be achieved, to dread and wariness around extension of technological control into personal practices and the potential risks and uncertainties associated with this. The below Dynamic group extract shows these contrasting positions in relation to the ‘personal second skin’. The interactions also reveal the tensions and difficulties encountered by citizen-consumers in discussing hypothetical eventualities and their struggles to situate and make sense of the scenario proposals:

\(^{64}\) Karen, Dynamic, washing - Note: In this chapter where the participant name is not mentioned in the body of the text, quotes are referenced using footnotes to ensure transparency and to show which focus group they were from.

\(^{65}\) Linda, Dynamic, washing
David: I really liked the personal heat skin idea, and I just think it's a great idea you know, using the energy you're generating every day and to heat yourself and cool yourself so I just think it's a fantastic idea, I think we're moving towards it already with stuff like dry form t-shirts and all that, I just think it's fantastic.

Stephen: the clothes thing just harks back to the first scenario again, and I really like it because it's so, so simple, and cheap relatively speaking not very technologically out there. That people can just regulate their temperature by smart clothing it just makes so much sense and you just get the impression, I get the impression that so many decisions that people make around home heating are just based on – I'm freezing, and you hear people say it all the time so willy nilly, you know I'm really cold, and it's like it isn't cold, just put on a jumper and it just solves instantly so it just seems like it's such a kind of a quick win that, I just can't believe it's not pushed more…

Deirdre: actually I hated, I meant to say I hated that idea.

Paul: so did I yeah

Stephen: the heat vest?

Deirdre: yeah, the heat vest, the personal heat vest…l, I completely agree that put on a jumper, regulate your own body heat if you can, but this idea of, and maybe it's just the way its described, but this idea of this hot water bottle, or whatever, like an electric blanket on you like

Stephen: but it's like going climbing, with, you decide whether or not to put on a thermal, you know

Deirdre: well no that is a good idea, but I'm saying this idea of you know it's something that's powered and it's a battery that turns on, and it's on you like, just -

Conor: well you know you have this body armour stuff now, it's something, I would have thought it's something

Stephen: something that you wouldn't even notice it

Conor: yeah, there'd be lots of different ways of wearing it, or whatever styles

Stephen: it's not like I'm heating up now, it just, it just gives you the same temperature all day

Deirdre: that's what it sounds like to me it's that you know, you start to heat up because this thing's turned on you!

Dynamic, heating

Stephen and Conor relating to known 'body armour' and 'thermal vests' highlight the capacity for the 'heat vest' to raise bodily consciousness and avoid "willy nilly" [impulsive] decisions to turn on the central heating. It is conceived of as a simple, obvious solution, such that Stephen "can't believe it's not pushed more". Indeed, the concept received twelve green and only three red votes in the final ranking exercise. Those who were positively disposed towards this concept, tended to exhibit hope and excitement in the future potential of science and technology innovation: "I mean, just looking at this scenario [Second Skin] I'm just thinking of
all the possibilities of kinetic energy. Others however were more distrustful and resistant, as indicated by Deirdre’s response to the ‘personal heat vest’ that shows wariness towards direct body-technology contact and a preference for the delivery of warmth through ambient temperature. Contrasting viewpoints amongst citizen-consumers towards the novel scenario technologies can be better understood by relating to work by Weaver et al. (2009) who identify four key frames used in popular media of science and technology (in particular nanotechnology). These are: 1) progress, 2) regulation, 3) conflict and 4) generic risk. While some people viewed the scenario concepts through the progress lens, which marries technical innovation and scientific discovery with social progress, others were more reserved. For some, potentially risky outcomes were emphasised especially around such concepts as the ‘carbon quota scanner’, ‘revite-alarm’ and ‘wash monitor’. It was often felt that such advancements may open a “Pandora’s Box” with uncertain personal, social and moral implications. A line, albeit a blurry one, was therefore found to exist between technologies of efficiency and convenience and those based on unwelcome intrusion and control. For example, although the ‘revite-alarm’ was often considered in a favourable light, it made others uneasy: “I like to be woken up because it’s time to be woken up, [not] because you know, something’s [an alarm] coming on again, you know, some kind of sensors acting upon you”. Similar sentiments were articulated regarding the ‘deodorising clothing’ as a participant from the Dynamic group commented: “it’s a bit weird, makes me think I’m wearing something that has…you know, eating-you organisms”. Underlying these responses, was unease in shifting responsibility for personal washing or heating practices to the hands of technology. This is revealed in the below extract on the ‘wash monitor’:

*Brian:* I didn’t like the washing idea of the wash monitor, something telling you that you’re filthy. I mean people are entitled to be dirty if they want to be

*Patricia:* I know! Does it say it out loud as well?!

*Group:* [Laughter]

*Brian:* Yeah, I think it does – I’m sure there’s ways of doing it with a bit more decorum, but no, I didn’t like the idea

*Researcher:* Did anyone else…?

*Anne:* I didn’t care for the wash monitor either, but for a different reason, it’d be a sort of thing that we’d all be robots, you know, kind of like you wouldn’t be able to use your own mind kind of to decide whether you need a shower or not, and you kind of be going according to the technology telling you, you’d be more like robots, that idea, and you know in theory, you know it sounds good, but from a practical human level, I think…

*Brian:* People buying you a wash monitor, wouldn’t go down well!

*Group:* [Laughter]

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66 Stephen, Dynamic, heating
67 Lyla, Dynamic, washing

Mainstream, washing
It is suggested here that technological advances like the ‘wash monitor’ and ‘personal second skin’ could lead to loss in human skills and de-humanise personal bodily practices or functions such that “we’d all be robots”. Such angst-ridden comments reflect the omnipresence of narratives of science fiction within contemporary culture, increasingly referenced in relation to the advancement of human biotechnology (Oudshoorn, 1996; Nisbet et al., 2003). Similar mention of science fiction was made in relation to the ‘spot heating’ concept as the following comment reveals:

“I don’t like the idea of the spot heating at all, and I just don’t like the idea of a beam following me around and then someone else comes in and there’s another beam following you and then next thing there’s four of us, and it’s like a transporter deck in Star Trek, you know!...I like the idea of being able to control it [heating] for myself and not something thinking for me” (David, Green, heating).

This quote encapsulates the often-expressed desire for control over personal heating and washing activities with less recognition of the role of habitual and subconscious decisions and actions in daily heating and washing activities. This sentiment appears to counter smart home trends and commercial domestic visions which show trajectories of ever more automation and delegation (as revealed in visioning work by Philips, 2009). Citizen-consumers often maintained that human ‘common sense’ trumps artificial intelligence in the diagnosis of bodily washing or heating needs and there was scepticism of rational or scientific assessments. This is revealed in a comment from Brian in the Mainstream washing group: “a [wash] monitor could never tell you if you’re clean or dirty, it’s always a personal decision” and in the Dynamic group where it was reasoned that, “it’d maybe be a novelty, but after two weeks you’d just use your common sense.” These responses allude to the relativity and contested nature of cleanliness and the importance of ‘feeling’ clean (based on subjective emotional and personal assessments) rather than physical attributes of cleanliness, or ‘being’ clean. In addition, there was a strong sense that the scientification of washing and heating decisions could lead to standardisation in cleanliness. This would remove the liberty for people to make washing decisions based on their own personal preferences. As one Mainstream washing participant noted: “people are entitled to be dirty if they want to be.” Such sentiment does not pay heed to existing social forces for conformity and the power of commercial forces in shaping ideals, beliefs and expectations of cleanliness and beauty (Ashenburg, 2009). It could be inferred that this stated desire for control was provoked as a reaction to those socio-technical innovations that were cast as controlling within the scenarios. These responses are supported by findings that show “feelings” of fear are common in situations where a person is out of control or has limited understanding of a new technological system, while the feeling of being in control tends to reduce perceptions of risk (Boyd, 2012). Dubious responses from citizen-consumers towards the radical technology innovations are to be expected given the historically observed tendency for new technologies to “spark moral panic” due to their potential restructuring impacts on existing social order (Boyd, 2012: 3).

68 Liz, Dynamic, washing  
69 Brian, Mainstream, washing
Tensions between control and delegation within scenario discussions confirm work on the design of environmentally efficient household services by Jelsma (2002) who talks of the importance of “distributed competency” between human and non-human actors (machines, infrastructures and devices). Linked to this, Jeremijenko (2001: 1) advocates the shifting of “moral and intellectual responsibility from mere electrical hardware” to humans, the “moral actors”. In this process, Jeremijenko argues that devices can then serve as transient assistors, cultivating greater responsibility and knowledge on how to act green, which can ultimately be embodied without the reliance on a technology. Citizen-consumers expressed a desire to use their own personal skills in the completion of heating and washing practices so as not to undermine their own intelligence and to enhance ownership. This finding shows the need for strategies that promote some level of user engagement and re-connection with resource supply to enhance learning and cultivate more sustainable consumption. The risk of technological failure was also provided as a key reason for citizen-consumer resistance towards some of the new hardware concepts as revealed in the below extract on the water quota ‘thumb print’ proposal:

**Teresa:** I suppose the risk with kind of what Wes was saying about the scanning and the technology... floating around in my head is those e-voting machines, you know, is it the kind of technology or kind of advancement that could end up like them you know.

**Group:** [Laughter]

**Teresa:** locked up in a shed somewhere, that kind of thing is just, just the risk with like the whole idea of quota-ing, and having it all kind of computerized and…

**Emer:** what if something goes wrong!

**Teresa:** yeah, and what if something goes wrong now I suppose it mightn’t if it’s done right but, that’s what’s floating around in my head is those e-voting machines

**Emer:** you can’t depend on technology 100% like something’s always, like I’m jinxed with technology! Something always breaks, or my laptop’s a disaster. I don’t have a very good relationship

**Kieran:** with these voting machines the problem was that they didn’t have a paper receipt of the votes so they couldn’t verify it, whereas at least with something like water, it’s only relating to charges it’s not something as important as democracy.

**Green, washing**

In this extract, depending on technology is perceived as risky for such a fundamental need as personal bathing given its capacity to malfunction. This raises issues regarding the perception, social construction and communication of risks that can accompany the introduction of new infrastructures and technological systems (Spence et al., 2008). In this exchange, reference to previous failed attempts on the part of the government to introduce modern e-voting systems reveals a lack of confidence in political capabilities. Absence of institutional trust in the capabilities and agendas of policy makers or the business community
operating a particular technology has been shown to act as a key inhibitor to uptake (Rourke, 2010). In addition, there was recognition that improper use by humans can also lead to malfunction (I’m jinxed with technology!). Scepticism was evident amongst citizen-consumers regarding the capability of humans to acquire the necessary skills to utilise the scenarios’ systems and technologies. It was clear that citizen-consumers’ existent technophobe and technophile orientations had a strong bearing on their personal evaluations of the scenarios. Their emotive responses show the role of intuition, instinct and feelings in their assessments, reflecting literature that highlights the contribution of ‘gut feelings’ over reason and scientific deliberation in risk evaluation (Slovic et al., 2004).

On a functional level, doubt over the capacity of the new washing and heating practices to fulfil their functions appropriately was another key reason for their rejection. For example, Sheila from the Mainstream energy focus group felt that the Second Skin scenario would not fulfil her warmth needs: “it’d be cold, I’d want my second skin and I’d want my spot heating and I’d want the whole lot, it just wouldn’t do”. Within the washing focus groups, reservations were voiced over the potential for steam clean to make hair go “frizzy” while there was worry regarding the health implications of the ordering of water use in the ‘wet room’ despite its positive waste saving attributes. Within Aqua Adapt, reduced bathing was less popular as was the use of gels which people thought might feel ‘sticky’ and lead to only superficial cleaning: “So if you’re not showering in the morning and then you’re not changing your underwear either and then you’re going to work, would you not start to feel a wee bit manky?” David from the Green group put it simply: “I don’t think you could get a substitute good enough for comparison to taking a shower”. He then went on to express preference for making the shower more efficient through reduced flow and shorter shower times as long as we manage to “keep the shower!” This shows a strong reluctance to adopt washing practices based on the removal or reduction of water and shower usage.

A key finding from the focus groups was that citizen-consumers were often more positively disposed towards novel technological strategies for personal warmth than those for personal washing. This could be due to the direct body contact that many of the washing devices involved, whereas the heating concepts (apart from ‘personal heat vest’) were less personally invasive and based on ambient warmth. Additionally, many of the innovations depicted within the future washing scenarios were considered to be more novel than those contained within the heating scenarios, even though both contained a relatively comparable mix of existing and new features. This is perhaps due to less education and awareness on water issues and the absence of incentives for sustainable water consumption practices, corresponding to low diffusion and awareness of existing water efficient devices and greywater and rainwater systems within the residential sector in Ireland. Indeed, recent policy on the new restructuring of water provision in the Republic of Ireland (DECLG, 2012b) appears to correspond with “commercial” models of governance whereby no mention is given to demand management

70 Isobel, Dynamic, washing
and rhetoric of customer service prevails (Bakker, 2003). This will not challenge the observed way in which citizen-consumers tended to frame water problems as broader infrastructural challenges, calling for the repair of leakages as a precondition for householder action.

### 6.3.2 Narratives of nature, health and wellbeing

The washing and heating scenarios were found to provoke animated discussion concerning the future of human relations with the natural world. These discussions reflected fundamental questions within environmental philosophy (Rolston, 2007) on whether the current trajectory of human consumption will require an increasing distancing from nature, or if it can be based on a more harmonious relationship. Citizen-consumer feedback frequently evoked nature-culture dualisms, characterising scenario elements as either “natural” or “unnatural” where unnatural was linked with negative connotations. These debates were particularly teased out in the Aqua Adapt scenario where utterances of approval were often made with reference to the previous scenarios that were considered restrictive and unnatural by comparison. This is exemplified in the below selection of initial responses provided by participants in response to Aqua Adapt:

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“I just thought the idea of living more in tune with natural rhythms, that this is what it does is a good idea, rather than you know, going all sort of futuristic and so on, that you’re actually there going back to the natural” (Deirdre, Dynamic).

“I just like the idea that it was a more natural idea, and it was less kind of government imposed you know rules and regulations and it was just more natural, and just the rainwater harvesting systems, I thought that was a great idea” (Karen, Green).

“I like this one because I mean it’s just simple, and everything just works, you know it’s just water on the roof and that’s what you have you know, and the only complicated thing is the water monitor, whereas you know with the first one, all the technological stuff, it is a bit unnatural you know, big brotherish” (Lyla, Dynamic).
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Here, Karen and Deirdre remark on the natural qualities of Aqua Adapt compared to what they conceived as the futuristic and controlling undertones of De-Waterise and Efficiency-Sufficiency. As a concept, “natural” is recognised as being contested in meaning. This is due to its scalar quality and also because very little of the planet conforms to “natural” pristine wilderness (Robertson et al., 1996). This is especially true of the washing and heating scenarios given that they hinge on the use of energy and water - natural resources that are manipulated (albeit to differing degrees) into substances for human use in the home, rather than being in their original, intrinsic form. This means that almost all the concepts within the scenarios were necessarily “unnatural” when the concept is taken to include “all the good

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71 This demonstrates the potential influence that the ordering of scenario discussions may have had on participant responses. As De-waterise was shown first, there was no point of reference. Aqua Adapt, being the final scenario was often considered in contrast to De-waterise and Efficiency-Sufficiency.
things as well as the bad ones brought to humans in culture by technology and craftmanship” (Rolston, 2007: 2).

Through a deeper reading of citizen-consumer responses, multiple interpretations of the word natural become apparent. Firstly, the term was used to denote practices that served to improve harmony and connection with the natural world, or as Deirdre says, were “in tune with natural rhythms”. Secondly, citizen-consumers used it to denote scenarios or practices that were simple and known to work. In this sense, Aqua Adapt was valued for its “back to basics” strategy. Rather than being the preserve of the Green groups, the natural qualities of Aqua Adapt, appealed to Mainstream and Dynamic groups alike, suggesting at least a stated desire for purity and more holistic connections with nature. “Unnatural” scenario concepts were those that were thought to be complex or untested in a techno-scientific and cultural sense. The rhetoric of Big Brother was repeated once again in these discussions with reference to control and the risk of relying on technology. Citizen-consumers therefore made associations between past and natural, and future and unnatural. Wariness was exhibited towards the potential replacement of natural washing practices with technological processes which were representative of further human intervention in citizen-consumers’ typically romantic representations of nature. Across groups, there appeared to be more willingness to accept restrictions arising from natural, rather than government forces, as Karen stated: “It was a more natural idea and it was less kind of government imposed, you know, rules and regulations”. In this sense, two strategies of control are pitched against one another; government restriction versus the submission to environmental fluctuations. This stated willingness to yield control to natural forces was an interesting finding given the prevalence of essentialist human-nature distinctions throughout modern history as manifested in human struggles to control, tame or exploit natural forces (Shepard, 1996). It could be interpreted that the laws of natural forces were reasoned to be more lenient and acceptable than living according to laws imposed by government. This was especially so given the perceived unlikelihood of prolonged drought in Ireland: “it just makes sense, especially in a country like Ireland, where, you know…just look out the window. It’s a fantastic idea…we’ve no shortage of water like!”2. Indeed, while the purpose of the energy and water quotas was to translate natural limits into legal restrictions, this ecological logic was rarely appreciated by citizen-consumers, who instead seemed to prefer dictating their own relationship with the natural world.

The ‘rainwater supply monitor’ was seen as a positive tool for facilitating a connection with nature and came second in the voting exercise after ‘rainwater harvesting’ which was the highest scoring of all the washing scenario concepts. Commenting on the ‘rainwater supply monitor’, a Green group attendee noted its capacity to help “adapt your habits to when we have high supply, rather than just throwing on a massive wash every Friday because you’ve

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2 Karen, Green, washing
In this way, it could be said to reflect the function of a “mediating design” serving to mediate “between the wants of consumers and the needs of nature” (Jelsma, 2003: 105). These citizen-consumer views demonstrate a rhetorical willingness to challenge the current unconscious and habitual nature of washing practices. Such flexibility in consumption practices has been found to be an inherent trait of self-providers in contrast to conventional provision systems configured around predict and provide principles (Chappells and Shove, 2004). Within the Green energy focus group there was a desire for greater connection between the source of energy and the location of its consumption:

“I think you just suit the actual energy source to the area you’re in, I mean sort of like it might not suit urban areas, wind power, but under-floor, underground some pump heating might be the better option there. So I think you suit the actual energy to the actual area you live” (Michelle, Green, heating).

It was felt that local energy provision through on-site renewable systems could help people re-establish connection with natural resources. This would build understanding of the consequences of environmental problems for local areas, which is considered an important link to encourage personal action (Stern, 2000). It could be said that these strategies would contribute to what eco-psychologist Roszak (1995: 12) refers to as the restoration of the “ecological ego”, brought about through experiencing the self within, rather than apart from the earth. As Roszak (1995: 12) states: “if the self is expanded to include the natural world, behaviour leading to destruction of this world will be experienced as self-destruction”. While such a depth of connection is a long way off for most (and could be criticised for overlooking contextual realities), participants did articulate a desire to recalibrate with natural cycles. One participant noted that Aqua Adapt could serve to challenge current negative perceptions towards rain, engrained in the Irish consciousness: “it would be really strange if we really shift people’s psyche instead of like oh God its terrible all this rain, you’d be going woohoo, bath time”.

It was stated that technologies, such as the ‘revite alarm’ conversely did not always imply a distancing from “natural” washing practices but could actually help develop a closer connection between bodily processes and washing responses. This is articulated by a member of the Dynamic group in relation to the ‘revite-alarm’ concept: “I like the idea of, you know, if I could…feel my body more adjusted to the rhythms, you know, the biorhythms.” The technology was therefore viewed as a means of enhancing a natural connection between sleep patterns and diurnal cycles. This suggests that rather than involving a further disconnect from natural processes, technological advancement, conversely, can serve functions that “adjust” our bodies to the “biorhythms”. On the part of participants, this shows a more enlightened view of human-environment interactions, moving away from historically

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73 Wes, Green, washing
74 Isobel, Dynamic, washing
75 David, Green, heating
essentialist distinctions to new conceptions of sustainability, echoing what Rolston (2007) terms “a synthetic world” based on complementarities and mingling between humans and the environment. This mode of thought is linked to a key theme relating to the implications of the future scenarios for personal wellbeing and health. Contrasting the fear exhibited by some citizen-consumers towards the ‘personal second skin’, others were excited about the wellbeing possibilities of integrating nanotechnology and personal heat needs:

**Rory:** the vest was cool.

**Jackie:** but don’t we have thermal vests now anyway, don’t we have thermal skins now that cyclists wear and whatnot for.

**Rory:** but when that comes in 2050, I mean even now with nanotechnology and all that monitoring how your blood pressure and all that kind of stuff is, it could fit in to all that kind of stuff, it just fits in to that kind of line of thought.

**Jackie:** it could have little buttons on it and pads on it as well that would vibrate so you could lose weight as well when you had it on.

**Group:** [laughter].

**Jackie:** so you could do anything with it then!

**Green, heating**

These comments touch on the growing trend across a range of areas including health, energy and communications, where there is a convergence of technologies towards multifunctional and integrated devices and paradigms of personalised medicine that would have been unimaginable a decade ago (Vaitheeswaran, 2012). Another concept that elicited positive responses for its health effects was the home ‘second skin’. Although there were reservations over its aesthetic appearance, this “magic skin” captured the imagination of attendees who liked its potential to replace the need for heating with fossil fuels and to advance wellbeing in the home:

**Rory:** you could get your house covered in this magic skin thing and you don’t need to have turf or oil or gas and that so I think, just for that it’s good like you know what I mean

**Andrea:** I don’t think the aesthetic appearance, it wouldn’t really worry me because I think if you’re going to be able to come up with something that solves that you’re going to be able to make it look alright as well, you know

**Jackie:** as I say if it was built into the materials, a skin on the front of the house or something.

**Andrea:** we just saw that house that moved with walls I mean that’s’ not half as bad! Look if my house looks like a bubble wrap case of a computer or something I’d go with that

**Researcher:** did anyone else have, what did you have Ailbhe, did you put that as your advantage?
Ailbhe: yeah no, I thought that was one of the really good things, just for like as you were saying the health problems as well like it’s huge for mould growth and everything you know, it would probably make the house more efficient to clean and everything do you know once it's well insulated.

Green, heating

This extract illustrates the propensity of citizen-consumers to compare across the scenarios, showing the potential influence the sequencing of scenarios had on responses. The home ‘second skin’ and the ‘biological core’ were considered external or unobtrusive advancements as they did not imply physical contact with the person and were largely infrastructural concepts. Ultimately the ‘Second Skin’ scenario received ten stars, five from the Dynamic, and four from the Green group. The highest proportion of votes for Second Skin were assigned to the ‘home second skin’ and ‘personal heat vest’ concepts. This again reveals the greater levels of flexibility amongst citizen-consumers, particularly in these two groups, in their desired mode of delivery of personal warmth in contrast to washing where there was a strong desire for the retention of water in fulfilling this activity. Indeed the relative nature of perceptions of warmth was touched upon within the Green and Dynamic groups where participants talked of the possibility of “acclimatising” to different temperatures:

Jackie: The one thing nobody ever talks about and that’s acclimatising yourself to the actual weather around you and we did it over the last couple of years, and you know
Andrea: the more heat you have, the more heat you want
Jackie: the more heat you crave, you crave heat, why?
Andrea: whenever people come to our house, they don’t take their coats off, we think it’s fine but it’s only about 17 degrees inside, but we’ve just got used to it because we don’t want to use it.
Rory: but you don’t want to say that to like an old person in their 80s
Andrea: no, it’s not universally applicable.

Green, heating

Two important observations can be made from this extract. The first is the recognition of a ratcheting effect in heat preferences and a suggestion that this can be controlled whilst allowing exceptions for elderly people who have greater difficulty in managing their personal warmth. Secondly, Andrea talks about the practice of using extra layers rather than central heating in her household, commenting: “we’ve just got used to it“. This illustrates that heating practices tend to be uniform within the home yet vary between households, suggesting that the support of the key decision makers or influencers within the home is necessary for a shift in household practices. The issue of the “un-healthiness” of excessive heat was raised in the heating Dynamic group, however it was in the washing focus groups where questions of
health emerged as locus of discussion. Citizen-consumers, especially those from the Green group stated there was a need to cultivate washing practices that “won’t harm the environment, or won’t harm your skin, or your body”. These sentiments were articulated in discussions on the implications of the current trajectory towards a “sanitised world”:

Kieran: Well I liked it, I liked it, well you see I suppose the thing is, we’re projecting 40 years forward and I would hope people would be able to see the wood from the trees a bit in forty years time…we’ve become this sanitised world and it’s kind of gone to the extreme where advertising is actively making people scared of germs and it’s illogical but it works, it makes people buy their products and if there was a counter-balance to that it’s something that I’d be very happy about anyway. Not saying, it would take a lot of courage from any government to do it…but I think, you know, it should be done, but it’s, it’s kind of counter commercial and it’s counter. Unless there’s an alternative, like eco-hygiene projects, products promoted in their place that, you know that won’t harm the environment, or won’t harm your skin, or your body or whatever.

Teresa: that’s probably where they’d have to go wouldn’t it, for an eco-range of products, because obviously they’re all going to feed in to the rain water cycle, so that would be, if that system was to come in 2050, that’s kind of the way they’d have to go really, wouldn’t it. Keep everyone healthy and happy but, we’re not going to put bleach into the ground, into the rain again, just -

Kieran: it directly affects you then…

Green, washing

In this passage, Kieran and Teresa draw the link between healthy washing practices and a healthy environment through cultivating an awareness that chemical usage ultimately ends up in the water cycle, impacting humans and the environment. Kieran demonstrates a critical awareness of the pervasive logic of marketing and expresses hope that with cultural awareness, we will “be able to see the wood from the trees” by 2050. He alludes to the pervasiveness of narratives of a “hygienic utopia” within the public imagination (Ross, 1996) and suggests that by 2050 an interventionist approach may be both acceptable and required to challenge this. In this view, Kieran sees the evolution of ‘nanny state’ functions as preferable to counteract the strength of industry generated messages that promote unhealthy or excessive levels of cleanliness. In this interpretation, the adoption of critical enquiry on personal washing or beauty routines is considered to warrant investigation despite its potentially controversial nature. However, other participants were less certain that current levels of cleanliness were excessive, and had hygiene concerns over concepts such as the ‘waterfall salon’ and ‘wet room’:

“I don’t like the idea of bringing the water from the shower into the washing machine just with like shampoos and conditioners and all of that being washed in as well I just don’t think it’s hygienic…otherwise it’s a great idea” (Karen, Green, on the ‘wet room’ concept).
“Wouldn’t want your knicker water going round and round!” (Joan, Mainstream, on the ‘wet room’ concept).

“It’s just what if you’re sitting in this public bath and you see this woman coming with all her kids and they all have dirty nappies and she throws them all in beside ye” (Lyla, Dynamic – on the ‘waterfall salon’).

In principle, the idea of water reuse was appealing, however there was concern regarding the health implications of lower quality water. This suspicion amongst the public regarding the health risks of non-potable water (such as greywater and rainwater) is reported in other qualitative research (Sisolak and Spataro, 2011; Ward et al., 2011; Wong and Sharp, 2012). The presence of these sentiments reveals the heightened awareness amongst the Irish public of water quality issues, evidenced in a recent Eurobarometer poll (EC, 2009c), and spurred by persistent outbreaks of cryptosporidiosis in the mains water supply in Galway in the last decade (EPA, 2007). There was acknowledgement across groups that there are clear hygiene requirements for personal washing, which would need to be defined prior to state intervention. The capacity for policy to alter preferences for cleanliness and water quality was mooted however and the moral implications of intervention into this private domain were questioned. One perspective was that national governments had little capacity to regulate multi-national companies in the current globalised capitalist system. As David of the Dynamic Washing group commented:

“I don’t know how that would happen because really governments don’t govern the world any more, it’s big companies, multinational companies, and everything that we buy is owned by multi-national companies...so whether it’s a consumer-led thing whether they’ll adapt, and, but eh, you know, I think, we are ruled by multinationals”.

This participant then likened the proposal for campaigns on reduced washing and for ecological washing products to the current ‘Drink Aware’ campaigns on sensible alcohol consumption, stating that it would be a “hard sell…I just can’t get my head around it, you could get a hell of a lot of abuse with that!” The conscious orchestration of messaging on washing practices did not sit as comfortably with this participant. This reflects the dominant position in debates on policy and its role in social change, which often reject the notion of legislating for the subtleties of individual lifestyles. As Hobson (2002: 113) notes, there is an “inherent difficulty of effecting subtle and often intangible social changes through unwieldy legislative and regulatory instruments”. By contrast, the Mainstream group reasoned that balancing commercial messaging with public awareness campaigns would be a positive development:
**Helen:** you’d have to do an advertising campaign to point out that this is socially responsible and this is good for the environment, and this, actually is what everyone’s doing now, It’s like, you know like…

**Noleen:** good for your skin

**Helen:** good for your skin, yeah, but good for the environment and becomes socially acceptable and socially desirable.

**Joan:** yeah unacceptable to be spraying and, and washing

**Noleen:** You can encourage people not to use too much water, because like, skin I think is not, eh, eh, people who have continual showers, they’re all mad. Their skin dries up and then they have to moisturize.

**Joan:** You don’t need to shower, literally as much as you do.

**Group:** [agreement]

**Noleen:** I’d say your skin would look better

**Joan:** Well it’s a pleasurable experience and that’s why you do it, and that’s one thing, I think it just takes, all this just takes the pleasure out of washing, that’s what, well I know that’s not very pertinent.

**Mainstream, washing**

In this exchange, one participant suggests that in addition to regulation of commercial advertising, government educational campaigns would have to be developed to reinforce the message that responsible washing behaviour is “good for your skin [and] good for the environment” such that prudent washing becomes “socially acceptable and socially desirable”. The supposed beauty benefit of rainwater was considered an added advantage of the scenario, providing another way of developing support for its ‘natural’ logic. This supports evidence relating to the benefits of mobilising environmental action through engaging with other issues of concern, such as health and wellbeing (Bedford et al., 2004). It also shows the strength of “old wives tales” in public consciousness and in shaping practical know-how on domestic routines, especially for beauty treatments and washing behaviours, as Teresa from the Green group commented: “They say for washing your hair it’s [rainwater is] the best thing you could be using”. Citizen-consumers frequently emphasised the emotional and therapeutic needs that showering and bathing fulfil and there was a palpable sense of distress at the thought of these being threatened. This is encapsulated in the comment from Joan: “Well it’s a pleasurable experience and that’s why you do it…all this just takes the pleasure out of washing!” while David from the Green focus group made similar utterances:

I think washing now is, people often wash to relax, it’s even more than cleaning, there’s another aspect to…therapeutic, unwinding, sometimes you could be crystal clean and then decide to have a shower to chill out you know!"
Citizen-consumers strongly valued the liberty to make their washing decisions based on impulse, emotion and whim and there was stress at the thought of these liberties being removed. Directly following this response from David, another participant emphasised the importance of water-based bathing not only for psychological, but also medical reasons. Issues were also raised about people who engage in “heavy labour, or sports” who may need more frequent or intensive washing. These discussions highlighted the strong emotional connection that people have with their established washing routines and the value they attach to its interlinked wellbeing and cleanliness functions. Similarly for personal heating, the proposal for reduced home size was called into question due to its potential “detriment to people’s health”:

Andrea: if there’s a limit on floor space at what point, how small do you get to the detriment to people’s health? You know.

Jackie: we’ve to change people’s minds. They’re a trend, they’re not a sort of necessity, that’s what they are.

Shell: yeah because I know definitely in the country now there’s a couple of people around me and they’ve built these new houses and they’re absolutely massive like,

Andrea: well I’m not talking about those huge, huge houses, I mean these were just two bedroom places but they were so small that some of them had kitchens that were half the size of that table you know

Jackie: but that’s what you’re going to get in urban areas.

Andrea: but is it a healthy living space though? Overcrowding, does that kind of make people very, very unhappy?

Rory: you just have to use the space more efficiently and not like have you know retarded kitchen islands and all that…

Joan: you can’t take away taste, or sort of like choice in something like this, that’s what it is, choice.

Rory: no but like you know you just have to put more thought into the space you have like, how best can you use the space and then try and like you know, get people thinking that way.

Green, heating

Just as there is difficulty in developing an objective assessment of cleanliness, the science of healthy space limits is also subjective and as a result, participants struggled to define how much space was required as a basic minimum for personal health. It was agreed that certain Celtic Tiger homes are clearly oversized, however there was unease at the potential for regulating home design due to infringement on personal expression, desires and preferences: “you can’t take away taste or…choice”.
6.3.3 Regulatory and non-interventionist perspectives

The heating and washing scenarios, with their embodied regulatory dynamics, stretched citizen-consumers to consider broad questions regarding the role of regulation and the politics of entitlement in energy and water consumption practices. Across water and energy focus groups, opinion was divided on whether individuals are capable of achieving the required moral consciousness and practical capabilities to consume within environmental limits, or if a top down approach should be employed to shape and constrain behaviour. These debates were provoked through discussions on the carbon and water quotas within the Carbon Control and Efficiency-Sufficiency scenarios. The ‘water quota’ required a significant re-definition in citizen-consumer perceptions of water. It implied a movement away from conceptions of water as a resource that is cheap and literally ‘on tap’, to one that is a valued and precious commodity. Although the notion of paying for energy usage has been an enduring feature of energy governance, the ‘carbon quota’ system demands that all consumption, including energy usage in the home, together with other product and service decisions are viewed through the prism of carbon and in light of their environmental impacts. The below extract from the Mainstream energy group reveals an initial negative response towards carbon quotas likening them to the “crazy concept” of payment for water:

Kevin: the carbon quota now, I don’t know, like when I studied economics they told me about the funny factory that made water, you know what I mean, which was something that you’d have thought would never happened, you’d never get people selling bottled water, you know what I mean. I’m just nervous of all that control, you know.

Cáit: but you like bottled water Kev

Kevin: no I don’t like paying for it. It’s a kind of funny concept, it’s something you’d die without in six days and you start selling it you know

Cáit: I know but you still do, but I’m saying now it’s not even a big deal whether you buy water or not, whereas back then, you were like oh it’s a crazy concept

Kevin: it is a crazy concept because the tap water is better. I think there’s a danger when you start metering things like power, water and stuff like that, at what point are they going to start giving you an oxygen quota, you know what I mean, we’re not far off it.

Mainstream, heating

For this group, the carbon quota was symptomatic of the alarming advancement of tighter control into areas of private consumption as symbolised by recent trends for water commodification. For a resource that “you’d die without” the advance of this form of regulation was considered a portent of worse to come and an erosion of the civil liberties expected in a modern welfare state where the politics of entitlement is a core value (Maniates, 2001). In many initial citizen-consumer responses towards the carbon and water quotas there was evidence of psychological reactance (Moser and Dilling, 2007). When a person feels
pressurised to accept a certain view or perceives a threat to behavioural freedom, the theory of psychological reactance prescribes that the automatic emotional reaction can be to adopt the opposite view or action to what is being proposed. The initial response from David of the Green washing group illustrates this:

David: There’s always a concept in my head that water is free and it should always be free. But, that notion of having to pay fines, it’s where we’re going to go but it’s just like, you know f*ck that you know, it’s just immediately unappealing that - we’ve enough bills to pay at the moment, and this is going to be an additional one.

Researcher: and if say it was say a quota that you got for free and you pay if you exceed that, do you think that would be something that’d be acceptable?

David: [hesitation], yes, maybe

Teresa: [it’s] gonna have to be, isn’t that the way it’s going here anyway?

In this discussion, the ‘water quota’ concept is seen by David as an erosion of valued citizenry rights: “water is free and it should always be”. Given the impending introduction of water charges, citizen-consumers formed their responses towards Efficiency-Sufficiency’s water charging system in relation to the present situation. In the context of the economic crisis, charges were often considered an unacceptable additional financial burden for householders. There is evidence of exasperation and lack of confidence in the government whereby the concept of water charging is viewed as another symptom of government ineptitude and injustice in responding to low public finances. Indeed these sentiments are supported by findings of a national poll held in Spring 2012 that showed the lowest levels of confidence in the Irish government since its entrance into power. This was conducted at a time when there was widespread media debate on water charges, showing the importance of context in influencing responses (Collins, 2012). Nevertheless, acknowledging wastefulness in household water use, citizen-consumers accepted on principle that greater value needs to be assigned to water resources, with water charges representing one key strategy.

Citizen-consumers voiced various conditions that should be satisfied in order to ensure adequate water supply and equitable access under conditions of water charging. The ‘thumb print’ concept was rejected as the mediating device between regulatory limits and consumer usage, receiving the highest number of red votes of any washing scenario concept in the ultimate voting exercise. As David from the Green group commented: “the idea of scanning in to use any device, I think is just, I don’t know - a bad idea. Real 1984”. By contrast to the water quota, the carbon quota was received more positively in initial assessments. For example, in the Green focus group, five people out of seven identified the quotas as a positive
attribute in the early post-it exercise. As discussions evolved, fundamental questions were raised over issues of allocation, monitoring and operation. Discussion often concentrated on the appropriate scales of application and burden sharing within a carbon quota system. As Claudia from the Green heating group commented:

“You know, how would it work, I mean, would this have to be launched on a global scale, all at once, I don’t see that happening because what if you know, someone’s over from France, and they’re staying in your house, and how does that work? Can you get guest passes?”

In this comment, the compatibility of a national quota system with the realities of a globalised world are raised given high levels of mobility (of people and goods) across national boundaries. It was often felt that the imposition of stringent consumption limits would have to be applied at a supranational level (for example at EU level), with nation states following suit. This was especially the case with the carbon quota where knowledge of the Emissions Trading System (ETS) led to reasoning amongst the Green group that this could be funnelled to the individual level. With regard to water quotas, there was less attention to matters of international action, as water issues were considered local rather than global problems and thus the prerogative of nation state policies. Given that Ireland by comparison to other countries experiences less water stress, the potential inequity of burdening Irish people with stringent quotas, with no similar restrictions abroad, was considered contentious. It was felt that this would lead to the commodification of water and the escalation of its value. A member of the Dynamic washing group touched upon this stating that householders would ask their foreign visitors to: “bring a bottle of water with you, instead of a large bottle of wine, bring a bucket of water!”. This notes the wide-ranging affects that the scenario concepts could have for other areas of personal life, including practices of entertainment and hospitality.

It was supposed that restrictions to water availability could affect how and when you choose to entertain, while others raised issues of social embarrassment arising from the need to ask guests to be frugal in their water usage, or from the potential for the ‘thumb print’ system to fail. Further discussion in the Dynamic washing group continued to raise questions of control and allocation: Who decides? It says that everybody will get enough but who decides what’s enough? For the quotas, who decides what people need? There was concern that one universal water or energy quota would overlook the varying needs of individuals due to differentials in age, mental agility, education, physical ability and family responsibilities. For example, it was noted that difficulties could be experienced with the thumb swipe system for the elderly and the less technologically savvy. In addition, levels of water and energy requirements were considered highly variable and often linked with levels of physical activity, health and age. As a participant from the Dynamic washing group commented:

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76 The post-it exercise took place at the start of each focus group whereby participants were asked to write down on post-its what they found most and least appealing about the scenarios. This exercise captured initial reactions and was used in analysis to reveal whether and how individual opinion changed following group discussion.

77 Debbie, Dynamic, washing
“I’d have questions about whether body gel and baby wipes and stuff would do the job if you’re after running 10k or something and all you want is a quick shower… where does that work, and then do they get extra vouchers because they’re in to fitness?” (Liz, Dynamic).

Geographical location was also considered a constraint in relation to the successful and equitable operation of the carbon quotas due to absence of appropriate, low carbon services (especially public transport). Reservations were voiced over whether the quota systems would be too crude to take into account these nuances in consumption needs and abilities. Issues of trust and transparency in decision making around the quota schemes were also raised. It was thought that the establishment of carbon prices on goods and services could be open to abuse and follow the usual path of collusion and backhanders between private sector interests and government: “[what if] the government then maybe lies about how bad it [the product] is, you know, with trade deals with certain companies?” Given the recent accounts of endemic clientelism, cronyism and corruption in governance throughout the Celtic Tiger era (McDonald, 2012), these comments were perhaps unsurprising and reflective of the low levels of confidence in the government to pursue objectives of social good. This is revealed in the Green washing group discussion:

**Wes:** the other idea, that it [waterfall salon] would be controlled by central government issuing vouchers, Ireland is rife with nepotism, and favouritism and stuff!

**All:** [laughter]

**Wes:** Dave would be walking around smelling awful clean, he’s got connections and I’d be stinking the place up for weeks. No, I didn’t like that idea.

**Researcher:** So how would you ensure better access…

**Wes:** maybe if you earned vouchers, like going back to some of the other ideas that were discussed, but just the idea that some kind of central government issues these vouchers would be problematic.

**Green, washing**

The possibility of exploitation of power and connections was teased out in this extract and some felt that the water quota would lead to the development of a “black market”. Citizen-consumers felt that the national tendency to disregard regulations and resist authority would jeopardise the equitable operation of the ‘waterfall salon’ voucher and quota mechanisms. Research by Davies et al. (2001) on waste recycling in Ireland reports similar findings where members of the public attributed the legacy of colonialism to disobedience tendencies. Rather than regulatory restrictions and ‘stick’ approaches, citizen-consumers often recommended other methods based on earning or rewarding energy and water allocations for good behaviour, and more frequently, showed a preference for conventional economic ‘pay per use’ models. The fundamental clash between neo-liberal free-market strategies and regulatory
control of carbon emissions was evidenced in an impassioned debate in the Dynamic heating group:

Conor: Well I really can’t get past the most dislike one – carbon quota, large no no, absolute no no. It’s kind of like one of those rules that tells you that your car motor tax should be more expensive because you pollute more, like that’s a joke, you’re already getting taxed for it in terms of like, the amount of fuel that you have to use to pay for your car. The idea of not being able to just use as much electricity as you want to pay for, is just absolutely wrong, and I would, I just would never sign up to any system that allowed that. No.

Researcher: Well did anyone have a contrary opinion to that?

Gary: Well I thought it was a great system, I mean I think anything that kind of encourages you to kind of you know get to know what you’re carbon usage is and kind of control it and reduce it if possible I think is a good idea. I mean I’m not quite sure I understand where exactly you’re coming from?

Conor: I just don’t think you should be allowed, you shouldn’t have anyone choose, you shouldn’t have a quota, if you want to pay for usage, that’s fine

Gary: but normally you get a quota and you could supplement it a bit if you want to buy, I mean the same way as your salary permits you to buy long haul flights, if you want to buy over quotas, like I mean you think now, there’s just endless use, but imagine a situation where you’re out of use

Conor: but hang on

Gary: hang on, I’m just saying let’s say we’re totally out of fossil fuel, we couldn’t get them in for whatever reason, we couldn’t afford to live as we do now which is just to have everything going, surely then, there’d have to be some sort of quota

Conor: but this is, but this is coupled with the use of renewables, right, on your smart systems and everything else, there’s absolutely no way that I don’t have a right not to buy my usage.

Dynamic, heating

Here, two clear competing value frames are revealed regarding individual rights and duties in relation to environmental action. Defined by Crompton (2010: 10) as “the mental structures that allow human beings to understand reality and sometimes to create what we take to be reality”, frames were clearly used to inform how citizen-consumers viewed the future realities depicted in the scenarios. Within the above extract, Connor encapsulates the ‘self-interest’ frame said to prevail in modern western society (Crompton, 2010). This is underpinned by rational choice models and economic traditions of intellectual thought that advocate efficiency and free market strategies in response to environmental problems: “The idea of not being able to just use as much electricity as you want to pay for, is just absolutely wrong”. Here there is little connection between the behaviour of individuals and environmental destruction. Human ingenuity and technological innovation (“smart systems and everything else”) are deemed to be sufficient and reasonable responses. By contrast, imagining a situation where “we’re totally
out of fossil fuels” Gary accepts that “there’d have to be some sort of a quota”. This support for regulatory enforcement and action to remain within ecological limits reveals evidence of a ‘common interest’ value frame and notions of environmental citizenship (Hawthorne and Alabaster, 1999 in Hobson, 2002). Much work within psychological literature notes the clash of value frames between those of a self-interested, competitive and extrinsic orientation and those based on common interest, self-transcendence and benevolence (Kollmuss and Agyeman, 2002). The prevalence of ‘self interest' frames in policies, economic discourse and institutions is said to undermine the capability of its polar opposite, ‘common interest’ frame, which links people’s actions to wider contexts and elevates morality and values in personal decisions impacting social life and the natural world (Crompton, 2011). As the Dynamic group discussion unfolded, the concept of carbon quotas was seen to fundamentally oppose conventional neo-liberal, capitalist systems:

Stephen: Just as an overall concept I don’t see how it works really in a capitalist society where it’s all based around consumption of everything, so, so if you’re lobbying on carbon costs on individual items, and everything is through the prism of carbon, and l - I don’ know how that works when all everybody wants us to do is to consume all the time. I don’t know.

David: that’d work better than a carbon you know limit or quota, if individual, if carbon tax is added, so be it and you can afford to buy as many as you want. But to have a fact that you, you buy a teddy bear, you buy whatever the examples are that you’re using your quota, it just…

Researcher: so rather than a quota the tax reflects the actual cost to the environment.

Stephen: correct.

Green, washing

These participants did not see a possibility of a radically different system of organisation in the future and there was a sense that capitalist systems will endure, accounting for a preference for market-based measures characterised by the freedom to consume based on rational cost benefit assessments whereby “you can afford to buy as many as you want”. Citizen-consumers in the washing focus groups also exhibited distress at the removal of rights to consume water irrespective of disposable income:

“Just the idea of not having your own shower facilities. You know, that you wouldn’t - the fact that in the scenario you wouldn’t be able to just throw water over yourself, because you had the money, because you wouldn’t have the shower to do it!” (Lyla, Dynamic group - in relation to De-Waterise).

This extract relates the issue of water access to broader concepts of choice, freedom and liberty to consume within personal income boundaries. Such sentiment is demonstrative of conventional relationships between Irish citizens and consumption patterns across domains of energy, food, and transport where supply is typically related to willingness to pay and thus a
restructuring of liberties to consume was often met with distress. The below extract from the Dynamic washing group captures this sentiment and reveals an acceptance of the inequalities inherent in resource pricing systems:

\begin{quote}
\textbf{Noleen:} the scanning was the one that didn’t appeal to me.

\textbf{Joan:} the scanning, yes

\textbf{Noleen:} to know that you’re over the limit is a good idea

\textbf{Joan:} as you say, oh my god!

\textbf{Noleen:} a letter or something

\textbf{Helen:} I don’t like the idea of the quota you know

\textbf{Joan:} No I don’t either

\textbf{Researcher:} So what would you prefer then, just water charging, or…?

\textbf{Helen:} yeah I think the water charging, like If you want to use it, you do, can use it but you’ve got to pay for it, you know.

\textbf{Researcher:} but then is there a sense that some people who don’t have money will be -

\textbf{Joan:} well people who haven’t money, I mean it’s like anything else, you just have to stick within your boundaries, if you have the money, I know it’s probably not equal for everybody but sure life isn’t equal.

\textbf{Patricia:} and that might be your little treat every week

\textbf{Joan:} Nice long shower, exactly

\textbf{Anne:} No I think the water quotas are, are not a bad idea but they’d have to be eh, reasonable, now I’m not sure that I like the idea of fines for over the water.

\textbf{Joan:} no I don’t like the fine.

\textbf{Anne:} but reducing the amount, kind of water restriction, you know reducing the flow of water if you’re going over an amount.
\end{quote}

Mainstream, washing

This extract of the Mainstream group shows a jaded acceptance of economic models of governance, which according to Bakker (2005), are characterised by ‘willingness to pay’ logic, over those based on social equity or ‘ability to pay’ and ideals of universalism: “I know it’s probably not equal for everybody but sure life isn’t equal”. For those on lower income, a long bath or shower would then be transformed into a ‘treat’. Citizen-consumers often believed in the power of monetary and information incentives to change their behaviour: “to know your over the limit is a good thing”. This is further revealed in the below cross-section of quotes from the washing and heating focus groups:
“I do strongly agree with water regulation and charging for water, but just not that way. You’d be cutting down once you saw your few bills, you know, few big bills” (Liz, Dynamic, washing).

“The first step is metering to see actually what money you save… the government has to first say here are the savings and if that doesn’t work, and allow people the chance to actually control their own usage first then go with the rates, you know, the stick approach” (Lorraine, Dynamic, washing).

“I think your pocket is going to sort of like deter what you’re going to sort of spend anyway, I mean if the incentives are good enough then you’re wasting your time not going after them, do you know what I mean, again, it’s a different mindset altogether, it’s getting rid of this wastage mentality” (Jackie, Green, heating).

These extracts show an acceptance that greater value needs to be assigned to resource usage and environmental issues, yet a preference remains for provision of information to reveal consumption levels and costs - relying on mechanisms of self-control before imposing quotas. In this sense, the ‘carbon quota scanner’ was conceived of as a useful device for its informational purposes and was likened to a “bank statement of your energy consumption” and health labelling on food. Light touch intervention tended to be preferred as one person from the Mainstream water focus group commented: “overall kind of giving people the feeling anyway that they have control over what they’re doing as opposed to being controlled. I think it’s very important”. Behavioural nudges involving individual rewards, incentives and information were thus preferred over sticks such as the ‘energy crash course’, which was characterised as “a punishment for sort of living” as shown in the below extract from the Green heating group:

**Rory:** The energy crash course, that sounds ridiculous.

**Ailbhe:** some people need it!

**Rory:** just sounds like going to an AA Meeting or something

**Andrea:** yeah is it also going to end up being a way to…fine you for going over your quota...

**Jackie:** I don’t like that, no, a punishment for sort of like for living…there’s no good, that’s not going to work.

**Andrea:** is it going to become a way, a think the way you are saying, it’s too hard to control, that would be very difficult.

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78 Rory, Green, heating
Jackie: I think if you used it positively, and forget about negatives as far as energy efficiency is concerned you going to encourage more people to be community like led and I think it will work. You know but if you’re going to start pummelling people for using two kilowatts more than they should.

Andrea: It makes you just think no, because you feel you’re doing the best you can but it’s still not best enough.

Jackie: dictatorship - you’re not going to do that, there you go, look!

Ailbhe: it’s like everything else though, you’re going to need incentives but you’re also going to need penalties, it won’t work without penalties, you need something.

Green, heating

This extract encapsulates much of the sentiment around regulation that the scenarios provoked. There was an instinctive opposition to punitive measures and control (“pummeling people”) with simultaneous recognition that “it won’t work without penalties”. While the ‘energy crash course’ was considered a step too far for this group, some members of Dynamic heating group felt that it was not hard enough. Typically, they suggested financial penalties could be more effective rather than enforced education, consistent with the general resistance towards group and community level rewards, competitions and governance as discussed in the following section. Nevertheless, formalised learning on environmental issues within the education syllabus was often talked of as being the solution for the acceptance of tighter regulation and the acquisition of practical skills required for the performance of the future washing practices. Inter-generational themes were present here as it was often asserted that the youth would be best positioned to adopt the scenario practices given their mental and physical agility and their relative malleability in terms of personal values and habits. This appreciation of the value of sustainability education through conventional schooling systems, life-long learning and continuous personal development is widely reflected within literature and policy discourse (Davies, 1999a; UNESCO, 2010). In advocating education strategies, there was a tendency amongst participants to cast ultimate responsibility on the next generation as many considered it an unreasonable and impossible task to teach ‘old dogs new tricks’:

Noleen: the thumb-print is the one I would…it’s a bit unrealistic I have to say to you. The thumb print I have to say to you now…

Patricia: well do you know what I would feel, and very possibly it’s something you need to start as a child and you just get used to it. But what about elderly people, I mean elderly people who mightn’t be absolutely all there, remembering all this. They’d never manage something, you know this whole thing, I’ll do this first, second, third fourth and all
the rest of it. I mean I'm sure people could get used to it. But you know.

Joan: It's hard to conceive now.

Pat: Isn't it, yes, yes

Noleen: But going back to the plastic bags, like you know, we are all now on paper bags, like initially when people said get rid of the plastic bags, people just you know, it's ridiculous.

Brian: But you still see people buying plastic bags in supermarkets, I can't understand it.

Pat: But I mean I do think that people would get used

Noleen: I agree, I agree

Patricia: it might be something we get used to maybe in a while but it all sounds like an awful lot of work.

Mainstream, washing

As demonstrated above, the Mainstream washing group felt that there was limited capacity for their (elderly) generation to learn new consumption practices and how this might work was “hard to conceive now”, especially given the technical know-how that would be required. In the Green heating group it was conceived that light touch education strategies may work “for the younger generations, and then the older ones would have to be coerced!”. Examples of coercion were found in the recent indoor smoking ban and plastic bag tax that many referenced as evidence of the success of ‘stick’ strategies to promote behaviour change over short time scales. While citizen-consumers were often instinctively opposed to such regulatory instruments, it was frequently reasoned that “people would get used to it” such that it becomes socially unacceptable to do otherwise. In these kinds of reflective moments, instinctive barriers to regulation were eroded, revealing greater flexibility and an openness to new rules of practice that was rarely apparent from the onset. For example, in the closing discussion of the Dynamic heating group it was suggested that the scenarios were quite conservative in their perceptions of the capacity for cultural change. Through engrained and extensive sustainability education, coupled with being brought up in a more environmentally conscious environment, it was reasoned that many of the practices depicted in the scenarios “would be second nature” to today’s children - tomorrow’s adult inhabitants of the 2050 scenarios:

“One of the things I thought about the eco-cation courses and a manifestation of this has come up in every scenario I think is that the idea is kind of premised on the way we are now about these kinds of technology and about home heating and that whereas I think in 2050 you would hope that much of it would be second nature to many of the children coming through school so I think it’s something

79 The Mainstream washing group had an average age profile of between 50 and 65.
that, mightn’t need to be as big focus…and you know I think eventually maybe in 2050 there won’t be a need to coerce people to go to these courses because everyone will be aware of all these things (Deirdre, Dynamic, heating)."

This perspective is typical of the more holistic and optimistic stance of certain participants with regard to their conceptions of possibilities for social change through time. For these people, the focus groups appeared to provide inspiring spaces for wonderment at the potential solutions that may evolve in the future for sustainable consumption.

6.3.4 From individual to collective governance and responsibility

Within citizen-consumer focus groups debate often focused on conceptions of collective responsibility provoked through discussions on scenarios that involved innovations for collaborative governance, action and ownership. This was the case for practices of public bathing and ‘group rainwater harvesting’ in Aqua Adapt, and the ‘shared spaces’ of Community Core. These themes also emerged in discussion on district energy and water competitions and collaborative learning proposals (i.e. ‘green works’ in Community Core and ‘open innovation’ in Second Skin). Positive evaluations of these concepts tended to identify benefits relating to social interaction, the promotion of environmental awareness and participatory decision-making, while negative responses often highlighted unequal geographical and socio-demographic capabilities for participation and the potential erosion of privacy and individual prerogatives. Conceptions of privacy in washing were particularly teased out in debates about the ‘waterfall salon’. The social nature of this concept proved to be its most controversial quality with positive or negative assessments dependent on personal preferences for privacy in bathing, together with experiences of similar situations. Broadly speaking, the Green group was most critical of the ‘waterfall salon’, while the Dynamic group identified the “sociable” element of public bathing as “fun” and enticing:

| Lyla  | I love the idea of the communal bath thing, that’d be nice now, good fun!! |
| Laura | I actually didn’t like it. I didn’t                                  |
| Lyla  | well if you’d go with a group of friends I think it’d be very sociable |
| Laura | I think more the term “public bathing”, you’re probably, you know, your “spa” kind of, would go down more |
| Deirdre| I’ve never done it but I like the idea of it, you know, go with a group of friends |
| Lyla  | the idea of that is there’s no chlorine in the water so when you get out you don’t need to shower, that’s you clean. |

Mainstream, washing
Again, the recurrent issue of the framing of scenario concepts is raised with a suggestion to draw upon spa references rather than ‘public bathing’ which sound more utilitarian. Nevertheless, this group, consisting mainly of a younger, female cohort, had few reservations about re-casting personal washing as a public activity but more about the hygiene implications and inconvenience of out-of-home bathing. Reservations on shared bathing were extensively discussed in the Mainstream group. After reference to the Budapest Public Baths, the following debate unfolded on the particulars of social interaction, nudity, personal grooming and cleansing routines at the baths:

**Helen:** I’d do it. It would appeal to me

**Patricia:** I was at one

**Helen:** but you’re washing in other people’s dirty water then wouldn’t you be?

**Patricia:** well, I was at it in Budapest, and they weren’t, I mean there were some gorgeous looking women – you’d really feel ashamed of yourself.

**All:** [laughter]

**Patricia:** equally there were a lot of older ladies, men, it was separated, and all the rest of it, and they were having a wash

**Joan:** and was it in a nudey bath? Did you feel odd in a swimsuit?

**Patricia:** no, no I didn’t, I felt odd anyway going in, after a while sure nobody looked at you, and there was chatting going on, yes, I mean people met there.

**Noleen:** if other people were happy, I would be quite happy to meet up and bathe and well I think you could chat and -

**Joan:** I wouldn’t I’d hate that.

**Helen:** I wouldn’t mind as long as the water wasn’t dirty or anything

**Noleen:** better than not showering

**Joan:** well it is but

**Noleen:** like the swimming pool

**Helen:** I know, but you’re supposed to shower before you go into a swimming pool.

**Joan:** but I just couldn’t imagine myself being relaxed

**Noleen:** it’s the other people!

A variance in cultural and individual washing preferences is revealed in this extract where despite widespread nudity in the Budapest baths, it was asserted “nobody looked at you”. Interestingly, while many proclaimed to be attracted to the “naturalness” of Aqua Adapt, the prospect of revealing the “natural” naked body to the public at the ‘waterfall salon’ was met
with mixed reactions. Perceptions around nakedness and the human body is the subject of much socio-anthropological work that often refers to the duality between Judeo-Christian and Greek cultures. While the Greek tradition is said to consider nudity as the ideal state of the human figure (as celebrated in their sculptural and athletic practice), the Judeo-Christian tradition, emphasises the role of clothing in distancing the body from the state of deprivation experienced by lower classes and from associations with sex (Barcan, 2004). Although such dualities are less relevant in modern globalised society, the legacy of Judeo-Christian religious and symbolic tradition in Ireland contributes to the prevalence of prudish and conservative attitudes towards nudity, potentially accounting for the unease exhibited amongst citizen-consumers towards the ‘waterfall salon’. Nevertheless, they were often more open to shared washing practices with family members and there was some openness and willingness to renegotiate norms of bathing and cultural meanings of nudity and privacy as Noleen notes: “if other people were happy, I would be quite happy to meet up and bathe”. This reveals the power of social expectations and cultural conventions in shaping what is considered to be normal consumption behaviour, showing how important it is for new sustainable practices to be compatible with social norms to achieve scale and success (Sustainable Consumption Roundtable, 2006).

Similar discussions on the dichotomy of private versus public bathing were held in the Green group where there was strong sentiment that washing is a “personal” rather than a “social” pursuit. This group raised issues of equality, suggesting that the ‘waterfall salon’ is an “unfair” solution due to its potential to cause discomfort and unease for some people. An auxiliary concept to the ‘waterfall salon’ was the delivery of education on sustainable living in-situ. The Green and the Dynamic washing groups were positively disposed towards “learning tips about living more ecologically” and it became apparent that the optional nature of this educational initiative and the ‘greenworks’ courses was favoured over the enforced educational concepts of the other scenarios (e.g. ‘energy crash course’ in Carbon Control). The ‘greenworks’ course of the Community Core scenario was especially appealing for its socialising and practical dimensions:

“I kind of like it as an idea and I thought of it as a socialising thing, that you just meet up with people and they’re you know, looking for ways of improving things, and so on. You know it sounded like it could be made fun as well” (Karen, Green, heating).

In relation to the ‘greenworks eco-points’, a number of citizen-consumers responded positively towards the personal rewards that could be accrued. It was suggested that these could include reduced energy bills, discounts on retrofitting, and local produce with one Dynamic participant emphasising that “the economic side of things would certainly be an incentive”\(^{80}\). While personal rewards were appreciated, feelings were more ambiguous about community level competition and award programmes for low consumption neighbourhoods (e.g. ‘carbon

\(^{80}\) Deirdre, Dynamic, washing
quota league’ and ‘district water competition’ concepts). The Mainstream washing group perceived the ‘district water competition’ the most positively and early comparisons to community energy projects and Tidy Towns set a positive tone:

**Helen** - I think that’s quite a good idea because it gets you interested but doesn’t point the finger at you specifically

**Noleen** – yeah, because I love when I go to a town and it says it won the Tidy Towns award when you come in to the town, this town got second prize, or whatever it is, you’d be looking around and you’re far more vigilant.

**Mainstream, washing**

The positive response to area based award schemes amongst this group could be attributed to their socio-demographic profile as many were of an older, female, rural cohort perhaps with a stronger sense of community and place. This group was positive towards the concept of district awards and consumption visibility on a community level. However, when it came to the display of personal consumption details, there was more opposition:

“I think you should be able to see what your own consumption is, I don’t see why you should want to see anybody else’s” (Deirdre, Dynamic, washing).

There was an unwillingness to divulge information on personal consumption, particularly in the Mainstream washing and heating groups, as Nuala articulated: “It’s a personal information thing…Google have enough personal information on us!” This reference to Google exhibits unease amongst citizen-consumers at current online developments in the “big data age” whereby personal information from social media and online platforms is increasingly accessed by third party institutions from the public and private sectors (Krotoski, 2012). In this sense, some participants interpreted the scenario IT tools and web platforms as tools for the extension of “police state” agendas and were wary of the means and ends of data collection. This is articulated by a member in the Mainstream washing group who believed that the ‘district water competition’ was “sort of a Police State thing”, with another agreeing, “what was it, George Orwell?...it’s really somebody peering into your life and all that”. This highlights the political and moral debates that are entangled with new technology developments based on the capture, storage and processing of personal consumption data (Feeney et al., 2008). Citizen-consumers from the Mainstream energy focus group were particularly vociferous about this:
Nuala: so it’s like big brother watching you all the time, the other thing I hate are quotas and big brother.

Group: [agreement]

Padraig: I think that’s a common denominator

Cáit: it doesn’t bother me though, what’s the big deal?

Padraig: I don’t like big brother

Sheila: I don’t like being watched and monitored.

Cáit: It doesn’t bother me like, I don’t see the big deal of their watching what you consume.

Nuala: you see you’re that generation, you know, do you know what I mean

Sheila: when you get older, when you get older it bothers you

Cáit: like if they knew you bought whatever like, is it just you wouldn’t like them to know how much like energy and stuff you’re using?

Sheila: no, no, you know you shouldn’t have people looking over your shoulder and that type of thing

Kevin: I agree, it’d be like the time the priests used to read from the pulpit how much everybody had donated for the year!

Mainstream, heating

This extract reveals a generational gap in perceptions of IT for monitoring and benchmarking. Older cohorts tended towards intrusive and sinister interpretations, perhaps reflecting their lower levels of experience with smart devices, social media and the Internet – integral components of the future scenarios. The comparison of the carbon quota with past practices of clergy publicly divulging individual donations contributed to fear and suspicion of the concept amongst the group. This reveals the importance of the publics’ relationship with national institutions (such as the Catholic Church) in shaping their responses and worldviews, and in this instance, their norms of privacy. By contrast, the younger generation appeared to be more comfortable with social media and were accepting of the tracking of personal information by external agencies. This shows the variety in interpretations of privacy across citizen-consumers, highlighting potential issues in data protection that would need to be negotiated were such advancements in transparency implemented. Aside from issues over privacy of personal data, reservations were also voiced about the capacity for collective responsibility and co-operation that were vital for many of the scenarios’ collaborative concepts. The Dynamic heating group in particular questioned the capacity for community spirit and trust amongst neighbours required in Community Core. This is evidenced in the below extract that was representative of many of the ‘social dilemma’ (Biel and Thogersen, 2007) debates evoked by the future scenarios:
**Ryan:** I like the idea that you had the ‘green-works’ but I’m not sure about the idea here of getting together with all your neighbours and kind of turning around just to get a little gold star a little sign at the end of your street saying ‘you’re brilliant’, I’m not sure. I’m just going back to I think it’s more capitalist situation here, you know you’re getting rewarded for something that’s fine

**Researcher:** so do you think individual rewards more than community awards you would be more in favour of?

**Ryan:** judging by my neighbours yes!

**All:** [laughter]

**Ryan:** wouldn’t want to be hanging out with them!

**Gary:** I know the answer to that often, well I suppose, likewise, I don’t necessarily want to spend any more time with neighbours after work, afterwards, I just want to arrive home, chill out, relax… So, while I still like the idea of you know community spirit and being able to get a playground for the kids

**Deirdre:** to me, depending on your neighbours being good carbon citizens, is just, I’m not sure that tallies.

**Gary:** I know that it sounds awful, but…

**Deirdre:** It’s like penalising people for not being good enough at carbon management, just

**Conor:** for buying in to the wrong area, you know

**Deirdre:** yeah, for having bad neighbours.

More often than not there was resistance towards depending on co-operation from neighbours, or as Deirdre puts it, “depending on your neighbours being good carbon citizens”. It was reasoned that short-term private interests would trump collective ones, especially given the time demands and potentially low levels of interest amongst citizen-consumers to manage their carbon consumption. In this sense, one person felt that the scenarios were “forcing” a notion of community that may not exist or be desired, especially in urban communities. Likewise, within conversation on ‘group rainwater harvesting systems’, important questions were raised about appropriate scales of natural resource governance ranging from ‘collective commons’ to ‘central management’ models. Echoing Hardin’s thesis on ‘tragedy of the commons’ (1968) participants identified that a collective rainwater harvesting system could be susceptible to over-use or misuse by a self-interested minority, as Lyla from the Dynamic group commented: “You’d have one person within the community that says to hell with it, and then everyone else would be up in arms against them!” With this, Deirdre responded: “It’s just another area for potential conflict, rather than potential, you know, coming together”. This contradicts findings in research which suggests that collective institutions like community-owned windfarms are strong promoters of community wellbeing whilst simultaneously providing supportive structures for collaborative environmental action (Seyfang, 2010).
Echoing sentiments voiced in the Dynamic group, the Mainstream washing group agreed that “monitoring” systems would have to be put in place to ensure responsible use of collectively harvested rainwater. Aside from these issues of community trust, others identified obstacles to the community education and governance concepts arising from the differential ability of individuals to participate due to socio-economic, educational, demographic or familial circumstances:

“If you’ve a family and you’ve young kids and you have to wash up after them all the time and you don’t even get to know your neighbours…it appeals to people who are educated not people who work shifts you know, working late in factories and stuff” (Wes, Green washing - of De-waterise’s ‘open innovation’ concept).

Although the Green washing group was highly sensitised to the potential inequalities of access and participation, they agreed that their profile would be more inclined to participate in the sustainability education initiatives. Other citizen-consumer groups felt that only a particular “sandal wearing” profile would have the required time, knowledge and desire to participate. The below extract from the Mainstream group relating to the ‘open innovation’ concept illuminates this sentiment:

**Helen:** Well the one thing, I…I don’t like the idea of this kind of group sitting around

**Group:** [laughter and agreement]

**Patricia:** that’s right, no.

**Helen:** “many people attend these creative interactive forums, and eco-points are gained for participation” [reading from the focus group hand-out]. It seems to be a little bit too controlled and a little bit too big brother, but I don’t know…

**Dee:** that was my thing as well

**RD:** how would you modify that idea?, what specifically don’t you like about it?

**Helen:** it’s kind of the group thing, and like you know

**Dee:** and also getting credits for being there

**Helen:** yeah, yeah

**Brian:** well you wouldn’t necessarily have to be there I mean all this technology nowadays you could do that on a phone, or just partake in a blog or something like that, and if you did that, you’d get your credits, I’m telling you that’s the way things will go.

**Joan:** yes dear!

**Group:** [laughter]

**Helen:** it’s just strikes me all these eager beavers sitting around in their sandals, you know

**Patricia:** and you know the types!…maybe I’m just not in to that kind of wavelength”.

Mainstream, washing
There was a sense of apathy towards group interaction and the concept of ‘open-innovation’ was seen as too far removed from their current lifestyles to engage with: “maybe I'm just not in to that kind of wavelength”. The resistance towards “eager beaver”, “sandal wearing types” supports evidence that overtly green or environmental imagery and rhetoric used in environmental campaigns may be an inhibitor to garnering support amongst mainstream populations (UNEP, 2005a; WWF, 2008). While the youngest attendee commented that many of the community proposals could take place online by 2050, this was quickly disregarded by other participants who were less familiar with modern social networking and online platforms and found such a development hard to comprehend. There was a negative perception within both the heating and the washing Mainstream groups towards those who would find the overtly environmentally friendly or communal dimensions of the scenarios appealing. Some identified “commune” undertones within the Community Core scenario: “this is like what I call the hippy solution, where we’ll all live kind of quietly, and grow vegetables”81. Their sentiment reflects what Hobson (2002) characterises as the dominant perception of hippies as being counter mainstream, with anti-government and subversive tendencies. Another aghast response was evoked in relation to the Community Core scenario which was interpreted as involving dramatic, and in Maria’s perspective, unwelcome advancements towards communality:

Maria: but is this change, really not only like change in terms of energy use and in terms of energy for heating purposes, it seems to me it’s like a massive cultural change, some sort of abolition of private property? Like, we’ll all live in the same houses, same size in 40 years time, well 39...you know the, the biological core, they are changes in terms of energy consumption and efficiency of energy production and heating systems, but the actual restriction on the personal choice, property as well is a bit, I don’t know -

Conor: It’s not because you’re being forced to have a situation where you’re living in here, or you know, that is, something that’s going to be forced upon you, the idea is that people will choose [to live as depicted in the Community Core scenario].

Dynamic, heating

Maria finds the ‘biological core’ and efficiency improvements attractive, but the underlying cultural dynamic of Community Core is unappealing and likened to collectivisation of private property and with that, an erosion of individual prerogatives, privacy and “personal choice”. By contrast, Conor notes that this would be a self-selecting, rather than enforced reality. Community Core was identified as being the most challenging to capitalist and individualistic tendencies: “I think society is getting more individualistic, not less, and I think people would kick hard against the idea of having to share things”. This counters the reported trends of collaborative consumption amongst the western world spurred through new online platforms which are said to fulfil age old desires for belonging and social interaction through modern

81 Kevin, Mainstream, heating
information technology (Botsman and Rogers, 2010). Indeed, there was palpable distress from some participants at the persistent challenges the scenarios made for “society and the way we live now”. This was especially the case in the Mainstream heating focus group where participants were of the opinion that certain universal and timeless desires for comfort, individuality and style will endure irrespective of sustainability challenges:

**Nuala:** it’s like, I’m reading this, and it’s like, the society and the way we live as we know it is kind of going out the window!

**Padraig:** gone out the window yeah

**Nuala:** everybody is going to these meetings and this and that, and it’s like it’s a totally different world, I mean, life as we know it!

**Joan:** it will be, it will be too I’d say

**Nuala:** but they will still go to discos and they’ll still go out drinking and they will still do all these things and girls will not want to wear as you say, the second skin

and d’ya know what I’m saying, where does it end

**Kevin:** there’s no drinking

**Padraig:** they’d be on a quota!

**Nuala:** you know, do you put the shield ['second skin'] over the disco, do you put it over the library, do you!?

**Padraig:** it seems all very controlled, you’d stop smoking, there’ll be no drinking, you’ll probably get a tablet, if you’re good you’ll get two

**Nuala:** I know it’s only the scenarios, but every one I’ve read that keeps bringing you back to the further thing where someone else is in control up there.

**Padraig:** it’s 1984ish

**Nuala:** it is yeah, very, very much so.

**Mainstream, heating**

Within the Mainstream heating group, the scenarios were considered to be reliant upon a cultural evolution beyond the capacity of the forty year timeframe, and beyond fundamental human desires for individualism, self-expression and novelty. Orwellian rhetoric pervaded and clouded discussions such that many concepts were considered to have “controlling” dimensions and were cast in a negative light. By contrast, a more holistic sense of the capacity for cultural evolution through time was revealed in the Mainstream washing group. Referencing past experiences of well water use between neighbours, these participants noted the existence of a good “community spirit” when this alternative system of provision was the norm. Experience of these alternative water practices in the past served as evidence of practice evolution and it was reasoned that another “mind-set shift” could take place towards sustainability such that “we’ll all be thinking that way”. As the discussion unfolded there were
suggestions that the use of well water and rainwater could be reinstated, showing a willingness to revert to older, familiar practices, irrespective of the inconveniences that this might involve. According to literature on policy feedback, “memetic mutations” towards cooperation and empathy can be promoted through the expansion of alternative systems of provision (such as collective rainwater harvesting) that embody and rely on such values for their successful operation, creating a positive reinforcement feedback loop (Crompton, 2010). Indeed, the ‘water supply monitor’ that tracks personal and pooled rainwater resources in Aqua Adapt was seen as a positive device to cultivate these values, making people think of “the bigger picture”:

“I think that makes people think of the bigger picture as well, you know, people kind of tend to think, you know, me individual, but by linking it to the water grid you kind of think, I have to share this, you know, it’s not just for me. That’s what I liked about it (Emer, Green, washing).

Although there was acceptance of the use of technological tools as a means to cultivate greater collective responsibility, opinions were more polarised regarding the actual changes in social relations that would be needed for direct communal governance.
6.4 Conclusion

This chapter analysed feedback from citizen-consumers on the future heating and washing scenarios in relation to key emergent themes of: human-technology interactions; nature, health and wellbeing; regulatory extension into personal consumption practices; and individual and collective responsibility. These themes were explored with reference to the scenario concepts that provoked them, highlighting divergent interpretations and responses amongst citizen-consumers and linking these to broader literature on sustainable consumption, social practices, and science, technology and society studies. To conclude, the chapter reflects on these findings with attention to the qualities of the scenarios that citizen-consumers identified as most positive. The underlying qualities of the scenario concepts, including their values, meanings and principles, were often found to be of more importance to citizen-consumers than the specific details of concepts themselves. It is also important to consider this feedback to identify the most promising qualities of the scenarios to accentuate in the Transition Phase.

Another factor found to be of fundamental importance to citizen-consumers was the reconfiguration of the relationship between people, things and institutions within the scenarios. Aside from commentary on these findings, this conclusion section draws observations on commonalities in patterns of thought, group interaction and conceptions of practice evolution across time and space which were found to play a key role in shaping citizen-consumer assessments and interpretations of the future scenarios.

Voting patterns presented at the beginning of the chapter showed that Aqua Adapt was the most popular washing scenario, followed by Efficiency-Sufficiency while Second Skin and Carbon Control received the most positive votes in the heating focus groups. However, as the ensuing analysis showed, these votes cannot be considered definitive given the complexity in opinion revealed through the qualitative analysis. Also considering the voting exercise took place as a public activity, it was subject to influence by group dynamics, perhaps skewing individual opinions to a degree (Flowerdew and Martin, 1997). A key observation was that citizen-consumers could rarely imagine inhabiting the scenarios in their entirety but rather cherry-picked elements to their favour. For example, despite statements of support for Aqua Adapt, citizen-consumers were less positively disposed towards the depicted practices of gel usage and attendance at the ‘waterfall salon’ that would be required in times of lower water availability. Likewise, although participants strongly valued the ‘energy management system’, and the ‘home floor plan’ concept of Carbon Control, the ‘carbon quota’ was met with caution due to its challenges to conventional ability to pay paradigms of personal consumption. Given these sentiments, there was a stated preference for solutions that facilitated controllability, engagement, personalisation, and efficiency in personal heating and washing practices. These preferences were often formed as a reaction to those concepts that were seen to evoke strategies of state control, disempowerment, curtailment or standardisation. Nevertheless, most citizen-consumers did view some form of valuing and charging for water
as appropriate. The ‘carbon quota’ was generally accepted, although information and market-based measures were favoured as first steps.

Perhaps unsurprisingly, a propensity was found for citizen-consumers to prefer ideas that were less challenging to personal norms and routines and did not detract from their washing and heating experiences as known in the present day. This was evidenced by the preference for technical innovations that were considered “realistic”, “waste-saving”, “convenient” and “smart” - typically those that were slight modifications of existing practice materialities. This is in line with literature on the social shaping of technology that reports radical innovations are less likely to be adopted than incremental ones (Williams and Edge, 1996). Citizen-consumers were often wary of what they felt was excessive technological extension into personal spheres and bodily practices. Scenario concepts such as the ‘wash watch’, ‘spot heating’ and ‘personal heat vest’ were seen to embody a trend of scientification or automation in personal washing and heating decisions. For some, this was seen to undermine personal knowledge and know-how, reducing people’s practical capabilities to perform these tasks, leaving them vulnerable to risk of technological failure. These sentiments support literature showing that rather than full automation, practitioners like to be “engaged in the activity of doing” for enhanced satisfaction and control (Lockwood and Murray, 2005; Marchand and Walker, 2008, 1163; Strengers, 2008). This shows the importance of building in options for engagement and personal adaptability to strategies for sustainable water and energy consumption. Participants valued the liberty of making daily practice decisions (in particular those relating to personal washing) on impulse, emotion and whim and resisted those concepts that they felt would reduce options to pursue choice, variety and personal taste. However they were less inclined to explicitly provide these as primary factors in their judgment of the scenario practices, more often attributing their adverse responses to loftier issues of justice, equality and personal freedom.

Comparing responses between heating and washing focus groups, citizen-consumers were found to be more open to different modes of heat delivery in comparison with personal washing where the use of water was strongly valued and less negotiable. For example, the home ‘second skin’ and ‘personal heat vest’ concepts were popular for the potential advancements that they could bring for the indoor environment and personal health, representing welcome alternatives to central heating. This was reflective of the positive disposition towards concepts, technological or otherwise, that were seen to enhance personal wellbeing and health showing how important these emotional and physiological agendas are in personal washing and heating practices. Linked to this, citizen-consumers were often attracted to scenario proposals that served to enhance greater connection between resource usage and natural rhythms. It is interesting to note that this was a common sentiment across citizen-consumer focus groups and was not only the preserve of the ‘green’ profile of participants. Working within the confines of natural rainfall limitations appeared to be more
desirable to citizen-consumers than regulatory restrictions which may potentially be more unforgiving and indiscriminate.

In concluding this chapter, it is pertinent to make reference to the patterns of thought and interpersonal negotiations through which people formed their opinions and made sense of the future scenarios. This reveals important insight on how to frame and design interventions for more sustainable consumption practices. A key finding was that citizen-consumers’ experiences of alternative consumption practices (throughout their lives and in other cultures) played a fundamental role in shaping their conceptions of the potential for evolution in heating and washing practices and their disposition towards those depicted in the future scenarios. Through their reference to alternative practices, an appreciation of the relativity and dynamism of norms, meanings and rituals around washing and heating practices across space and time was revealed. A deeper reading of their responses showed that personal conceptions of human nature played an important role in whether and how citizen-consumers thought socio-cultural changes could occur to support collective and altruistic motivations which are said to be required for action on “bigger than self” problems (such as climate change or other environmental issues). Good practices of other countries were often mentioned as evidence that the scenario depictions could or should be adopted. The below exchange from the Mainstream group on the ‘Community Core’ heating scenario is illustrative of typical discussion on cross-cultural differences:

**Reseacher:** What about that - the idea of the regulation of space so that there is actually a set amount that you can build according to the number of occupants.

**Nuala:** well they have that in Holland,

**Sheila:** I was going say, they have it in Holland

**Joan:** it’s a good idea I think

**Sheila:** I was in Holland a few weeks ago and there’s lots of things we could be learning so much from them.

**Nuala:** yeah, yeah, they have it, but because we’re used to what we’re used to, it’d be very hard for us, the up and coming generation maybe yes but

**Padraig:** but the Dutch are a very orderly crowd!

**Group:** [Laughter]

Mainstream, heating

In this extract, Sheila believes that this mode of compact and environmentally friendly living is one that can be learnt. This reference to the potential for cross-cultural learning supports literature by Shove (2004) that shows the horizontal migration of practice elements cross-culturally, challenging conventional vertical niche-to-mainstream conceptions of innovation diffusion as depicted in the ‘multi-level-perspective’ model used in transitions research (Geels,
Despite this, participants were often more pessimistic regarding the capacity for adoption of overseas practices and conventions given cultural factors particular to the Irish context. There is a presumption within this extract that the Dutch are an innately “orderly crowd” by comparison with the Irish. In addition, the cultural legacy of farm landholdings and the desire for private land were considered steadfast traditions, accounting for scepticism towards the ‘reduced space’ and collective facility concepts of Community Core. The acknowledgement of cross-cultural variances in heating and washing practices hinted that engrained cultural preferences, rather than technical or administrative ones, were key barriers to the adoption of the scenarios’ socio-technical innovations. Despite some general scepticism towards the capacity for behaviour change, many participants recollected points in their own lives when they enacted alternative washing or heating practices as a result of differing technologies and norms of the time. This showed an understanding that mindsets do evolve and openness was revealed to the reinstatement of practices that were rooted in past conventions. For example, older participants spoke of shared well water use and weekly baths, while others recalled the absence of central heating in their youth. By contrast, younger participants tended to have more rigid conceptions of washing and heating “needs” but were more open-minded to adopting the novel socio-technical innovations compared with citizen-consumers of an older generation.

Within focus groups, reference was also made to temporary practice reconfiguration in the present day in response to exceptional circumstances. For example, many anecdotes were told about the ‘big freeze’ of 2011 when creative behaviours were employed to save water (such as the re-use of bath water for toilet flushing). During these periods, practices of water consumption were clearly “destabilised” (Shove et al., 2008b) and citizen-consumers stated that in such situations “you automatically do the necessary things” to ensure water availability. However, these new practices did not necessarily stick, as one person commented: “just for a few days though, and then you kind of go back to normal”. Instead, they were short-term, adaptive actions borne out of necessity rather than long-term, enduring cultural changes to washing routines. These discussions on practice alteration through time showed more openness to practice change than was often explicitly communicated, revealing an underlying creativity and flexibility in citizen-consumer conceptions of “normal” heating and washing expectations and skills.

As a rule of thumb, citizen-consumers normally stated they would consider adoption only “if” various conditions were satisfied rather than professing outright support. These conditions discussed briefly to close this chapter and related to: 1) functional considerations (e.g. whether on a basic level the depicted practice would serve its function effectively); 2) equity in application (e.g. if quotas were applied universally and transparently with allowances tailored to individual circumstances); and 3) future socio-political and environmental contexts (e.g. if there are water shortages or international regulatory action is taken for climate change). To begin with functional considerations, evaluations on the capacity for the depicted practices to
provide effective cleaning or heating were strongly shaped by citizen-consumers' experiences of similar practices and technologies. Existing technophobe or technophile orientations were found to have a strong bearing on responses and shaped citizen-consumer perceptions on human capabilities to develop the required “technical know-how” for successful practice completion. Secondly, universal and age-old concerns of equity, privilege and justice were voiced by citizen-consumers in relation to many of the scenarios’ regulatory depictions. While many believed prudent use of natural resources is required, there was a strong sense that more stringent regulations (such as the water and energy quota systems) would only be acceptable “if” they took into account differential circumstances. These related to differences in individual needs, abilities and opportunities to maintain within quota limitations arising from variations in age, physical ability, education, income and familial responsibilities. Of primary concern for citizen-consumers was the need for burden-sharing and action across scales and sectors. They also requested greater transparency and monitoring to reduce opportunities for corruption. For example, it was often considered that government would need to demonstrate action to reduce water leakage before requiring payment by consumers: “even at the minute, I’d be happier to pay the water rates if I thought that they were going to do stuff like that [repairing pipe leakage]”.

This leads to the third key ‘if’ factor in citizen-consumer scenario assessments which relates to the broader social, political, economic and environmental context in 2050. Given the uncertainty as to how these landscape contexts may evolve in the future, citizen-consumers often made assessments based on the present day. However some included caveats that their decision would change in different future realities. For example, it was noted that a dramatic reduction in fossil fuel availability would necessitate tighter restrictions on personal carbon consumption, thus making the Carbon Control scenario more acceptable. Similarly, in relation to water usage, it was noted that such a scenario would be more acceptable and successful in a situation of palpable water scarcity:

“If in 2050 people think there’s enough water and they’re still being told by government, we’re not going to give you any and people are meant to sacrifice and then there’d be uproar I think, so, this would be a really good scenario, based on the fact that there wouldn’t be much water to give everyone” (Lyla, Dynamic washing).

In evaluating citizen-consumer responses it was clear that both affective (emotional) and effective (intellectual or cognitive) forces were at play in shaping perceptions, understandings and evaluations of the future practices. This is consistent with research on public understandings of science and technology that shows a range of variables shape responses including: personal values and knowledge; socio-demographic background; trust in political, social and scientific institutions; and broader socio-cultural, political and economic contexts (Ho et al., 2011). Just as these differing internal and external drivers led to competing visions on how citizen-consumers see the world today, they also influenced their responses to the future visions, further demonstrating the ineffectiveness of relying solely on interventions
based on rational actor models of behaviour. This also accounts for the few generalisations apparent across Green, Mainstream and Dynamic groupings while those that were apparent tended to be a function of the participant's age, life-experiences and personal value frames rather than their environmental orientation. This finding conforms with an array of literature within social sciences which shows that although an individual may have positive environmental values and attitudes, these are often overpowered in routine daily practices which are shaped more by the availability and configuration of material items, combined with states of emotion, know-how and social norms (Reckwitz, 2002). The next chapter will elaborate on how insight gained from citizen-consumer focus groups was built into the ultimate scenarios used in the final Transition Phase of the backcasting process. The Transition Phase was based on the engagement of strategic stakeholders in the development of interventions to build towards the most promising features of the future sustainable washing and heating practices.
CHAPTER SEVEN:
TRANSITION PHASE
7.1 Introduction

The Transition Phase represented the end point in the iterative backcasting process. Building upon insight developed through the preceding phases, the aim was to identify the most promising future heating and washing practices and to engage stakeholders in the design of stepwise interventions to work towards their achievement. Voß and Kemp (2006: 433) characterise transition procedures by the processes of “opening up and closing down” that they involve. While the Visioning Phases involved activities and mindsets distinctly aimed at “opening up” (or imagining and exploring future possibilities), the Transition Phase is distinguished by processes of “closing down”. This is where insight, concepts and innovations generated from the earlier Visioning, Sustainability Evaluation, and Citizen-Consumer Phases are distilled to develop concrete action plans for the future scenarios. The primary means by which these action plans, or ‘Transition Frameworks’, were developed was through a stakeholder Transition Workshop held for each practice. Back-office work related to this phase included a preparatory process of distilling the future scenarios into three ‘Promising Practices’, and a results processing step after the workshops that elaborated ideas into comprehensive Transition Framework documents and evaluated stakeholder survey feedback. Two Transition Framework documents were produced - one for personal washing and another for home heating - each containing a timeline of interventions to build towards the 2050 Promising Practices. These were disseminated through various environmental media outlets and were sent to participants in the backcasting research, along with key governmental, non-governmental, civil society and private sector actors. Empirical material referred to in this chapter includes observation and evaluation of the workshop process by the researcher, workshop transcripts, material developed at the workshops (intervention ‘post-its’ and timeline output), and survey responses.

The chapter initially details the three Promising Practices that were developed for both personal washing and home heating, representing the final iterative step in the refinement of the future scenarios. These Promising Practices were taken forward to form the end goal to work towards at the Transition Workshops. Initial discussion of the output from the Transition Workshops focuses on the intervention brainstorms held in each, where participants aimed to develop policy, research, education and business interventions to work towards the 2050 Promising Practices. Next, results from the timeline development session are presented. This represented a further stage of “closing down” where participants wove the interventions into interrelated strands of action over time, identifying possible challenges, drivers and actors for their implementation. Within these discussions, broader debate was provoked on the interactions between interventions through time and the challenges of coordinating long-term action within environmental governance. Given the normative dimension of the backcasting process, the Transition Workshops offered space for participants to explore and articulate their perspectives on priorities and principles for sustainable consumption. A spectrum of stakeholders participated in the workshops. This meant that a range of personal and
professional values, philosophical and practical viewpoints were represented. Aside from output generation (in the form of the interventions contained in the Transition Framework documents), this chapter provides an opportunity to examine how these different frames and values shaped the solutions proposed and to consider what this reveals about dominant thinking on sustainable consumption. The chapter ultimately reflects on the benefits, limitations and challenges relating to the Transition Phase with reference to participant perspectives. Evaluation of participant feedback is extended in further detail in the final results chapter on ‘participatory backcasting and sustainability learning’.

### 7.2 From future scenarios to ‘Promising Practices’

Prior to the Transition Workshop, it was necessary to review and revise the scenarios to ensure that they reflected the results of the previous Citizen-Consumer and Sustainability Evaluation phases. These two phases permitted greater exploration of the benefits and limitations of the scenarios from the perspective of everyday users and against the new economics sustainability evaluation criteria. Aside from building in this insight, an additional motive for the final iteration of the future washing and heating scenarios was to further accentuate their practice focus to improve feedback and dialogue on this conceptual angle amongst participants at the Transition Workshops. Furthermore, it may also have been cognitively challenging for participants to fully absorb the minor details of each scenario in its original format, leading to less specific intervention proposals. Therefore to ensure that the scenarios were focused, practice oriented, and reflective of previous phases, a set of three ‘Promising Practices’ were distilled for both washing and heating. A systemic process was designed to complete this task represented diagrammatically in Figure 7.1 and explained in the following paragraphs.

#### Figure 7.1 Promising Practice development process

![Promising Practice development process diagram](image)

To begin the process of Promising Practice development, discrete concepts within each of the scenarios (such as ‘wash monitor’, ‘eco-cation’ and ‘second skin’) were analysed individually. ‘Concept cards’ were created for each, detailing citizen-consumer feedback with attention to their recommended modifications and the number of votes they had allocated to the concept (See Appendix T for a sample concept card). Reflecting public feedback in this way enabled elaboration and refinement of the concepts to reflect user-preferences, increasing the likelihood of user acceptability. In addition, a review of existing similar concepts was conducted. These were outlined within ‘concept cards’ and also in the Transition Workshop
introductory presentation. Assessing the evidence base in this way gave both the researcher and workshop participants an indication of how emergent or embryonic socio-technical developments could be elaborated and combined in the future to form the Promising Practices. This exercise gave weight to the feasibility of the heating and washing Promising Practices. Furthermore, it took heed of studies on socio-technical innovation that note that rather than emerging out of the blue, innovations typically arise from creative combinations of existing elements, which themselves represent combinations of ones from the past (Arthur, 2009). After this process, the most promising and innovative concepts were prioritised. The use of “promising” in this sense denotes concepts that performed well in the sustainability evaluation and in the citizen-consumer workshops and have been strengthened and elaborated throughout the entire iterative backcasting process. “Innovative” concepts were those that represented bigger breaks from the norms, procedures, meanings and devices of current washing and heating practices.

Following this, each promising scenario concept was considered for the underlying qualities and cultural values it embodied – a process strongly informed by feedback from citizen-consumers showing the importance of these considerations. This process drew upon work by Akrich and Latour (1992) on “design scripts” whereby objects are considered to reflect and reinforce, or “script” certain values (such as sustainability) and rules of practice (e.g. optimum room temperature levels or expectations of cleanliness). Such a perspective is common amongst researchers in technology, design and social practice fields who consider the symbolism of everyday objects and how this reinforces societal meanings (such as immediacy in the case of power showers). The process of “reading” the scenario concepts to develop Promising Practices also relates to work by Spaargaren (2003: 690) on “environmental heuristics” or “rules of thumb to be used by citizen-consumers in determining ‘how to go on’ in a more sustainable way in the context of the time/space-bound daily routines they are involved in”. Through this in-depth reading of the scenario concepts, it was found that they tended to script procedures relating to:

1. Strategies and motivations for washing / heating
2. Management of and relationship with the resource (water or energy)
3. Methods of provision and infrastructure relating to the practice

By clustering the promising concepts according to the above dimensions, three Promising Practices were created for the washing and heating studies as listed in Table 7.1.

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82 In the sustainability evaluation certain concepts contributed to low overall ratings for their scenarios such as ‘spot heating’ (Second Skin), ‘energy crash courses’ (Carbon Control), the water quota ‘thumb print scanner’ (Efficiency-Sufficiency) and the ‘nano-shower’ (De-Waterise). These were also controversial concepts in the citizen-consumer workshops and to a certain degree, there was continuity between those scenario dimensions that scored well in the sustainability evaluation and those that were popular amongst citizen-consumers. Notable exceptions however were those based on community spaces and space reductions that scored well against the new economics indicators yet were less popular amongst citizen-consumers. This raised the question of which to prioritise in the ultimate Promising Practices and attention was paid to bringing forward those that were the most innovative in order to stretch thinking in the ultimate Transition Phase.
### Table 7.1 Washing and Heating Promising Practices

<table>
<thead>
<tr>
<th>Practice Procedure</th>
<th>Washing Promising Practices</th>
<th>Heating Promising Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategies and motivations for heating/washing</strong></td>
<td>Adaptive Washing</td>
<td>Thermal Awareness</td>
</tr>
<tr>
<td><strong>Management of and relationship with resource</strong></td>
<td>Efficiency in Use</td>
<td>Managing Carbon</td>
</tr>
<tr>
<td><strong>Methods of provision / infrastructure</strong></td>
<td>Connecting with Nature</td>
<td>Adaptable Homes</td>
</tr>
</tbody>
</table>

Each Promising Practice was represented as a short narrative detailing how a person performs their washing or heating task and the bundles of devices, actions, regulations, infrastructures and user expectations associated with it. These narratives are found in Tables 7.2 and 7.3, which should be reviewed by the reader in order to improve understanding of the ensuing discussion. The Promising Practice narratives were utilised in the introductory presentation\(^83\) of the Transition Workshops alongside visual mood boards containing images of comparable solutions found in the present day. Figures 7.2 and 7.3 also show images of the original scenarios, circling those concepts that were included in the Promising Practices. This shows their roots within the original scenarios and the cross-fertilisation between scenario components in their creation. In this sense they are born out of the initial scenarios whilst reflecting additional insight and suggestions garnered from the previous backcasting phases. As with the earlier scenarios, the Promising Practices are not considered definitive blueprints for guaranteed sustainability in washing or heating practices, nor are they intended to be mutually exclusive. Rather, each Promising Practice represents a promising quality of sustainable washing or heating, typically activated during a particular stage of carrying out the practice. They could therefore be pursued collaboratively or in different combinations depending on future situations and further studies.

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\(^{83}\) See Appendix U for copies of the Transition Workshop introductory presentations.
Figure 7.2  Washing Promising Practices: relationship with original scenarios
Table 7.2  Washing Promising Practices

<table>
<thead>
<tr>
<th>Promising Practice</th>
<th>Narrative</th>
</tr>
</thead>
</table>
| Adaptive Washing   | *In the year 2050…*
|                    | “We have reduced worries about body odour and wash less intensively and frequently. Our wash-monitors help diagnose when and where we need to wash so no water is wasted on unnecessary washing. Gel cleaning products help reduce our water use and we often have a quick basin wash, or wash together to maximise efficiency. Our clothing is deodorising and breathable - this keeps us, and our clothes fresh!” |
| Efficiency in Use  | *In the year 2050…*  
|                    | “Thankfully none of our water goes to waste any more. Water from our washing machine, sink, bath and shower is filtered and recycled for re-use again. My shower cycles through different stages with varying pressures so nothing is wasted. I can see live updates of the quantity of water I’m using and the associated costs. Costs vary throughout the day and during different seasons so we all work around these fluctuations and we receive rewards for low water use” |
| Connecting with Nature | *In the year 2050…*
|                    | “Every morning just after I wake up, I check my rain monitor to see how much water I have. With advanced water filters, we use harvested water for most of our washing activities. Otherwise we can use greywater from dual water mains which also deliver a small amount of potable water for drinking / cooking. When it’s rainy, I use all the water I want but if there’s a dry period I cut back. The smart water grid allows me to feed my excess water to the communal rainwater system.” |
Figure 7.3 Heating Promising Practices: relationship with original scenarios
### Table 7.3 Heating Promising Practices

<table>
<thead>
<tr>
<th>Promising Practice</th>
<th>Narrative</th>
</tr>
</thead>
</table>
| Thermal Awareness      | *In the year 2050…*  
“We actively manage our personal warmth and are less fussy about having one standard temperature all the time. I keep cosy through a combination of additional layers or by activating my ‘personal heat vest’. I maintain tight control over energy use through checking room temperature indicators and actively adjust space heating and all our appliances through our home floor plan”. |
| Managing Carbon        | *In the year 2050…*  
“I keep a tight rein on my carbon quota. It’s easy to do this as every time I use energy to heat my home or I purchase any product / service I can see the exact environmental costs associated. I make great savings from being careful about my consumption and can see how my consumption compares to my neighbours. I look forward to receiving my eco-points for keeping within my carbon budget”. |
| Adaptable Homes        | *In the year 2050…*  
“My new home is fully equipped with the latest space adjusting interior and has bioclimatic architecture that maintains a comfortable, healthy indoor temperature so I’m lucky enough not to have to use heating at all. My space is a bit tighter because of recent regulations to tackle the trend for excessively large houses, but communal spaces for socialising and eating compensate for this”. |

#### 7.2.1 Promising Practices: discussion and explanation

Comparing the heating and washing Promising Practices, it is interesting to note that commonalities emerged in their enshrined values, scripts and strategies. From the citizen-consumer workshops it was found that personal experiences in fluidity of practices across time, space, and in crisis situations, led to a higher willingness to engage in more flexible expectations of heating or washing and demonstrated competency to adapt behaviours accordingly. This, together with their stated willingness for engagement in the activity and for
personalisation of consumption practices, led to the development of the ‘Adaptive Washing’ and ‘Thermal Awareness’ practices. Adaptive Washing is based on a societal acceptance of reduced washing overall and flexibility in washing practices assisted by personal ‘wash monitors’, strategies for targeted bathing and deodorising clothing. Thermal Awareness reflected the observed preference within focus groups for direct heating options, along with greater personal adaptability in practices of heating and healthier temperature levels. This is assisted by room temperature gauges, energy monitors and a shift towards direct body warmth strategies through the ‘personal heat vest’ and the use of extra layers. Promising Practices relating to the management of and relationship with water and energy resources were informed by citizen-consumers’ disposition towards technologies that promoted frugality, transparency and efficiency in consumption. In addition, most citizen-consumers thought that water should be more highly valued as a resource and were relatively accepting of tighter carbon restrictions as long as allowances were made for specific circumstances and principles of equality and fairness were applied. These sentiments were built into the ‘Efficiency in Use’ and ‘Managing Carbon’ practices. Efficiency in Use requires a highly aware population and values of frugality govern washing practices. Large reductions in water are enabled through water efficient devices and people are skilled in altering water use in conjunction with fluctuating water costs (that change with water availability). Managing Carbon implies a high awareness of energy issues stimulated by carbon quotas. Greater consumption visibility and individual reward systems motivate conscious consumption and ICT assists in energy management. Lastly, in both heating and washing focus groups, citizen-consumers showed a strong preference for technologies or socio-cultural changes that promoted healthier living and personal wellbeing often facilitated through the establishment of greater links with natural cycles. Concepts embodying these qualities, including washing based on rainwater availability and the use of dual-stream water qualities, were included in the ‘Connecting with Nature’ practice. ‘Adaptable Homes’ embodies the preference for bioclimatic architecture, and more variable, environmentally connected concepts of warmth, delivered by adjustments to the building fabric.

For the heating Promising Practices, it must be noted that there was a conscious decision not to include concepts from the heating scenarios relating to renewable energy at this stage. This was due to the large body of recent and emergent work on long-term pathways towards renewable energy and grid decarbonisation, mainly with the aim of achieving a target of an 85-90% reduction in greenhouse gas emissions by 2050 (e.g. SEAI, 2010b; EC, 2011a; Ros et al., 2011). Instead, the focus of the heating Promising Practices was on the effective delivery of personal warmth through alternative systems, including direct body heat devices, passive home heating and systems of incentives and disincentives to encourage wise energy use. The heating Promising Practices are therefore neither dependent on the success of these renewable plans, nor would they be rendered entirely void due to their failure. For example, the optimum solution for the ‘personal heat vest’ device of the Thermal Awareness practice would be that it is powered by renewable electricity. However should this be
unavailable, the relatively low power it would require could be delivered through alternative energy (for example kinetic or solar power) and it is intended that the concept of direct body heating be less energy intensive than space heating.

### 7.3 Promising Practice intervention proposals

This section provides a discussion of the interventions proposed by workshop participants to build towards the 2050 Promising Practices. After the workshop introductory presentation, intervention brainstorms took place. To encourage the development of a mix of interventions, brainstorm facilitators stimulated participants to think in terms of three key intervention categories outlined below:

1) **Policy**: regulatory and economic tools, including design and building regulations and market based instruments like taxes, incentives and subsidies.

2) **Education and engagement**: educational programmes, community initiatives and awareness campaigns.

3) **Research, technology and business**: Research & Development (R&D) agendas and economic investment strategies.

These intervention categories were intended to serve as a loose guide to promote integrated thinking consistent with the practice oriented perspective. Participants were encouraged to think of the meanings, cognitive and symbolic aspects of washing and heating practices along with hardware, regulatory frameworks and infrastructures. This was important for the development of a holistic Transition Framework, counterbalancing transitions research that tends to focus on technical and infrastructure systems (Rotmans and Kemp, 2008; Bailey and Wilson, 2009) and transition policy, which shows typical concerns with long-term roadmaps, detailing technological innovations and targets for decarbonisation (e.g. McDowall and Eames, 2006; SEAI, 2010b; EC, 2011a). Initially, it is useful to adopt a broad overview of the quantities of interventions proposed by participants according to the three key intervention categories of ‘policy’, ‘education and engagement’, ‘research, technology and business’. A very equal spread of interventions across these categories is revealed as shown in Figure 7.4.

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84 For shorthand in the workshop, these categories were referred to as “policy”, “people” and “technology/business”.

85 These figures on the quantity of intervention proposals were generated through recording and counting post-its containing participants’ suggested ‘interventions’ at the workshops. Participants were assigned the task of recording their intervention concepts on post-its and brainstorm facilitators made every attempt to ensure each idea was captured.
On a simple quantification, a total of 164 concepts were proposed for the heating Promising Practices, while 201 were proposed for the washing practices. Within this, each Promising Practice yielded between 43 and 77 intervention concepts. The higher volume of interventions proposed for the washing Promising Practices may in part reflect the fact that there is less attention in policy and practice to water consumption issues, thus accounting for the higher number of ideas to fill this vacuum. It may also be a function of the difference in group dynamics and attendee profiles on the day. Another notable differentiation is the higher proportion of ‘education and engagement’ ideas developed for the home heating practices (accounting for 37% of total intervention proposals) in contrast with the personal washing practices where this category accounted for 27% of interventions. This may be due to inherent differences between the composition of the heating and washing Promising Practices. For example, the personal washing Promising Practices saw more attention devoted to interventions for enhancing the efficiency of water using devices and water provision technologies, such as rainwater harvesting – areas that are currently underexplored compared to the high levels of attention devoted to energy efficiency. Despite these slight variances, the quantity of ‘policy’ interventions was consistent across the the washing and heating practices, accounting for roughly one third of interventions in each case. The next two sections provide a detailed analysis of the interventions developed by participants at the Washing and Heating Transition Workshops.
7.4 Washing interventions

7.4.1 Adaptive Washing

Many participants felt that in order to gain support for Adaptive Washing practices, such behaviour would have to incur economic benefits for its supporters arising from reduced water bills. With facilitator intervention, participants were encouraged to think beyond basic volumetric water charging strategies (which would be taken as a given in the forthcoming years in ROI and NI) and prompted to think of alternative interventions for the achievement of adaptive washing strategies. After warming up, ‘research, technology and business development’ ideas proved to be the most prevalent in the Adaptive Washing practice, accounting for 46% of all interventions. A large proportion of these related to research and development concepts for ‘deodorising clothing’, ‘wash monitors’, ‘gel based cleaning agents’ and shower improvements to permit sharing of water and splash washing. A fundamental barrier identified by participants to implementing these innovations was the difficulty of engaging and enlisting the support of commerce unless there was demonstrated market demand. In initiating investment, reference was made to the ‘1% for the Planet’ initiative, a global movement of companies who donate 1% of their sales to environmental organisations. It was recommended that a similar initiative be instigated within the cleaning industry where 1% of profits could be dedicated to research on sustainable products and communications supporting adaptive washing strategies. Building upon current trends in the clothes washing industry of providing guidelines for sustainable use on packaging (e.g. AISE, 2010), it was suggested that a similar strategy be applied for personal washing products.

Advertising by the beauty and hygiene industry was considered an unrivalled power in propagating escalating norms and expectations of cleanliness and the washing requirements (including use of cleaning products) that accompany them. This echoes work by Foucault (1997) who explores the extent to which social constructs, such as cleanliness, bodily ideals and beauty, reflect and reproduce formulations of socio-technical power. In contrast to industry, the government however was seen as having a less powerful role in cultivating cultural norms of washing. Overall, ‘policy’ interventions for this Promising Practice were relatively low, accounting for 18% of total interventions. In fact, the Adaptive Washing practice contained the least amount of ‘policy’ interventions of all the Promising Practices. This perhaps reflects dominant perspectives amongst participants and wider society on the role of government in managing, guiding and intervening in the domain of personal washing activities that are cast as private and individual prerogatives. It was therefore considered that the public may baulk at government instruction, or that their messaging would “get lost in the noise” given the strength of industry marketing. The Irish government, as with other western neoliberal democracies, has shown a characteristic reluctance to challenge levels of

86 http://www.onepercentfortheplanet.org/en/
consumption, especially with regard to water use in the home. This is clearly evidenced in its recent Irish Water consultation document where there is no mention of any intention to encourage citizen-consumers to reduce their water usage. Instead, engagement with the public is reduced to ‘marketing and communications’ (DECLG, 2012b), showing the prevalence of information-deficit models of behaviour change.

While there was some suggestion that government could intervene by regulating advertising around norms of beauty, many workshop participants felt that a more effective route would be to regulate the products themselves, removing the option to pollute upstream. This stance echoes the prevalence of consumer sovereignty doctrine within neo-liberal policy strategies (Maniates, 2001) showing a preference for upstream regulation, rather than engaging in direct messaging which could be seen to challenge individual liberties. Despite state messaging on practices of food consumption around issues of health, safety and hygiene (Griffith et al., 1994) a similar instructional role was not envisaged when it came to issues of environmental and personal health intertwined with household washing practices. Nevertheless, one participant did note that a potential in-route could be to revisit state messaging on washing requirements for newborns, which, in her opinion, were excessive and perpetuated unnecessary standards of cleanliness. This links to literature on “life events” such as the birth of a new child, or moving home, where openness to new information and routines can provide windows of opportunity for catalysing sustainable behaviour change (Schäfer et al., 2011).

Given that the Adaptive Washing practice involves changes in procedural know-how and norms of washing, it is not surprising that ‘education and engagement’ interventions were more abundant for this Promising Practice (at 37%) compared with the other Promising Practices where it comprised less than 30%. Ideas were proposed for the launch of a sustained, national awareness campaign encouraging adaptive washing. Reference was made to the adage, “if it’s brown flush it down, if it’s yellow it’s mellow” while another communications participant suggested a “share it, spare it” awareness campaign. It was proposed that research be conducted to examine the quantities of water, cleaning agents and frequency of washing required for different demographics and lifestyles. Participants felt that any attempt to promote reduced bathing would have to be supported by strong evidence on the implications for hygiene and personal wellbeing. Linked to this, a campaign of “myth busting” on washing requirements was proposed, delivered through school education on personal development and health and through GP offices and health centres. It was thought that these messengers would be more trusted by the public, given the documented importance of integrity and impartiality in delivering such information (as noted by Glig and Barr, 2006). Amongst some attendees, there was an assumption of the rational actor model, however many revealed a more nuanced understanding of the complexity of internal and external factors influencing environmental behaviours and most educational or communications interventions were seen to form only part of the overall strategy. Reflecting work by Wildson and Willis (2004) on public engagement upstream in the formulation of
science agendas, some participants commented that the establishment of any minimum health and hygiene standards should be conducted as part of a public debate rather than top-down information provision. This would value the diverse forms of social intelligence and public knowledge that would have to be included together with “scientific” knowledge to help negotiate the contested topic of hygiene requirements and to ensure a balance of perspectives is provided.

To stimulate uptake and to normalise the use of deodorising clothing, it was suggested that school uniforms be required to use deodorising materials. Intervention proposals such as this showed linked-up thinking by participants, merging technological interventions with educational proposals. A related concept was for a “wash in work” campaign whereby employees are encouraged to cycle or walk to work and can avail of efficient showering facilities there - avoiding the need for personal shower ownership. Additionally, suggestions were made to play on the cult of celebrity to glamorise (Goodman and Redclift, 1991) reduced washing through depicting characters from popular television soaps adopting these adaptive strategies and using ‘deodorising clothing’ and ‘wash monitors’. Likewise, it was suggested that adaptive washing strategies are showcased on beauty and health programmes to illustrate how they might be incorporated into daily routines. Others proposed the development of a reality TV programme where housemates are challenged to live eco-friendly lifestyles, including the adoption of sustainable washing practices. Continuing this line of thought, it was suggested that home improvement programmes could promote efficient, low-water and targeted showers.

The power of social media was repeatedly emphasised in many discussions around ‘educational’ interventions for adaptive washing, with one participant noting that it provides a rapid way of achieving critical mass. However, in general there was very little knowledge as to what exactly social media entails and how to harness it, perhaps owing to a lack of practical experience on the part of participants. Although social marketing strategies based on targeting segmented consumer groups through alternative media and social networks are increasingly promoted in policy guidance (for example: Sustainable Consumption Roundtable, 2006), participants revealed mixed sentiment regarding their use. A major concern was their unpredictably and the lack of control over messaging that comes from entering into the two-way dialogue that is inherent to social media processes. Another mentioned difficulty was that the most successful social media campaigns tend to be driven by bottom-up rather than top-down processes, raising questions over whether government could successfully harness their power. In this way, social media was feared and revered by participants in equal measure. Relating to this one person argued, “with social media, there’s so much noise on it, whereas with the curriculum, you’re locked down you know, stuck in a room and you’re forced to think about it!” This strengthens the need for a balance between formal education to build deep understanding, together with social media to reinforce and target messages.
7.4.2 Efficiency in Use

The Efficiency in Use practice hinges upon concepts that target improvements in the efficiency of washing devices together with education on the value of water and variable water charges. Policy based interventions dominated for this Promising Practice, comprising 44% of total interventions. The predominance of policy proposals is mainly explained by the prevalence of technological concepts within this practice and the perceived need for supportive product and building regulations and incentives to promote their uptake. Due to the strong theme of technological efficiency within this Promising Practice, discussion tended to veer towards general infrastructural issues of water leakage. This was considered a fundamental supply-side inefficiency to be tackled prior to promoting efficiency in household water practices. As one engineer commented: “if 50% of the water is going down the drain, that’s 50% of the problem”. Similarly, another commented, “just build reservoirs! just build them, if we don’t have them the water won’t be there, so obviously we’re still missing a lot on the connections”. However, in response to this observation, another attendee noted that this proposal was “too simplistic, too expensive”. This discussion snapshot reveals the blend of perspectives represented in the backcasting process and the importance of participants’ professional training and personal values in shaping the output. This supply-side focus also reflects dominant discourse within water policy which predominantly focuses on infrastructural issues, supply side, and meeting projected demand, rather than optimising the use of existing resources, changing water use habits, practices and technologies (Brooks et al., 2009). There was little knowledge amongst the group of emerging “soft path” approaches championed by various institutes87 and other decentralised and ecological water management strategies. Nevertheless, the language of “demand management” was quite familiar in the context of energy use and it was reasoned that similar strategies could be employed for efficiency in water use.

To inject long-termism and strategic thinking into sustainable water consumption policy, it was frequently suggested that a dedicated body be established to develop policy and educational programmes targeting the residential sector. Just as the Sustainable Energy Authority Ireland (SEAI) operates this role for energy use in ROI, it was proposed that a ‘Sustainable Water Consumption Authority’ (SWCA) be established following this model. This could either be a new dedicated body or a strategic panel / subsidiary to Irish Water. It was suggested that the ‘SWCA’ could serve a research and advisory role on water demand management with the responsibility of administering education and awareness and water efficiency retrofit programmes. Additionally, there was widespread feeling that the water sector could benefit from the bank of expertise and critical analysis of the successes and failures of approaches to improving sustainable energy consumption. For example, it was recommended that existing regulatory requirements for energy efficiency in technologies and the built environment could

87 Such as POLIS, Project for Ecological Governance Institute, Canada (http://poliswaterproject.org/softpath), and the Pacific Institute, California, (http://www.pacinst.org/).
serve as a template for introducing similar water efficiency regulations that would stimulate innovation towards greywater re-use and low-flow, shower cycle concepts. The role for EU design directives was noted here with a distinct paucity of regulations governing the sphere of water consumption. Another suggestion was that water efficiency standards be developed for housing with an associated rating system (of A to G) similar to the Building Energy Rating (BER) scheme. It was suggested that the targets could be translated into maximum average daily usage units, to build towards a goal of 60 or 70 litres per person per day by 2050. These water efficiency ratings (WERs) would be calculated on the basis of the efficiency of water using appliances within the home and rainwater and greywater harvesting systems. It was suggested that building regulations begin with an initial requirement for the re-use of bathroom water (from shower and sink) for toilet flushing, subsequently to be elaborated to require greywater use between appliances. It is interesting to note the idea of home water efficiency ratings was considered novel by the group, who had little knowledge of similar existing ratings, the most prominent being the UK Code for Sustainable Homes (DCLG, 2006).

To develop an appliance water efficiency rating scheme, suggested interventions included R&D for systems to measure water use and the development of online water calculator tools allowing people to calculate the water footprint of their washing devices. The potential for rebound effects from these technological advances was noted. Emphasis on inefficient behaviour was also expressed with one researcher in the area of sustainable living stating: “[I]t comes back to education again then, a tap is not necessarily inefficient, it comes down to well, if a person leaves a tap running for ten minutes then that’s inefficient”. An alternative perspective was provided by an architect who immediately responded: “No, if the facility is there for it to be left on for ten minutes - that’s inefficient”. This exchange illustrates characteristic differences in disciplinary perspectives, with the architect being typically conscious of the power of design to shape society and behaviour in the home. This led the two participants to agree that any water efficiency retrofits should also be accompanied by education measures. For example, at the time of introducing water metering, it was suggested that fixture efficiency kits (including low flow shower heads and taps) be made available for homeowners and that these be accompanied by extensive education, ideally peer-to-peer, through networks such as Eco-Teams. This intervention was also intended to promote social sustainability. It was considered that a lack of experience on the part of certain user groups on how to use new water saving devices, especially those based on IT, would raise issues for equal access and compromise principles of fairness.

‘Research, technology and business’ concepts comprised 30% of the total interventions for the Efficiency in Use practice. R&D interventions were proposed to develop the ‘wet room’ systems along with shower improvements for enhanced controllability, alternative flows, and

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88 It should be noted that these workshops took place prior to the planned addition of the EU Water Performance Buildings (WPB) directive and the Blueprint to Safeguard Europe’s Water policy consultations (EC, 2012a).
live information updates (on use of energy, water and financial costs). Future research agendas were also suggested for waterless showers and nano-particle cleaning. It was noted that a range of devices currently exist that have not yet achieved mainstream uptake such as cistern ‘bricks’, shower timers and aerators, and these could be made more attractive through tax breaks and in-store promotions. With regard to concepts for water charging within the Efficiently in Use practice, it was considered vital to introduce charges, as per current policy. However it was suggested that this could evolve to more nuanced and holistic charging strategies whereby prices fluctuate with seasons and levels of water availability. Indeed, modeling work undertaken by Le Quesne et al. (2011) shows the potential for reductions in environmental impact through flexible water network operations using variable abstraction quantities and user charges tied to the prevailing flow or level.

The need for non-regressive water pricing was also voiced and a suggested solution was the allocation of a certain quantity for free to reflect the number of residents and their potential requirements (taking into account health and income variables). This would have to be accompanied by genuine understanding amongst citizen-consumers of the economic, environmental and cultural value of water. Interventions were therefore proposed to improve education on the water cycle, its connection to human development, and the environmental problems associated with over-abstraction from natural water bodies. One example was for school field trips to sites representing the different stages in water supply with the goal of developing an understanding of the value of water to promote an instinctive desire to reduce consumption, rather than providing only a cost stimulus. Others suggested interventions that reward low consumption either by individual households, or on an area basis through linking up with existing initiatives such as Tidy Towns.

7.4.3 Connecting with Nature

Connecting with Nature sees a greater role for householders in rainwater harvesting and home water management, cultivating an appreciation for natural water resources. Policy interventions comprised 51% of proposed interventions for this practice as policy barriers were considered a fundamental hurdle to up-scaling rainwater harvesting systems. It was noted that many of the technologies required for Connecting with Nature are already in existence, however interventions in the form of building regulations for rainwater harvesting, or tax breaks and incentives for their installation would be required to improve their attractiveness and viability. A cost benefit analysis on investment in new reservoirs compared with the widespread use of rainwater harvesting on a household or community basis was suggested. Indeed, an existing study by Li et al. (2010) showed that the cost to install rainwater harvesting systems for Irish households is between €1,500 - €4,000 per household and that in combination with greywater systems, this could cover roughly 94% of domestic water used for non-potable applications. Significant market stimulation was called for in the
form of a nationwide rainwater harvesting grant scheme. However prior to this, it was recommended that research be conducted to establish which geographical areas should be targeted as a priority. This research would account for projected availability of rainfall incorporating potential climate change impacts, together with socio-demographic variables. It was suggested that retrofitting be rolled out on an area basis to promote economies of scale. Rainwater harvesting systems would begin with the use of rain for garden and toilet purposes. This would precede the development of more advanced filtration and storage systems that would permit its usage for other purposes including personal washing.

Participants felt that those who were unable to install these systems for reasons of house design or local ecology should be given extra allowances. With the development of the ‘smart water grid’, they could also receive low cost water supply from neighbours’ excess rainwater capacity. Interventions relating to home design and planning requirements to ensure compatibility with rainwater harvesting systems were also proposed. For example, larger, and hard roof structures were preferable for rainwater harvesting while more permeable surfaces, ecological landscaping and reduced garden paving were suggested to achieve better natural drainage systems. In line with the ecologically balanced feel of this practice, participants suggested natural drainage systems such as gravel beds and reed beds for filtering wastewater from showers and other household usages. These were seen to go hand in hand with rainwater harvesting proposals to maximise localisation of water supply, usage and treatment.

Enhanced professional education for potential rainwater harvesting installers, plumbers, planners, engineers and building designers was also proposed. The need for the development of certified rainwater harvesting installer lists and post-installation monitoring was reiterated, with vociferous discussion on current inadequacies around the enforcement of building energy standards. Participants also recommended that installers could provide practical DIY guidance to homeowners on skills for maintaining their rainwater harvesting systems together with advice on how to reduce their water usage. In this way, the retrofit programme simultaneously becomes a programme of educational intervention with direct peer-to-peer and experiential learning. There was a suggestion to investigate the possibility of training retrofit teams capable of carrying out both energy and water retrofits in order to improve economies of scale and to encourage householders to think of the link between these two resources.

At the time of introducing the rainwater harvesting retrofit programme, participants showed joined up thinking, suggesting a campaign on myth busting to alleviate potential safety concerns associated with greywater use. Such concerns could be stoked by previous public health issues relating to water and wastewater management. Similarly, showcasing rainwater systems on all buildings in the public sector was considered important to demonstrate best practice and to show consistency between policy messaging and action. Again, social media was noted as a key tool in stimulating conversation and promoting uptake. It was suggested that the private sector be incentivised to dedicate funding towards the development of
advanced weather and rainfall monitoring systems along with developing water filtration solutions to permit the use of rainwater for most household uses, potentially cleaning water to potable standards. Many participants saw potential in carving out an Irish specialism in sustainable water management by devoting focused funding, support and R&D towards developing the required IT systems, technologies and education. Support from enterprise boards such as Enterprise Ireland and IDA and developing industry-university partnerships was considered key in stimulating the “blue economy” to help Ireland become a global player in best practice water management. Given the impending establishment of Irish Water and the range of high-tech industries present in Ireland (such as IBM and Intel), it was considered that now is an opportune time to instigate change. This is indeed reflected in literature on socio-technical transitions (e.g. Shove et al., 1998; Smith et al., 2005) which notes the historical opportunities produced during periods of re-structuring of provision systems involving the re-organisation of social arrangements, roles and authority.

7.5 Heating Interventions

7.5.1 Managing Carbon

Despite carbon quotas comprising a fundamental component of this Promising Practice, ‘policy’ interventions were the least abundant at 29%, with most (39%) of interventions relating to ‘education and engagement’ concepts. There was a strong feeling that the introduction of personal carbon quotas would have to be predicated upon a massive increase in public understanding of climate change and support for environmental action. As a communications professional noted: “education is the holy grail, there needs to be a huge education programme run right through it”. Carbon was considered to be currently outside of the public psyche and it was suggested that there needed to be a large-scale literacy programme to get the public to “think in carbon”, which one communications professional stated was “an enormous cultural challenge”. In doing so, a number of interventions were proposed for increasing the penetration of environmental issues within the education system. It was suggested that education on energy sources, energy production, and embodied energy be integrated within the primary and secondary school syllabi, along with continued support to Green and Eco Schools programmes. A number of suggestions were made for an environmental management subject for students, teaching practical skills for carbon budget management and environmentally friendly living. For those out of education, suggestions were made for frequent ‘energy compliance courses’ that would involve a mandatory exam testing knowledge on carbon footprints and energy management, similar to the NCT (National Car Test).
In terms of immediate educational measures for the general public it was suggested that introductory education on carbon management occur at the same time as the smart meter roll-out, due to take place between 2010 and 2020 in both ROI and NI. The participants considered it vitally important that In-Home-Display systems (IHDs) were installed in every home to promote the linkage between energy consumption patterns and costs and to enhance controllability and programming. It was suggested that ‘support teams’ be established from existing groups such as Tidy Towns or community councils to assist the elderly and those with physical or mental impairments in using their smart meters and IHD systems. This reflects the engagement model currently pursued by the Global Action Plan Eco-Teams programme, where direct peer-to-peer teams have been shown to produce deeper and more enduring environmental behaviour change in the home over top-down information provision strategies (Hobson, 2002). High levels of R&D were proposed for the development of technology permitting greater user control over energy consumption and space heating. Investment was also suggested in advanced carbon budget systems to enable the government to track individual carbon expenditure and for ICT systems to allow personal budget management.

Prior to introducing carbon budgets, greater internalisation of environmental impacts for all products and services was suggested to disincentivise damaging activities. However, it was considered that the implementation of these taxes and further down the line, personal carbon budgets, would require much debate and co-operation amongst societal actors especially the corporate sector. It was agreed that Managing Carbon is unlikely to happen nationally without an international policy drive for stringent emissions caps and carbon currency. Given the globalised nature of our economy and financial system, it was felt that the implementation of personal carbon budgets would have to occur within broader conditions that made it economically favourable or politically necessary to do so. There was consensus that much research and piloting would have to occur to examine details and impacts of implementation and to assess which socio-demographic unit should be used as the basis for application of the carbon quotas – individual or household. Also research interventions were proposed to consider if a credit or quota system would work best, or if ‘sustainability’ rather than ‘carbon’ was a more appropriate pricing framework in order to incorporate social costs. The possibilities for future ‘smart phone’ devices (such as the IPhone) provoked much excitement across brainstorm groups, and for this practice, it was suggested that multi-function smart phones could be used to record personal carbon usage and be involved in all transactions, ultimately, leading to the replacement of money.

Most participants felt that such regulatory interventions were necessary given how engrained energy use is within modern society, as one planner put it: “you’re almost programmed to use energy...education isn’t the issue, you need something harder, but you don’t want to hit the vulnerable people”. Various social incentives were proposed for this Promising Practice. For example, it was suggested that intra-community awards could be developed to measure and
benchmark progress towards reduced household energy consumption on an area basis. These community awards, together with other interventions, could draw upon social norms approaches (Nolan et al., 2008) that emphasise branding of behaviour and benchmarking in order to play upon the inclination towards ‘tribe’ or social group associations. Participants elaborated the eco-points scheme contained within the Managing Carbon practice suggesting that energy suppliers be involved in setting benchmarks and rewarding eco-points. These could be spent on other certified goods, in repair and second hand shops, for borrowing/sharing services or for public transport. Through these interventions, the ultimate goal, as stated by one participant, was for carbon management to “become second nature” by 2050.

7.5.2 Thermal Awareness

The practice of Thermal Awareness stipulated a more environmentally conscious and bodily-connected population accepting variable temperature ranges and demonstrating adaptive heating responses characterised by direct body heat solutions. This practice yielded the highest number of ‘education and engagement’ interventions of any Promising Practice (washing or heating) at 54%, with ‘research, technology and business’ proposals at 28% and ‘policy’ at 18%. This is likely to be due to the fundamental socio-cultural changes that this Promising Practice involved and participants appeared to welcome the unique opportunity to discuss interventions to provoke these changes in what were enthusiastic and animated discussions. Participants felt that an over-arching problem was consumer culture characterised by fast paced fashion cycles based on cheap, poor quality clothing, and trends of escalating expectations for warmth within homes.

An appreciation of behavioural variance in heating practices was evidenced in workshops, revealed in comments from an architect that “we’ve forgotten how to adapt our internal environment to meet our comfort needs” while a policy researcher argued that “traditionally, people would have had a deeper understanding of clothing”. There was a sense of ‘unlearning’ in this area, symptomatic of general trends towards disconnection from activities, skills and processes for basic provisioning or what Hopkins (2008) calls the “great deskilling”. Nevertheless, it was noted that habits can change as evidenced by the recent practice of removing shoes upon entry into other people’s homes. Initially it was noted that this seemed “ridiculous” however as a communications participant explained, “we all do it now, there’s you know, a cultural thing to it and that’s very long-term”. For the acceptance of the ‘personal heat vest’ and the routine use of extra layers for warmth, participants felt that these solutions would need to become desirable, aesthetically pleasing and effective. In this way “competence” in the practice - said to be negotiated between and within social groups (Shove, 2003) - is demonstrated through effectively using these direct body heat strategies and accepting lower temperatures. Demonstration of adeptness in this heating practice then becomes a source of
social pride rather than embarrassment, which participants highlighted may be the case if any of the Promising Practices were seen as being driven by money-saving motives.

It was suggested that technology transfer between outdoor clothing companies, such as Great Outdoors, and higher-end fashion houses could help popularise thermally suitable clothing. R&D interventions were proposed to develop lightweight and thermally smart clothing as well as research into ‘personal heat vest’ technologies. In promoting such wear, a communications consultant asserted: “you know, there’s a trending thing here, like brand management and even if something’s ridiculous, if it’s cool, they’ll gravitate towards it”. This led to a discussion on the rise in popularity of ‘Ugg Boots’ and ‘Crocs’ despite their poor aesthetics. As with the Washing Transition Workshop, participants reasoned that celebrity endorsement was a powerful promotional tool to be harnessed. In order to upscale and normalise ‘personal heat vests’, and advanced thermal performance clothing, it was suggested that incentives promote their use in school uniforms and uniforms of Gardaí, the army and other public workforces. Likewise, it was proposed that thermal ratings be developed for clothing (akin to TOG values) to provide informed choices with increased VAT for clothing that is thermally poor or made from environmentally unfriendly materials. This, as one participant put it, would help to “align all the incentive and penalty structures”. Another suggestion was for workplaces to require employees to agree to wearing suitable clothing in their ‘terms and conditions’ of employment. Many noted the power of workplaces in shaping expectations of standardised indoor temperatures and contributing to escalating desires for air conditioning due to the championing of this technology in office spaces. These suggestions echo the CoolBiz energy saving campaign in Japan that is frequently held up as being a successful example of the use of social practice theory to inform a practical initiative for encouraging sustainable behaviour. Initiated by the Japanese Ministry of Environment, CoolBiz was based on the implementation of a new dress code for office workers that involved the removal of neckties and formal suits and the use of breathable fabrics to reduce the need for air conditioning. The Ministry of Environment estimated a 1.14 million tonne reduction of carbon dioxide emissions and a 36% decline in necktie sales in the year 2006 due to the campaign (Southerton et al., 2011). The campaign showed that what were considered engrained social norms of work clothing could be challenged leading to new perceptions of acceptable clothing through a low cost intervention based on championing and leadership from influential figures in the business and fashion worlds.

Much discussion in the Thermal Awareness group stemmed from the difficulty in defining “healthy” levels of heat. Some commented that direct heat from fires is unhealthy given the extremes of temperature it exposes people to. However the role of open fires along with the “obsession with drafts” were considered powerful cultural traits. Some comparisons were made with New Zealand, where participants noted indoor temperatures were lower than the so-called ideal of 22°C, demonstrating the role of socio-cultural as opposed to biological preferences for heating. This is reflective of findings by Nicol and Humphries (2002) who note
the existence of a range of variables influencing indoor thermal comfort including the characteristics of the building and individual responses such as physical activity, posture and clothing. Suggestions were made for building regulations to set upward limits on heating settings so that spaces cannot be heated above a particular level (to be collectively defined and negotiated) with proposals for a 23°C maximum thermostat setting. Public education and communications campaigns on healthy levels of heat were suggested and it was proposed that GPs and health centres could be appropriate messengers for education on thermal awareness practices. It was suggested that ‘comfort optimisation manuals’ should be developed for householders at the time of energy retrofits and building energy rating assessments and that installers provide guidance on practical strategies for Thermal Awareness. Education in schools was also suggested with an emphasis on practical strategies including self-generated body heat through physical activity.

Many intervention proposals related to R&D and incentives for visual temperature cues in the home. In general, participants called for more intuitive and embedded technological interventions within the home environment. Temperature lights or sounds indicating space and personal body temperature were considered adequate prompters to alert homeowners to their heating needs, or, in reference to work by Jelsma (2003) to serve as effective “cues” to evoke in an unconscious way the necessary actions. Despite the suggestion for regulatory and financial interventions to support these technologies, in general participants felt that attempts to achieve this Promising Practice had to transcend carrot and stick approaches and be sustained by internal personal belief structures. Nevertheless, it was noted that dramatic cost increases in energy, or the introduction of carbon budgets, as per the Managing Carbon practice, would be heavy influencers. The tension between the sale of energy units by energy suppliers and the requirement for reduced personal energy usage was highlighted, however, as noted by a futures researcher: “[just] as they encourage higher consumption, they could surely encourage lower consumption as well”. It was suggested that Energy Service Companies (ESCOs) become more engaged in the direct delivery of warmth, through a multitude of strategies that may or may not involve the use of electricity (for example through education, communications and the deployment of energy management systems, or personal heat vests).

7.5.3 Adaptable Homes

Fifty-eight percent of the intervention proposals for this practice were policy related. This was mainly due to the perceived requirement for elaborated building regulations to stimulate the development and adoption of the bioclimatic architecture and smart space features of this practice. It was considered that neither developers nor homeowners would adopt the depicted architectural innovations unless regulatory requirements stipulated them. A key barrier was “traditionalism” and inertia in the building sector and their reluctance to shoulder the financial
and technological risks of experimenting with innovations (also reported within Seyfang, 2010). Despite the capital-intensive nature of retrofit strategies, it was felt that an appropriate immediate intervention for this Promising Practice would be the rapid retrofit of Irish homes that fail to meet basic insulation efficiency standards targeting lower income households, schools and public buildings. In doing this, an expanded role was envisaged for retrofitters who would be required to educate householders on energy efficiency practices. For homeowners who undertake energy efficiency improvements, social rewards were recommended in the form of on-home, or online “placards” to provide positive reinforcement and draw upon notions of civic duty. It was noted that passive house solutions are already in existence but should be more rapidly deployed in new build. A passive house takes advantage of advanced insulation, household positioning, orientation and solar gain to reduce requirements for mechanical heating (DEHLG, 2010a). Ultimately, participants suggested that the building regulations be elaborated to develop a bioclimatic architecture design code, that encourages even more direct contributions between the environment and natural air flow rather than passivity which focuses on insulating the building from its environment. This would extend passive design standards and promote more coherence between the building fabric, its surrounding environment and landscape and the technical solutions employed. Aside from these more advanced concepts, it was often reiterated that “many simple solutions exist already” that can be maximised, in particular the use of motion sensor heating and advanced IT energy management systems for homeowners.

Participants had much to say about adaptable home space concepts. While a number of building regulation interventions were suggested to improve the adoption of adaptable space concepts, it was noted that key barriers were in fact cultural. This relates to the perception of the home as “a set thing”, not helped by the emphasis on “masonry materials” as articulated by one architect: “it costs thousands to knock a wall and then to rebuild it and you have all this mess and disruption, so if we can develop our technologies so that they [homes] can be adapted with more light-weight units…that’d be a good step”. Discussion continued on prefabricated home structure solutions that exist in varying guises, referring to “seomra” room and “Huff Haus” units. However these technologies have yet to be mainstreamed in Ireland and were considered as alternative solutions and short-term fixes as opposed to long-term, desirable options. It was suggested that home design codes take into account the transience of occupants and the evolution of homeowner needs by requiring the use of modular units and “re-use and disposal plans” for all new build to demonstrate consideration of life-cycle environmental impacts.

To advance the concept of internal adaptable space, simple low-tech solutions were proposed including internal modular walls or dividers that can shrink around the occupant depending on the number of people present and their location within the space. Linked to this, IHD systems (as mentioned in the Managing Carbon Promising Practice) were seen to help assist in this

clever usage of space. Considering flexible concepts of internal space and potential space reductions, many participants felt there was a significant change in mindset required and a shift towards more “continental” solutions where, “you don't make rooms specifically for anything in particular you've just got rooms that you can use for what you like”. By contrast, Irish householders demonstrate a preference for detached homes with separate, privatised spaces. One planner attributed this preference to the high number of poorly designed houses of the Celtic Tiger era:

“In Ireland, in the recent boom, houses have been advertised as three bedrooms, three en suites, and they're three pokey bedrooms and three pokey en suites in a small house and they're totally unnecessary, it’s only because the developer wants to project that idea”.

It was suggested that research be conducted on differential heating and living space requirements for occupants across time (over daily, seasonal and lifecycle periods). This would give weight to any interventions or regulations seeking to re-think concepts of home space, ultimately introducing a limit for floor space in new homes according to the number of occupants. This would aim to counteract the trend for larger houses that results in greater overall energy and material inputs. It was noted that shared spaces could have a role in compensating for reduced private space, with the potential creation of ‘guest apartments’ in denser residential areas. However, as the citizen-consumer research showed, there was considerable resistance towards ideas of communal space and reduced personal space, with similar concerns voiced in the Transition Workshop. This was therefore considered a very long-term goal by participants to allow for a period of cultural adjustment.

### 7.6 Timeline creation

This section focuses on issues relating to the implementation of the interventions over time raised by participants in the ‘timeline’ session of the Transition Workshops. In this session, participants were asked to prioritise and physically arrange the interventions (represented on post-its) on an A1 roll of paper into three main time slots representing short-term (present to 2020), medium-term (2020-2035) and long-term (2035 to 2050) timescales. Three timeline groups took place simultaneously, one for each Promising Practice and participants were asked to choose one group to take part in for this final workshop activity. Crucial to the timeline task was deeper debate regarding the dynamics between the interventions to ensure that they were mutually reinforcing and collectively leading towards the Promising Practices. While the previous intervention brainstorms focused on the development of a high volume of discrete intervention concepts, the aim here was to widen the viewpoint and to re-inject integrated thinking in order weave the interventions into related strands of action over time. The timeline session also extended discussion on the types of actors that would need to be enlisted to elaborate and implement the proposed interventions.
In planning out the interventions through time, difficulty often arose due to a number of “chicken and egg” dilemmas relating to the key drivers for change. For example, with regard to new technology development and deployment, opinion was split as to whether regulatory pressures or private sector innovation were the primary drivers. Similarly, for behaviour change, the dynamics between “carrot and stick” strategies and the role of top-down and bottom-up processes were debated. These “chicken and egg” issues were crystallised in the timeline discussions due to the need to place chronological order on the interventions. Similar debate took place in both the washing and heating workshops around these issues and on the political, societal and environmental challenges and drivers influencing the pathway to the Promising Practices. This section therefore integrates discussion on both washing and heating practices to allow for deeper and broader reflection on these common themes. After this, a diagrammatic of the interventions over time is presented for the heating and the washing studies (Figures 7.5 and 7.6). These figures were developed for the Transition Framework documents which were created as a back-office activity. In the development of the Transition Frameworks, the role of the researcher was one of organisation, refinement and elaboration. For example there was a need to remove duplication and re-distribute some interventions to the most appropriate Promising Practice where overlap was encountered. Due to space constraints, the timeline figures use shorthand descriptions for each intervention, however these should be understandable based on the intervention discussions in Sections 7.4 and 7.5. Full elaborations of timeline interventions can be found in the Transition Framework documents (contained within Appendix V).

7.6.1 Educational interventions: supporting technical and policy architecture

Policy milestones were often mapped out by participants first, providing the architecture of the timelines around which supporting educational, business or technology interventions were inserted. This perhaps illustrates the elevated role assigned to policy interventions by the group, where ‘education and engagement’ and ‘research, business and technology’ interventions were seen as supporting collateral rather than primary interventions in their own right. In terms of immediate, short-term interventions, it was recommended to start with the low, or no cost interventions. Many felt that ‘education and engagement’ interventions were the ‘low hanging fruit’ in this regard, especially those based on elaborating existing curricula and extending educational campaigns such as Green Schools and Eco-Schools programmes. For both the sustainable heating and washing practices, educational initiatives were laid out prior to and during policy interventions, especially for the more stringent interventions of household water charging and carbon allowance systems which would require significant education to build public support. Rather than simple advertising and communications “addons”, there was a strong sense that environmental education on the school syllabus should be

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90 The reader may wish to refer to these timeline figures prior to or during their reading of the timeline section in order to better understand the arguments made.
continually extended and elaborated, accounting for the consistent presence of educational measures throughout the short, medium and long-term timescales. It was cautioned that otherwise the benefits of policy and technical interventions could be minimal, as one participant engineer commented: "the novelty of smart metering wears off, you'll change for six months and then revert back, you need more education". The discussion continued with another participant making the analogy that "just because you have a speedometer doesn't mean you slow down!". Similarly, prior to the implementation of technological proposals such as ‘communal rainwater harvesting’, ‘smart water grid’ or ‘personal heat vests’, participants often stipulated educational and communications interventions to ensure the population were equipped with the necessary practical skills and supported their usage. Another enabler identified by participants for popular support of policy and technological interventions was the demonstration of a strong evidence base to the public, including reference to scientific facts. Thus before the promotion of adaptive washing practices or personal heat vests came communications interventions on their health, environmental and financial benefits. These suggestions perhaps over-emphasised the role of rational information in relation to behaviour change. Aside from concrete evidence on the flaws of this behavioural model (extensively reviewed in chapter three), work within social psychology provides additional reasons for inaction on the basis of scientific evidence. For example, the phenomenon of 'cognitive dissonance' is well reported in public opinion on climate change and relates to the tendency of individuals to ignore or criticise evidence that contradicts or challenges their current beliefs and practices (Shermer, 1997).

In both workshops, “shock tactic” interventions were suggested as a spring-board for the introduction of tighter regulations. For example, prior to the ‘carbon allowances’, a country-wide ‘blackout’ was proposed, while deliberate water restrictions were recommend to force people to confront their reliance on this resource. It was considered that exogenous (rather than managed) “shocks” such as oil or water shortages, or other environmental crises, would also be drivers of practice innovation and stringent political action – a confirmed phenomenon in transitions literature (Grin et al., 2010). Attention was also devoted to cultural “meta trends” (Tukker et al., 2008b) that influence the broader landscape within which socio-technical systems and their practices are situated. These included trends towards visibility in consumption, ethical consumption and green consumerism, which were identified as drivers for the achievement of the cultural changes required to support the Promising Practices. At the same time, it was recognised that meta-trends for rapid product cycles and the reliance of producers upon the generation of novelty, especially in industries of clothing and homeware, all conspire to promote excessive consumerism. This is reflected in socio-technical literature on sustainable consumption that notes our daily choices are not freely chosen, nor are alternative sustainable options blatantly ignored, rather it is the cultural conditions combined with dominant economic logic that extends prevailing patterns of conspicuous consumption. While it was acknowledged that processes of cultural globalisation hinder attempts for national intervention to shape cultural meanings and preferences in heating and washing practices,
there was less devolvement of cultural dimensions to the exogenous landscape level as Nye et al. (2010) report is the case in many transition experiments. This could be because the practice orientation bridged structure-actor dualisms - noting the role that government institutions and systems of local provision have in shaping cultural preferences together with the agency of practitioners in making and re-making practices through their performance.

7.6.2 Technology and policy dynamics: “chicken and egg” dilemmas

With regard to the sequencing of ‘research, technology and business’ interventions, there was a split between those that were already technically feasible and those that require longer lead-in times for research and piloting. In both workshops, participants stated that there needs to be speedier deployment of best available and emerging technologies for energy and water consumption efficiency in the home. Most felt that the market could not be expected to deliver without public intervention in the form of regulatory requirements and financial supports (for both producers and households). Many of the short-term ‘research, technology and business’ interventions therefore related to householder financial incentives for upgrading to efficient technologies and green public procurement (GPP) initiatives to provide producer support and guaranteed markets.

For retrofit interventions for the nationwide deployment of rainwater harvesting and greywater systems (as per the Connecting with Nature Promising Practice), it was suggested that these take place in the medium-term. This would occur after a period of education, pilot retrofitting, and tax breaks or grants to encourage uptake of existing water efficient devices and low-flow fixes. Both heating and washing workshop participants advocated continuous elaboration of building regulations to promote sustainable water and energy consumption with interim targets available to provide certainty to homeowners, builders and property developers. Home water efficiency design regulations started with push-tap requirements, low flow devices, dual flush and basic greywater recycling features, before extensive residential rainwater harvesting and greywater harvesting systems were required in the medium-term. Likewise the energy group deployed interventions for building regulations incrementally, postponing full regulatory requirements for bioclimatic and adaptive buildings until medium to long-term periods, after pilot and demonstration projects. When discussing building regulatory interventions, enhanced methods of monitoring and enforcement were considered key enablers and necessary to create a level playing field; as a Department of Environment planner asserted: “builders always find a way of short cutting these things”. Disparate opinions were voiced on the effectiveness of design codes on whether they stifle or promote socio-technical innovation; a debate which has yet to be fully resolved in the literature (Westley et al., 2011). This was one of a number of ‘chicken and egg’ dilemmas that arose during the timeline discussion. For example, some saw enhanced regulation as being a driver for experimentation and innovation within the strictures of new regulatory frameworks. In the energy workshop, reference was
made to the IT sector and innovation, with one city planner articulating his reason for advocating regulation to drive industry standards:

“You need standards in place so that there isn’t waste, so for example if you were to say now that all electrical devices had to use one charging device - how much waste does that free up?”

For basic efficiency improvements, it was often considered that regulation could assist in speedier deployment of best available technology. However some contradicted this stance. This is reflected in commentary from a software company representative who talked of the “difficulty in integrating policy with innovation / technology”, stating, “technology and innovation do not wait for policy”. Others commented that the restrictive nature of current building regulations can stifle emerging ecological building practices and products, a point also made by Winston (2012) on the challenges of implementing the Cloughjordan eco-village in Ireland. It was noted that there is also conservatism on the part of construction companies and developers who are reluctant to shoulder the extra risks and costs involved in innovation.

Many felt that there was a lack of expertise in Ireland in innovation management and saw an immediate role for the elaboration of research agendas and existing strategic innovation cluster support groups (such as The Green Way91) to prime new technology development and market innovation. It was noted that alliances and public-private partnerships (PPPs) should be developed with actors in the heating industry, such as ‘Glen Dimplex’, and the ICT sector, such as IBM, to complete many of the Promising Practice R&D requirements. A multitude of the short and medium term measures related to research for the development of new technologies such as the ‘personal heat vest’, ‘personal carbon budget management systems’, ‘deodorising clothing’ and ‘gel cleaners’. Here discussions reflected weaker ecological modernisation interpretations of sustainable consumption with emphasis on the capacity for research and development and pump-priming for green technologies to spur economic growth (Hajer, 1995; Davies and Mullin, 2011). This was especially the case in the water group where an immediate intervention proposal was the introduction of a task force to develop the ‘Blue Economy’. Indeed, overall, it can be said that there was less focus on social enterprise models for the delivery of goods and services as most were rooted in conventional commercial enterprise structures. This reflects the discourse of Irish innovation policy which Davies and Mullin (2011) note primarily relates to commercial and technological activities in the market, rather than in the social economy which advocates non-market exchange mechanisms and grassroots institutions.

Implementation of the more radical Promising Practice socio-technical innovations did not occur until medium and long-term timescales. This was to allow lead-in times that stakeholders figured would be necessary for R&D and the implementation of any required

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91 The Green Way is a Cleantech cluster organisation founded in 2010 in Dublin. It contains regional stakeholders committed to collaborating in order to “encourage green economic growth through the stimulation of the Cleantech sector in Dublin”. See: www.thegreenway.ie.
infrastructural and organisational changes. Within innovation literature, this is termed the “ingenuity gap”, representing the space between “the demand for appropriate solutions and its supply” (Westley et al., 2011: 764). In a similar vein, the potential for cultural ‘lock-in’ was identified and it was noted that time is also required between invention, social adjustment and institutional changes. Another chicken and egg dilemma, which was unresolved in the workshops (just as it is contested in innovation literature), was the question of suspending roll-out of innovations until there is demonstrated demand (or “pull” from the public), or adopting “push” strategies based on promotion by business or government to prime uptake. (Westley et al., 2011).

7.6.3 Addressing the “gap between hope and reality”: challenges of incrementalism

Throughout the timeline discussions, incrementalism and intertia in policy making were stressed as being key barriers to implementation. In one session, friendly teasing was observed between private, civil service and NGO representatives, each playing up to their stereotypical roles. For example, of the bureaucracy and inertia of the public sector, one participant jokingly commented: “my civil service inclination would be that we should have everything long-term!”. Similarly, in relation to the development of building regulations, a private sector energy technology company attendee stated: “it takes years to agree on anything, to get them to agree on this kind of standardised metric”. Aside from institutional, management and implementation hurdles, some participants were more fundamentally sceptical of the ability to realise some of the technological proposals. As one environmental NGO representative from the energy workshop, articulated:

“There is a lot of reliance on technology solving problems and producing products to help reduce water consumption yet very little of this is available. The gap between this hope and reality needs to be addressed”.

A key enabler in bridging this “gap” was the availability of capital for investment. Participants acknowledged that the current economic situation and the curb on all non essential spending was a significant block to the advancement of sustainability policies, programmes and initiatives. As a communications consultant at the energy workshop noted: “it’s short-term thinking, it’s survival instinct and it’s politically better to say I’m spending the money on children instead of sustainable energy”. The bottom-line and evidence of financial payback was therefore considered the primary driver of decisions at present, while it was supposed that an economic upturn would have a positive influence on the implementation of the Transition Frameworks. Just as the economic difficulties pose a challenge to the development of many of the interventions, especially those requiring capital for R&D, participants felt that a key driver would be the recruitment, training and retention of talent in Ireland.
Although there was sentiment among some that the Promising Practices were unrealistic, especially regarding their technological depictions, others felt differently, as one architect from the energy workshop commented: “lots of ideas exist already and just need to be implemented”. From this perspective, the primary barriers are seen as institutional, political and social rather than technological. A fundamental challenge was articulated in the survey feedback from a Department of Energy attendee who commented; “the difficulty is to align the research with the (largely) incrementalist approach to policy making”. Simmons and Walker (2000) draw similar conclusions in their research on how social science insight can be better integrated into environmental policy making. They conclude that if research results challenge existing conventions or goals of policy making, or are seen as unacceptable by significant stakeholders they are unlikely to be acted upon and thus recommend innovating incrementally and using familiar policy language. Indeed the ultimate Transition Framework documents did intend to translate what was a complex backcasting process into the language of policy makers to reduce disjuncture with conventional procedures. Within the timeline sessions participants often called for long-term regulatory direction for sustainable consumption policy to provide a framework against which business, citizens and the public sector would have clarity and certainty allowing more strategic decision-making. One participant from the national heritage council articulated this sentiment:

“The long-term perspective, to me that’s the critical thing…that the understanding is right from the outset that this is a long-term horizon, it’s not just going to be a quick fix solution…and for people as well it makes it more amenable that we’re moving towards resource consciousness and we’re all kind of learning by doing en route”.

The EU was seen as vital in driving this strategic direction and their policy lead was highlighted as a crucial enabler for the implementation of the Promising Practice policy interventions. These issues of embedding and extending research results beyond the confines of the experiment itself will be elaborated in the following chapter on ‘Backcasting and Sustainability Learning’ as buy-in and learning amongst participants is a prerequisite for broader spin off.
Figure 7.5 Sustainable personal washing practices: Intervention timeline from Transition Framework document

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1. Campaign for adaptive washing strategies &amp; targeted cleaning</td>
<td>2. Regulation on advertising promoting excessive hygiene</td>
<td>3. Regulation &amp; controlled messaging</td>
</tr>
<tr>
<td>4. Research healthy washing levels (for different lifestyles)</td>
<td>5. R&amp;D dirt &amp; odor monitor</td>
<td>6. Deodorising wear widespread especially for sport and workwear</td>
</tr>
<tr>
<td>5. Myth busting about cleanliness &amp; hygiene requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. R&amp;D deodorising clothing &amp; causes of sweat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. R&amp;D waterless, gel-based cleaning agents</td>
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<td></td>
</tr>
<tr>
<td>8. New national water authority - ‘Irish Water’ established (existing policy)</td>
<td>9. Holistic water management integrated into professional training</td>
<td>10. Variable water pricing according to season &amp; quality of water</td>
</tr>
<tr>
<td>9. Sustainable Water Consumption Agency</td>
<td>10. ‘Home water monitor’ systems rolled out (link with energy)</td>
<td>11. Intuitive awareness of personal water use &amp; embodied water</td>
</tr>
<tr>
<td>11. R&amp;D ‘home water monitor’ and water calculator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Communications supporting the need for water changing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Education on the value of water, the water cycle &amp; supply system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Efficiency improvements for water fixtures at the time of metering</td>
<td>15. Tax breaks and in-store promotions for efficient devices</td>
<td>16. Ban on water inefficient products</td>
</tr>
<tr>
<td>15. Building regulations for enhanced efficiency of water using fixtures</td>
<td>16. Water calculator apps for water using devices</td>
<td>17. Building regulations maximum 70 litres per person per day</td>
</tr>
<tr>
<td>16. Water Efficiency Rating (WER) for homes &amp; products</td>
<td>17. R&amp;D waterless showers, nano-particle cleaners</td>
<td></td>
</tr>
<tr>
<td>17. R&amp;D systems for reuse of greywater between water appliances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. R&amp;D for shower improvements (flow variations, live feedback)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Pilot retrofit for RWH &amp; GWH - link with energy retrofit programmes</td>
<td>21. Retrofitters to provide education on water efficiency</td>
<td>22. All schools are centres of smart water and best practice water use</td>
</tr>
<tr>
<td>22. R&amp;D for rainwater monitor, advanced filters for RWH and GWH</td>
<td>23. Public buildings and schools water programme, develop Aqua Park</td>
<td>24. ‘Smart water grid’ implemented</td>
</tr>
<tr>
<td>25. BT Young Scientist - water theme</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend**
- **Policy**
- **Education & Community**
- **Research & Business**

* GWH = Grey Water Harvesting
** RWH = Rain Water Harvesting

Existing policy milestones

‘Blueprint to Safeguard Europe’s Water’ - EU policy, sets targets for water efficiency to 2050

**Figure 7.6** Sustainable home heating practices: Intervention timeline from Transition Framework document

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Warmth Optimisation Manuals with BERs*</td>
<td>2. Temperature indicators in rooms required (colour coding)</td>
<td>7. Education for energy school sustainability syllabus</td>
</tr>
<tr>
<td>4. Education and communications; healthy heat, clothes before heating</td>
<td>5. Practical skills - adaptive body heat, self-sufficiency.</td>
<td></td>
</tr>
<tr>
<td>6. ESCOs** focused on delivery of results (warmth &amp; efficiency)</td>
<td>7. Thermal performance uniforms &amp; workwear mainstreamed</td>
<td></td>
</tr>
<tr>
<td><strong>Thermal Awareness</strong></td>
<td><strong>Carbon Management</strong></td>
<td><strong>Adaptable Homes</strong></td>
</tr>
<tr>
<td><strong>Smart energy meters roll-out, time of use pricing, demand management</strong></td>
<td><strong>Carbon allowances - applied to home energy use &amp; transport</strong></td>
<td><strong>Area-based, nationwide retrofit</strong></td>
</tr>
<tr>
<td><strong>In-home-energy-displays’, touch-screen home energy controllability</strong></td>
<td><strong>Tax products to reflect their carbon, social and environmental impacts</strong></td>
<td><strong>Building regulations enforced, Carbon Neutral 2013</strong></td>
</tr>
<tr>
<td><strong>Research on personal carbon allowance</strong></td>
<td><strong>Formal education on carbon budgeting in school syllabus</strong></td>
<td><strong>Tax Incentives - interest relief for low carbon homes</strong></td>
</tr>
<tr>
<td><strong>Educational campaign with smart meters, support teams, phone apps</strong></td>
<td><strong>Energy suppliers - benchmark home energy use &amp; set targets</strong></td>
<td><strong>No new build (sweat existing assets)</strong></td>
</tr>
<tr>
<td><strong>Community projects for energy efficiency</strong></td>
<td><strong>Sustainability Reward Cards</strong></td>
<td><strong>Campaign to promote retrofit - placards to improve visibility</strong></td>
</tr>
<tr>
<td><strong>R&amp;D: ICT personal carbon budget control, information &amp; management</strong></td>
<td><strong>Integrated energy management systems, carbon allowance link with IHD</strong></td>
<td><strong>School retrofit &amp; renewable energy programme</strong></td>
</tr>
<tr>
<td><strong>Adaptable Homes</strong></td>
<td><strong>Passive Haus building regulations (remove need for heating)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Pasclive Haus buildings, adaptive and responsive to environment</strong></td>
<td><strong>Bioclimatic architecture (connecting &amp; adapting with environment)</strong></td>
<td><strong>Bio-climatic buildings, adaptive and responsive to environment</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Long-life, loose fit, adaptable interiors</strong></td>
<td><strong>Guest apartments</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Floor space restrictions</strong></td>
<td><strong>Requirement for communal spaces, services &amp; sharing</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Spread of communal facilities in densely populated areas</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Existing Policy</strong></td>
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</table>

**Legend**
- Policy
- Education & Community
- Research & Business

* BER = Building Energy Rating
** ESCO = Energy Service Company
7.7 Conclusion

To conclude this chapter, critical reflection is made on the procedural and operational issues associated with the Transition Phase with reference to responses from participant surveys distributed at the end of the Transition Workshops. The intervention brainstorms aimed to generate a high quantity and quality of intervention concepts. An average of 58 concepts were produced per Promising Practice and as indicated previously, the workshops succeeded in generating a rough balance between intervention categories. The structuring of interventions into the categories: “people, policy, technology/business” was considered “a good way to look at it” by one IT sector participant, while another stated that this breakdown led to a “variety of ideas emerging in narrow fields of consideration”. The even spread across ‘education and engagement’, ‘research, technology and business’ and ‘policy’ interventions would appear to affirm that the practice-orientation can and does result in the development of a more integrated intervention toolbox. Overall, the Promising Practices served their communications and operational role successfully despite some identified challenges. These challenges will be discussed next and stemmed from: 1) lack of familiarity amongst participants with the Promising Practices; 2) the inherent overlap between Promising Practices; and 3) the difficulty in conceptually separating out Promising Practices from their wider context.

While considerable effort was devoted to the development of briefing packs on the Promising Practices and workshop goals, inevitably some participants had not reviewed this material and despite its reiteration at the workshops, room remained for confusion regarding the minor detail of each Promising Practice. This was in part due to their richness in detail, and despite attempts to draw upon the distinctiveness of each Promising Practice, aspects of overlap between their constituent components proved somewhat complicating. In relation to this, one architect researcher commented in survey feedback that the “lack of difference between workshop topics [meant that] all conversations tended towards the same”. This meant that some Promising Practice concepts were discussed in each intervention brainstorm irrespective of which Promising Practice they were from. For example, water charging was an essential component of the Efficiency in Use practice. However water charges were also proposed as interventions to build towards Adaptive Washing practices as it was felt that these would incentivise adaptive behaviour. This reflects the mutually reinforcing nature of many of the intervention proposals which collectively would serve to reinforce all three Promising Practices.

While it could be said that the Promising Practices were based on an artificial distinction and were extracted from wider contextual issues, this was intended to focus discussion on the practice as “entity” and as “performance” (Schatzki et al., 2001). Nevertheless, it was found that participants were naturally inclined to gravitate towards contextual issues relating to questions of energy and water supply and broader socio-economic and political circumstances. Facilitators therefore reiterated that the Promising Practices were not designed with the intention of disregarding the broader situation, but rather to provide focus. Moreover, broader
discussion relating to landscape level forces, challenges and drivers was encouraged in the timeline discussions. Another observed “teething” challenge was for participants to put forward intervention suggestions based on what they felt needed to happen immediately for more sustainable water and energy consumption irrespective of the Promising Practice. For example, many people persisted in debating current issues of water charging or better enforcement of building energy efficiency regulations. Indeed, there was a sense that some participants wanted an opportunity to vent their immediate grievances, or showcase their own knowledge irrespective of its relation to the Promising Practice content. This could perhaps be because participants did not have the comfort blanket that the ‘visioning’ exercise provided to hide behind ideas that may have been more absurd or unsupported by the group. Robinson (2006: 1) attributes this observed fear of being wrong in adult professional settings to an education system that is based on individual merit and “stigmatises mistakes”, cautioning the fallacy of this approach: “if you are not prepared to be wrong, then you will never come up with anything original”.

In addition, some reversion to visioning processes occurred in the Transition Workshops. This confusion between fantasy and implementation phases is according to Gatersleben (2001) and Jungk and Mullert (1987) a common occurrence in backcasting workshops. In this sense, it could be said that the imaginativeness and openness inherent to the Visioning Phase were also prevalent in the Transition Phase. While this open-mindedness was a positive attribute, there were frequent suggestions for new concepts, especially for new technological devices that had previously been identified at the visioning stage, or were already contained within the Promising Practices. This reversion to processes of visioning stems from confusion surrounding the goals of the Transition Phase, especially amongst those stakeholders who had not participated in the project previously. While the challenges of the Visioning Workshop related mainly to the adoption of a liberated and creative mindset, participants at the Transition Workshop were faced with the challenge of merging this form of thinking with pragmatic considerations. It was found that the fusion of these somewhat polarised modes of thought required the adoption of a uniquely flexible mind-set. Owing to these mental challenges, other backcasting experiments have also reported difficulty in the ultimate phase of extrapolating back to the present (e.g. Van de Kerkhof et al., 2002).

One operational issue which revealed divided stakeholder opinion was the timing of the workshops. For example a city council communications participant commented, “I liked the quick pace, and moving to the three areas”, while another architect from the energy workshop noted the productivity benefits: “the intensive nature of the workshop is I feel more productive than if it was an all-day seminar”. In contrast, the main reason for criticism of the rapid intervention brainstorm process was that there was inadequate time for in-depth discussion or elaboration of the ideas. As one environmental NGO participant at the Washing Transition Workshop commented: “[there were] no down points other than the shortage of time to give very interesting issues”. Similarly, an engineer from the washing workshop stated: “excellent process
but possibly need more time to develop ideas - although this may not be the aim I realise”. These participants may have had higher expectations of the output that could be produced from the workshop. However, given the three-hour time frame, the balance of feedback was that the overall organisational structure was fit for purpose. The timing added to the rapidity of idea generation, helped by the fun addition of a count-down timer which contributed to a sense of teamwork.

As with the Visioning Workshop concepts, it was in the integration of the interventions that their true value was seen to emerge. On their own, no one intervention could lead to the fulfillment of any of the Promising Practices. Co-ordinating the mixes and timing of interventions was observed to be a cognitively challenging task for participants as it pushed them into time-spaces and disciplinary remits that they were unfamiliar with. The complexity of the task was also enhanced due to the quantity of interventions proposed (up to 77 per Promising Practice) and the necessity to enter into strategic discussion on policy mixes and innovation processes - topics that were often outside their areas of expertise. The physical involvement of participants in arranging the intervention post-its, prompted much debate on the interactions and relationships between intervention assemblages. This also led to the further refinement of ideas and the proposal of additional concepts – a generative capacity that was not anticipated for this exercise. It was intended to also have discussion on actors towards the end of this session and while some dialogue did occur, it was limited in scope due to time constraints. Instead, opinions on the various actors who should be engaged for successful implementation were elicited throughout discussions and a shortlist was created at the end of the workshop timeline sessions (these can be found in Appendix W).

A general observation on the positioning of interventions was the tendency to 'front load' the timelines with short to medium-term interventions, with fewer stretching up to the 2050 mark. This is mainly due to the higher levels of certainty and knowledge surrounding the present compared with the distant future where contextual factors are subject to change. In addition, many interventions could be considered elaborations or modifications of present strategies and were therefore more immediately implementable compared to those based on entirely different technologies or norms which participants felt would require longer lead-in times. Indeed, many of those interventions towards the end of the timeline tended to be for novel technologies or related to general goals rather than specific proposals. Kok et al. (2011a) reported similar difficulty in distinguishing between actions and milestones in the transition plan developed in the SCENES, Water Framework Directive backcasting study. Similar with Kok et al. (2011a), this research merged actions and milestones in the ultimate Transition Frameworks. There is reason to believe that the long-term periods which participants assigned for R&D for new ICT may have been too cautious, given Moore’s Law that reveals exponential rates of information technology advancement (whereby computing power doubles every 18 months). This fact leads Hammersley (2012) to argue that policy makers should not disregard technologies on the basis that they are not good enough now, but should work with the assumption that they will get much
better and cheaper in rapid timescales. This presents a real difficulty for the implementation of some of the infrastructures of the Promising Practices (for example the collective rainwater harvesting or variable water charging systems), as they would need to have in-built flexibility to cope with rapid advancements in their supporting information systems.

Considering the Transition Workshop output as a whole, it must be noted that the researcher had indeed anticipated a number of the intervention proposals as they tended to draw upon existing interventions and solutions. A degree of “policy transfer” was therefore evident in the backcasting process whereby previous and existing tools are applied to target different problems and contexts (Westley et al., 2011). In addition, the inclination towards tested and known ideas could be indicative of “recognition heuristic” which, according to Douglas (2011), is the natural propensity to choose familiar options where a paucity of information exists (as is the case of backcasting from the future). Indeed, in their survey responses, participants rated the quality of the intervention proposals at 3.5 out of 5. Although this indicates a medium-to-high regard for the interventions, this was a relatively low scoring compared with other dimensions of the backcasting process. Further analysis of the survey results (presented in the next chapter) shows that it was the holistic thinking, collaboration and idea sharing that were the most unique and valued aspects of the Transition process, rather than the specific interventions themselves. Participant feedback revealed a very positive evaluation of the workshop organisation and facilitation. This is evidenced by feedback from a heritage council representative at the water workshop: “I enjoyed the entire workshop from start to finish. The work dynamic in each group was very positive in trying to propose viable solutions”. Feedback showed a strong regard for the physical context and socio-cultural interactions at the workshops, identified as key contributory factors to contextual modes of learning (Falk and Dierking, 2000). The next chapter analyses the learning processes amongst participants in further detail. Participant opinions on the procedural and conceptual value of the social practice theoretical angle are also explored along with their opinions on processes of backcasting for sustainability governance. The conclusions chapter provides broader reflection on how the results of this research, especially the Transition Frameworks, may be acted upon considering broader institutional, ideological and practical challenges particular to the Irish context.
CHAPTER EIGHT:
BACKCASTING AND SUSTAINABILITY LEARNING
8.1 Introduction

A core quality of participatory backcasting exercises is said to lie in their potential to promote ‘higher order’ learning amongst their participants (Quist, 2007). ‘Higher order’ (or ‘conceptual’) learning involves problem and goal redefinition and a re-evaluation of underlying values and framings (Quist and Vergragt, 2006). Distinguished from ‘lower order’ learning (relating to the acquisition of new knowledge, operational procedures and strategies) ‘higher order’ learning is often considered a requisite for the conception, development and implementation of system innovations given their implied break from conventional infrastructural, institutional systems and societal norms. The importance of higher order learning in backcasting experiments is magnified given its association with increased likelihood of spin-off and follow-up activities (Quist et al., 2011). A key objective of this research was therefore to analyse “the benefits and limitations of the backcasting procedure as reflected in participant feedback and in the levels of learning it stimulated amongst them?” Davies et al. (2012a) provides an initial analysis of this issue with respect to the Visioning Phase of the backcasting process. Drawing on these findings, this chapter extends the analysis to integrate feedback from both the Visioning and the Transition Workshops, providing a comprehensive overview of participant learning processes and their opinions on the backcasting procedure.

Allied to each of the Visioning and Transition Workshops was a formal survey for attendees, designed to elicit their evaluations of 1) workshop output, 2) backcasting methodology, and 3) stimulants of learning. A high response rate of 92% was achieved for the surveys292 and responses were transcribed, analysed and categorised after the event. Drawing upon in-depth thematic analysis of qualitative and quantitative survey data coupled with researcher observation and reflection, this chapter analyses the levels and mechanisms of learning as reflected in backcasting participants’ feedback. This is of theoretical and empirical value for future backcasting research as it provides insight on how to enhance learning processes and will help build understanding of participants’ conceptions of the values and weaknesses of the practice oriented, participatory backcasting approach. The chapter begins with a brief overview of the key themes that emerged in the thematic analysis of survey data. After this, findings from the quantitative questions of the Transition Workshop survey are presented. Following their review of bounded socio-technical experiments93 (BSTEs) Brown et al. (2003) assert that higher order learning can be revealed through three key outcomes: shifts in the definition of sustainability problems and perceived solutions; alternative policy instruments and approaches; and shifts in relationships between participants through collaborative processes. Survey questions were therefore designed to assess evidence of these learning outcomes. Respondents were in widespread agreement that “the process of visioning had promoted new

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292 85% of heating attendees, and 95% of washing attendees completed the Visioning Workshop survey. 88% of heating attendees and 100% of washing attendees completed the Transition Workshop survey.

93 BSTEs or Bounded Social-Technical Experiments have many parallels with backcasting experiments in that they are concerned with implementing system innovations and are bounded in space, time and participants. The main distinction is that BSTEs focus on shorter timescales and on the development and introduction of concrete solutions or artefacts (Quist, 2007).
ways of thinking about sustainability problems” with 36 out of the 39 survey respondents across the Heating and Washing Visioning workshops responding positively to this question. An in-depth reading of survey responses led to the identification of characteristics of the backcasting process that were most valued and appeared to stimulate higher levels of learning amongst participants in the washing and heating research alike. These were crystallised into four interrelated themes:

1. Liberation
2. Collaboration
3. Holism
4. Long-termism

Liberation relates to the freedom and creativity facilitated by the adoption of the 2050 timescale, the use of visioning techniques and the break from everyday professional practice afforded in both Visioning and Transition Workshops. Collaboration refers to the opportunity to share and co-develop ideas with stakeholders from a range of professional backgrounds, sectors and interests. Holism signifies integrated, systems-thinking promoted by the practice orientated approach that was highly rated by participants. Finally, long-termism was identified as a key quality of the participatory backcasting process and incorporates participant perspectives on the strategic use of backcasting exercises within policy and their own professional work.

The chapter is structured around these four key themes and integrates feedback from participants in the heating and washing workshops due to similarities in the nature of responses across these parallel backcasting studies. Whilst these themes are discussed discretely, there are clear linkages between them. For example, holism was promoted through interdisciplinary collaboration, whilst also being stimulated by liberated and futures thinking. Therefore, the qualities of liberation, collaboration, holism and long-termism were mutually reinforcing and were found to collectively provoke higher order learning. Although some of these characteristics were more prevalent in either the Visioning or the Transition Phases, commonalities prevailed such that responses from both these phases are integrated, mentioning differences where relevant\(^4\). Likewise, attention is paid to the professional backgrounds of participants in order to identify any patterns in response and to provide greater context for their feedback.

Prior to the thematic analysis, an overview of the quantitative results from the Transition Workshop surveys is presented as yielded from a set of likert scale statements. These asked participants to rate on a scale of 1 - 5 (low to high): the quality and usefulness of the backcasting output (Questions One and Two); the procedural/conceptual value of the practice orientated backcasting procedure (Questions Three and Four); the value of interdisciplinary representation at the workshop (Question Five); and the potential for application of similar processes in their own work (Question Six). The resultant responses are presented in Figure

\(^4\) See Davies et al., (2012a) for a comprehensive review of the learning processes explicitly arising from the Visioning Phase of this backcasting research.
8.1 below in order of decreasing scale. These figures represent the average score from participants in the washing and heating workshops and will be referenced and further analysed throughout the chapter with reference to qualitative data.

Figure 8.1 Transition Workshop survey: quantitative responses

A striking feature of these responses is the overall high ratings that participants assigned to the various backcasting dimensions with each achieving an average of between 3.5 and 5 (indicating medium to high value). There was very high congruency within responses from participants in both the heating and washing research. Only one ranking of below three was made and there was a high concentration of opinion around the scores depicted in Figure 8.1. A distinguishing finding is that the dimensions relating to the methodological design and conceptual organisation of the backcasting experiment scored higher than those relating to the output. The “value of interdisciplinary collaboration”, “usefulness of backcasting” and the “usefulness of the practice-based approach” all achieved average scores of four and above, while the “quality of the transition plan measures” and “degree of innovation within the promising practices” were assigned moderately lower rankings. This suggests that participants assigned more value to the backcasting process and its inherent characteristics of collaboration, holism, liberation and long-termism than to the discrete outputs it produced. This is an important finding alluded to in other research (such as Kok et al., 2011b), which will be further analysed and tested with reference to additional qualitative feedback and other backcasting literature in the remainder of this chapter.
8.2 Liberation

Within survey responses, participants were found to rank very highly the liberation from current thinking, socio-technical constraints and daily work routines involved in the Visioning and Transition Workshops. This liberation created distance from the present day and was a vital factor in promoting creative idea generation processes that were so crucial to the entire backcasting research. Liberated thinking was particularly evident in the visioning exercise due to its adherence to traditional brainstorm rules which advocate the restraint of criticism coupled with ‘blue skies’ thinking (Michalko, 2006). This was intensified by the temporal distance afforded by the 2050 timescale. Aside from leading to creative proposals, the liberated thinking evident in both the Visioning and the Transition Workshops was seen to promote re-evaluative processes and individual reflection amongst participants – said to be vital stimulants of higher order learning (Brown et al., 2003).

In the Visioning Workshop survey, participants were asked if the workshop had “provided any new perspectives or given you any new ideas for how we could live more sustainably in the future?”. This yielded a variety of response types, where some participants mentioned specific concepts that were proposed in the workshops, while others provided more general or reflective answers. General answers often made reference to “out of the box thinking” and the removal of present day barriers promoted in the Visioning Workshop; as one county council environmental education officer commented, “[It was] excellent to be able to think about the future without constraints”. A Consumer Council representative echoed this sentiment stating that it was “refreshing to commentate on the positive without having to ‘over-think’ the plausibility. It did prompt me to think in a different way. [I] will consider using this technique in my own work”. These enthusiastic responses show that the Visioning Workshop successfully fostered a positive, liberated and stimulating environment. This facilitated the generation of creative proposals, or as one participant put it “crazy ideas”, that transcended disciplinary remits and conventional ways of problem framing and solution creation in the realms of sustainable washing and heating practices.

Aside from reference to general liberated thinking, a number of specific concepts were mentioned in participant responses. For example, respondents from the Washing Visioning Workshop made comments that the “closed system concepts for home water usage” and proposals for “merging of devices to fulfill water using practices (e.g. machines that wash body, clothes and dishes)” were extremely novel. In the Transition Workshop feedback, one NGO participant stated that, “brainstorming brought new ideas I hadn’t heard before”, while a city council communications representative commented; “looking into the future gave [me] good ideas for now” especially those that could be “implemented as part of a PR campaign re. saving / paying for water”. This final comment alludes to the value attached to the visioning concepts and transition proposals that related to challenging conventions, needs and norms and were non-technological and non-regulatory in nature.
Apart from these ideation benefits, the workshops were found to represent a unique and appreciated space for participants where the limitations of their day-to-day professional tasks and frames of thinking were set aside. Alluding to this, an architect from the washing Visioning Workshop commented: “the workshop method is a much more productive way of obtaining ideas than the conventional meeting where everyone arrives with their preconceptions / biases on what is achievable”. In this sense, another participant articulated that “it [visioning] is a way of breaking our narrow bands of thinking”, while an attendee at the Transition Workshop commented that the backcasting process “adds [a] blue skies’ element which is helpful to break down preconceptions”. These quotes show that the liberation qualities of the workshops served to challenge preconceptions, conventional wisdom and dogma on how to approach sustainability problems. These reflective and re-evaluative processes were present at least during the workshop itself, however as will be discussed in the conclusion of this chapter, their extension beyond the formalised exercise is subject to more uncertainty. It could also be attested that the physical space of the workshop, in an architecturally striking, modern university building, created a liberating space for the circulation of ideas and people. This was important given that the physical setting within which stakeholder visioning and collaboration exercises take place is reported to play a key role in either “constraining” or “enable[ing] trend breaking and rule breaking activities” (Quist, 2007; 50).

While most participants were of the opinion that the Visioning Workshop was an intellectually liberating experience, some respondents expressed disappointment in the mundaneness of the resultant ideas and in other participants’ abilities and willingness to imagine dramatically altered realities. For example, a representative of an energy poverty agency considered that the Transition Workshop produced “some new ideas, but most [are] already here”. This is reflected in the lower rankings assigned to the output of the workshops where participants gave an average ranking of 3.75 to the “quality of the transition plan measures”, while the “level of innovation within the Promising Practices” was assigned an average value of 3.6. This echoes feedback from participants in the SCENES pan-European backcasting project aimed at developing long-term scenarios and action plans for the implementation of the Water Framework Directive. Of this study, Kok et al. (2011b: 847) reported stakeholders were “only moderately convinced of the link with ‘real’ policy actions”, and “only one half of stakeholders were satisfied with the resulting strategies”. Nevertheless, SCENES researchers themselves said they were satisfied with the resultant actions, showing a gap in expectations between researchers and participants with regard to backcasting outcomes. For participants in the Visioning Workshops, there was difficulty in conjuring novel concepts and interventions and achieving full liberation from the present situation. It is important to note however that the Visioning Phase was not aimed at the blind creation of novelty for novelty’s sake. Rather it aimed to refashion, combine and integrate existing and new ideas in more creative ways that may not have been drawn previously. This echoes the often quoted words of William Gibson, U.S. science fiction author and futurologist who states that “the future is already here, it’s just not evenly distributed” (Hammersley, 2011). In this comment, Gibson suggests that the
difference between present and future is often in the diffusion and pervasiveness of existing socio-technical innovations; in this sense, future trends can be roughly anticipated.

For some, the visioning exercise was a daunting and challenging task. For example, one futures researcher stated, "some people in my group had difficulties getting out to 2050", while an architect and a product designer relayed similar sentiment in their survey feedback. In the main, differences in feedback between professional circles were relatively indiscernible, however most of these comments came from individuals who operate in professional fields where brainstorming and visioning techniques are more commonly applied. From their perspective, the event therefore proved less novel and challenging. It was found that existing professional mindsets and practices were important in shaping participants’ capacities to a) effectively engage with the requirement for liberated thinking in the backcasting exercise, and b) to personally benefit and learn from taking part. The visioning brainstorm removed many participants from their comfort zone due to its requirement for divergent thinking skills characterised by the ability to see many ways to answer and interpret a question or a problem, and the ability to think laterally rather than linearly. Divergent thinking is said to be an essential capacity for the generation of creative ideas and while inherent in younger children, studies have shown its diminishing nature - often attributed to the suppression of divergent thinking in conventional educational settings (Robinson, 2011). Other participants who had professional training in architecture or design fields were more familiar with these modes of thinking, revealing the relativity of learning benefits amongst participants. For example, although one city engineer from the Washing Visioning Workshop agreed that new perspectives had been provided, he stated that he found "pragmatism [is] hard to suppress" and expressed preference for a "critical review of ideas". This suggests that creative thinking processes can be discomforting for those whose professional and personal mindsets tend towards the pragmatic.

For these participants, there was some frustration at the limited opportunities to demonstrate their existing knowledge and experience in the Visioning Workshop setting. Nevertheless, the Visioning Workshop did not intend to entirely do away with current knowledge and some form of critical review or "reality check" is a known requisite of any visioning experiment (Janssens, 2008). Critique was therefore permitted during the clustering and voting exercise, however time constraints meant that this phase was assigned less priority, whilst the emphasis of the Visioning Workshop was on harvesting creative ideas that could be taken forward to the scenario elaboration phase. This reveals the recurrent tension between liberated thinking and pragmatism, imagined futures and present realities that arose time and again throughout the participatory backcasting process. The Transition Workshops in particular required these juxtaposed modes of thought, albeit with less emphasis on futurity and liberated thinking than in the Visioning Workshops.
8.3 Collaboration

Participants from both the Visioning and Transition Workshops repeatedly emphasised their appreciation of the interdisciplinary collaboration involved in the backcasting process. Reasons for the appeal of these collaborative processes mainly related to the range of perspectives and insights that interactive idea generation provoked. Interdisciplinary collaboration across communities of practice loosely linked to the water and energy fields was the most frequently cited workshop attribute together with positive comments on their structure, organisation and facilitation. Indeed, in the set of likert scale questions of the Transition Workshop survey, “the value of interdisciplinary collaboration at today’s workshop” received the highest overall rank from participants, achieving an average of 4.7 out of five and many stated that they would like to apply similar collaborative processes in their own fields of work\textsuperscript{95}. Likewise, in questions probing whether any new perspectives had been provided from participating in the Visioning and Transition Workshops, collaboration amongst diverse stakeholders was often cited as being a key stimulant.

Analysis of feedback on the benefits of interdisciplinary collaboration suggest that processes of “social learning” arose through the interactions and debates amongst participants. Distinguished from individual learning, social learning involves learning amongst an assembled group of individuals and “concerns itself with interactions and communications among actors, the relations among them, the quality of dialogue, and the congruency in the collective problem definition and identification of solutions” (Brown et al., 2003: 297). Social learning is linked with changing personal values and norms while negotiation and interaction processes are also said to provoke self-reflection and critical evaluation which Vergragt and Brown (2007) associate with conceptual learning. A multitude of respondents were extremely positive about the mix of participants who derived from public, private, semi-state and NGO spheres, representing a variety of professional backgrounds involved in the water and energy sectors. For example, one researcher commented that the Heating Visioning Workshop had the “right combination of people with different experience and opinion”. From the Washing Transition Workshop, an IT representative stated that there was “good diverse attendance across disciplines (academic, industry, local government etc.)”, while another architect expressed his appreciation of public sector representation: “local authority and department of environment people provided a good working context and provided an insight into local and national policy”. At a basic level, this heterogeneity of participants provided a valuable opportunity for contact building and networking. One washing industry representative in the Visioning Workshop remarked that “networking was very enjoyable – great mix of people”, while an IT sector participant from the Transition Workshop commented: “excellent opportunity to meet people who are interested in water related topics”. These positive responses contrast findings from Carlsson-Kanyama et al. (2003) on the ToolSust project where some participants were critical of

\textsuperscript{95} This was especially mentioned in response to survey question 4B of the Transition Workshop: “In your own field of work, would you consider employing any of the processes implemented by Consensus?”
the homogeneity of stakeholders in the backcasting exercise. It must be noted however that in the case of this PhD research, difficulty was faced in recruiting participants from certain fields and disciplines, especially from central policy administration and the private sector (as outlined in detail in the methodology chapter). Nevertheless, from the perspective of participants, the overwhelming opinion was that an appropriate mix was represented. An architect at the Heating Visioning Workshop put this succinctly: “a good melting pot of people who wouldn’t perhaps share ideas normally”.

This “melting pot” contributed to a snowballing effect in the generation of scenario proposals whereby ideas were worked up and elaborated collaboratively through group interaction and idea sharing. Collaborative ideation improved the richness of concepts and added a sense of collective ownership and agency given that few concepts could be traced to a particular individual. This is reflected in a response from an energy regulator at the Visioning Workshop who remarked that the “the group sessions were very open with an interesting mix of backgrounds promoting circulation of ideas from different perspectives”. There was therefore strong support for the views expressed in Meadowcroft (2009) and Quist and Vergragt (2006) that participant diversity enhances the “generative capacity” of backcasting experiments improving the innovativeness and spectrum of proposals. This sentiment was reflected by a designer at the Water Visioning Workshop: “the large group opened a large range of insights. I see it as a valuable way to achieve a unique perspective on sustainability problem areas”. This final comment suggests that participants’ perspectives on the nature of the problem (in this case, personal washing) were challenged through interdisciplinary dialogue. This quality of problem re-definition is a key driver for higher order learning and helped build deeper understanding amongst participants regarding the variety of forces that shape unsustainable consumption practices. As Vergragt and Brown (2007: 1108) affirm:

“Learning takes place when key actors representing a range of interpretive frames, problem definitions and core competences engage in intense interactions around an issue, a problem, or an idea”.

Evidence of learning according to this interpretation is reflected in feedback from an energy engineer at the Washing Visioning Workshop: “Different perspectives on the same problem expands thinking and is interesting”, while a planner from the Heating Transition Workshop echoed these sentiments: “[I] found the mix of people with differing backgrounds, commenting on the same problem, with differing experiences very interesting”. This feedback links to literature on ‘policy oriented learning’ that notes the importance of ‘congruent learning’ or learning amongst a heterogeneous group of actors which typically occurs during problem orientation processes and through the articulation of shared goals in policy making. Congruent learning contrasts processes of ‘joint learning’ amongst actors tending towards more homogenous values and mental frameworks – a situation more typical of organisation based visioning exercises (Quist et al., 2011). The value of congruent learning was acknowledged in survey feedback especially in response to question 3B of the transition survey that asked which dimensions of the backcasting process participants would be most likely to draw upon in their
own professional lives. In response to this, an architect stated that the process reinforced the need for "consensus – a shared vision is essential to allow people act together". A Visioning Workshop attendee commented similarly: “I really enjoyed getting perspectives from other people. It always helps expand how you think of sustainability and the cross-sectoral impacts and also shared goals and ideals”. These comments suggest a questioning of the sufficiency of existing cognitive constructs guiding sustainable consumption problems. Within literature on cognitive, policy and organisational sciences, this critical evaluation can create a “feedback-stimulus” mechanism which ultimately leads to the replacement of old cognitive constructs with new guiding principles, a process which is said to be heightened when a sense of urgency prevails (Vergragt and Brown, 2007: 1108).

The workshops produced a valued intellectual space for collaboration across “actor worlds” (Callon, 1995) representing different elements of the water and energy socio-technical systems where less lateral interaction and negotiation opportunities typically exist. This was aided by the 2050 timescale that promoted the removal of vested interests and bargaining positions given its distance from the present. Quist (2007: 41), referencing Callon’s work on long-term transport policy development for the Metro in Paris, suggests that through collaborative development of policy visions, “shared actor worlds” are created which help to reduce previous differences in value frames and goals. It could therefore be said that the Visioning and Transition Workshops, with their distance from present constraints, professional and disciplinary hems, helped create “shared actor worlds” within the physical workshop space that were also embodied within the future visions and action plans.

8.4 Holism

Another characteristic that was highly appreciated by participants was the holistic viewpoint provided through the practice orientation of the backcasting process. The future heating and washing scenarios were characterised by their range of technical and 'soft' innovations including rules, organisational and institutional conditions, social perceptions and norms. This integration of hardware and software innovations was promoted through the practice orientation of the Visioning and Transition Workshops and also due to the collective contribution from a cross-section of actors. Participant feedback showed strong appreciation for the holistic angle that the practice oriented backcasting process offered. This was found to be a key stimulant of conceptual learning due to the challenges it posed to conventional problem definitions and solutions development for sustainable household consumption. When asked to rate their opinion of the “usefulness of the practice based approach in thinking about solutions for sustainable consumption”, participants from the Transition Workshops assigned it an average of 4.1 out of five. In addition, many participants commented that the “people ideas” (or ‘soft’ measures explicitly designed to shape socio-cultural norms and daily practice procedures) were the most stimulating and provided new perspective and insight. Practice thinking was formalised
in the design of the Visioning Workshops where participants were asked to think of innovations along three categories of ‘hardware’, ‘people’ and ‘organisation’. In the Transition Workshop, practice interventions were designed according to ‘people’, ‘policy’, ‘research, technology and business’ categories. These frameworks were often mentioned in survey responses. In questions on whether any new perspectives had been provided, participants repeatedly mentioned that the “holistic” or “integrated” approach along with “people” ideas were the most thought provoking and innovative. The structuring of the workshops along practice lines was considered a positive means to stimulate systems thinking and an appreciation of the importance of socio-cultural innovation. This is reflected in feedback from a technology company representative: “people / policy / technology and business is a good way to look at it - I liked the way you split the three areas”, with another policy researcher attendee reiterated this sentiment: “the structuring of the problems into three promising practices was great”.

For those working within traditional technology or engineering domains, the approach was especially novel. For example, one representative from a heating company at the Transition Workshop stated, “It showed me more aspects (social / education) that I would not usually consider”, while an architect at the Visioning Workshop stated that “the workshop highlighted other areas other than building regulations / control, upgrades that I’m familiar with and showed that education is vitally important”. This indicates the high regard that participants had for the opportunity to interact with professionals and ideas from areas outside their conventional work remit. Despite this stated support of the practice approach, it is interesting to note that ‘people’, or ‘education and engagement’ interventions conjured at the two Transition Workshops accounted for the lowest volume of all the intervention categories. This perhaps indicates the related lack of participant familiarity with the kinds of innovations and interventions that could be developed to target changes in user expectations, norms, mindsets and bodily-mental actions involved in their consumption practices. This was evidenced in the Transition Workshops, especially for the Adaptive Washing and Adaptive Heating practices that were predicated on the highest levels of change in cultural norms of washing and heating.

Proposals for advertising and basic information provision pervaded initially, revealing the omnipresence of the information-deficit paradigm in the field of environmental behaviour change (Davies, 2002). This is unsurprising given the observed legacy of past tools, procedures and approaches as the main shapers of policy tools rather than the precise social, economic or environmental conditions of the time (Sacks, 1980; Hall, 1993). In relation to policy oriented learning processes, Sacks (1980: 356 in Hall, 1993) therefore states: “the most important influence in this learning is previous policy itself”. However as the brainstorm sessions progressed, willingness was revealed to stretch beyond information provision solutions and the opportunity to discuss these changes was greatly welcomed. For example, one researcher stated that they: “found the cultural discussions particularly valuable “, while another from the field of environmental communications said that they liked “the idea of changes in future

96 As outlined in the Transition Chapter, ‘people’ ideas comprised 27%, ‘technology and business’ 37% and ‘policy’ 36%.
perceptions of what is clean”. An architect from the Department of Environment commented that he was surprised at the “degree of consensus on [the] need to implement water reducing practices”, showing that this approach had potentially not been previously considered a viable option.

Rather than the ‘people’ ideas themselves, of more importance to participants was the practice approach that offered an alternative conceptual viewpoint and form of problem solving supporting the view that backcasting is a process driven rather than an outcome driven exercise (Quist et al., 2011). The narrow attention on heating and washing practices led to a focused problem definition, which as Brown and Vergragt (2008) note is more useful than discourse at worldview level which is less likely to lead to higher order learning. Of particular interest to participants was the consideration of interactions between the techno-material landscape and cultural norms and institutions. As one architect noted, ‘I liked the opportunity to imagine the future of society and technology’, while a designer commented that the workshops provided awareness of the need for a “combination of cultural revolution and technological advancement”. This shows quite a good understanding of what Shove and Walker (2010: 476) call “the importance of attending to all requisite elements of practice” in thinking about steering daily consumption practices towards sustainably.

Given the appreciation of the value that such holistic conceptual lenses provide, participants often noted that the workshops reinforced the need for interdisciplinary approaches and systems thinking in innovation, research, and policy designed to promote sustainability. For example, an architect from the Transition Workshop commented “…the problems presented were well beyond any one discipline so an interdisciplinary approach is essential” while others noted that the workshops had reinforced the requirement for “integrated design approaches”, and a “systems focus”. Another stated that the approach demonstrated the “need to combine policy / legislation with changing social norms and values around consumption”. These responses suggest that participants were stimulated to use systems thinking to explore the co-evolutionary dynamics of daily practices, which was a welcome attribute given the stated importance of systems thinking especially in collaborative settings for promoting higher order learning (Senge, 1990a).

### 8.5 Long-termism

The date of 2050 for the backcasting experiment was a challenging temporal scale for participants to operate within and stretched them to think beyond short-term policy cycles and incremental goals. In the Transition Workshops, looking back from 2050 to the present created a vantage point for participants from which the interactions between interventions for the heating and washing practices could be considered through time. The collective planning of interventions over the 40-year time period required participants to engage with an alternative temporal scale and space for action and was an antidote to the uncoordinated and fragmented
nature of current sustainability interventions. In tandem with the holistic quality of the backcasting experiment, this long-termism cultivated learning on the need for coordination across societal interests and actors. The disaggregation of Transition interventions into different categories (policy; people; business, research and technology) was considered by participants a useful toolbox to develop long-term, integrated strategy. For example, a private sector engineering consultant stated that he "liked looking at individual aspects in isolation and seeing how initiatives connect within a time frame" while a Consumer Council representative commented that it showed that achieving more sustainable consumption “is not an insurmountable challenge, and can be broken down into bite sized chunks like GCSEs\textsuperscript{97}.

Contrary to being an entirely complex activity, there was a sense of surprise at how manageable and straightforward long-term, integrated planning could be: “It provided more short / medium and long-term solutions I had not considered. It showed how so many solutions are short-term for implementation”. This response suggests that while the 2050 timescale of the intervention brainstorm freed participants to think of creative proposals, not all of these were as radical as one would assume. Therefore, many were considered readily implementable in the short to medium-term - one of the reasons for the relatively front-loaded nature of the timelines as noted in the previous chapter. Similarly, not all proposals for the 2050 practices were as futuristic as anticipated and participants were surprised that they often involved a reconsideration of past solutions that may have been more sustainable: “the idea of using material sciences for body warmth and [the] use of older technologies were interestingly explored”. This process of ‘looking backwards to look forwards’ was another trait of the long-term thinking involved in the backcasting research. When developing scenario proposals and plotting the transition interventions up to 2050, participants often reflected on their personal experiences of changing household consumption practices and policy through time. Alluding to this, one researcher at the Heating Transition Workshop commented that new perspectives were provided in relation to “people’s perceptions of change and timelines”. Similarly, in response to the survey question that asked “how might collaborative backcasting be usefully applied in governance processes for sustainable consumption”, a representative from an energy poverty agency identified its positive temporal qualities stating that it “enables a process for long-term thinking and opens possibilities where short-termism closes off”, while a city engineer from the Washing Transition Workshop commented that it “might make the decision-makers think further ahead than the next election”. This feedback indicates the role that long-termism can play in stimulating evaluative and reflective processes and in challenging conventional instruments and procedures for developing solutions for sustainable consumption – all indicators of higher order learning.

Participants were positive about the strategic role that backcasting could play for long-term sustainability planning and target setting, as articulated by one city council water engineer; “Provides much more ‘forward’ thinking approach rather than just looking at day to day - setting

\textsuperscript{97} GCSE stands for ‘General Certificate of Secondary Education’ in the UK.
a much longer-term target and seeing how best to get there”. From the perspective of most participants, the core value of backcasting did not lie in the development of sustainability targets alone, but rather in “seeing how best to get there”. This is reflected in a comment from an environmental NGO representative at the Washing Transition Workshop who said: “people will readily agree long-term targets but we need a system such as backcasting to show the path and milestones to reach those targets”. This comment touches upon the arbitrariness of abstract, long-term target making, without adequate consideration of the mechanisms for their achievement. It was therefore reasoned that backcasting techniques could assist in elaborating detailed pathways and integrated solutions, as one product developer commented; “[it was] useful in showing progression towards a goal and ensuring that interim targets are put in place along with consideration of other targets – e.g. align people, policy and technology targets”.

In general participants were positive and interested in the potential for backcasting to be utilised more extensively within formal policy making. This is reflected in their likert scale assessments of the “usefulness of backcasting as a tool for strategic policy-making” which achieved an average of 4.25 out of 5 from participants with no discernable pattern in responses across professional backgrounds. While participants assigned a rating of 3.75 to the quality of intervention proposals (which seems moderate compared with the high rankings assigned to other backcasting dimensions) this still indicates that participants felt the interventions were of medium to high quality. Positive feedback was reflected in recommendations for extending the output from the backcasting research. For example, one NGO participant from the Washing Transition Workshop stated that the intervention proposals “should be the basis for the current and future sustainable development strategies”. In this vein, respondents often emphasised that backcasting was more than just blue skies thinking and represented a pragmatic and comprehensive way of overcoming short-termism. This was articulated by a policy researcher at the Heating Transition Workshop who stated: “identifying targets and looking at different options for reaching them - an extremely logical and practical approach. Much better than the current short-term, piecemeal approach”. It was often thought that the learning processes stimulated through reflective long-term thinking within backcasting would be of particular value for policy makers: “Similar workshops with policy makers and stakeholders would be a good start. Introducing [a] different approach to thinking about the future for policy making”. In stimulating different ways of thinking about the future (or conceptual learning) it was noted that this would need to be accompanied with learning about new procedures (operational learning), as one representative from a computing device company asserted: “we need to educate our policy makers more on processes used (tools) for framing and solving problems”. However, policy makers present at the workshops showed the least familiarity with these tools compared with those in urban planning, architecture, design and communications professions.

Various opinions were voiced on the particular ways backcasting might be strategically employed for long-term sustainability governance. For example, one NGO participant stated that rather than typical government department-led policy making, backcasting processes could
be used to “identify environmental priority areas with task forces to follow in areas such as water, waste, energy etc.” This comment implies moving beyond isolated department formed policy agendas to the development of issue-based policy making, enlisting actors across and beyond government institutions and is reminiscent of collaborative governance ideas. Collaborative governance is defined by Ansell and Gash (2007: 544) as:

“A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets”.

A representative from the water services section of the Department of Environment made similar arguments on how backcasting could be applied in collaborative governance settings: “the process should not be applied just to government policies per se. It should be applied to issues and the relevant outcomes taken forward to advise policy and business”. Other public sector representatives favoured more institutionalised forms of backcasting reminiscent of transition management ideals with a leading role for government in their management and implementation. For example, a planning representative from the Department of Environment felt that backcasting would work “only if it was built into government decision making processes [with] time allocation for this”, while a city county council respondent said that “It should be a mandatory component of policy making”. This line of thought was continued by a researcher at the Heating Transition Workshop who emphasised that it “would require direct participation of decision-makers in creative process for problem and solution perception and ownership” [respondent’s own emphasis added]. Here, the respondent believes in the need to delegate actions and responsibilities to actors in order to increase their likelihood of implementation. These comments touch upon the fundamental issue of who is best placed to conduct backcasting exercises, with what participants, and what power. While survey responses did not extensively elaborate these issues, questions of orchestration, politics and participation will be explored in greater detail in the conclusion chapter of the thesis.

Issues of long-term ownership and compatibility with policy agendas were identified as key barriers to the mainstreaming of participatory backcasting. This was particularly noted by a representative of the Department of Energy, Communications, Marine and Natural Resources who, when asked if they would draw on the output of the workshop in their own work, answered “yes, if of relevance to policy development and implementation generally”. This shows that where backcasting remains an isolated or unique exercise (as in the case of this research), the integration of resultant proposals within existing institutions, structures and rules that shape current practices represents a larger challenge than would be the case if long-term, foresight procedures were institutionalised within policy making. This raises the important issue of the extent of action and change that can be expected as a result of isolated backcasting experiments. In order to improve the likelihood of action, higher order learning must be stimulated, however it has been recognised that there is difficulty in sustaining this kind of learning from singular experiences, as Hall (1993: 278) comments:
“Learning is conventionally said to occur when individuals assimilate new information, including that based on past experience, and apply it to their subsequent actions. Therefore we can define social learning as a deliberate attempt to adjust the goals or techniques of policy in response to past experience and new information. Learning is indicated when policy changes as a result of the process”.

While researching long-term impacts on participants’ professional practice and broader spin-off is clearly beyond the remit of this project, the best available proxy was to ask participants if they intended to draw upon any of the learning that was cultivated through the process. Their responses to these questions are explored in the next, penultimate section of this chapter.

8.6 Personal application of similar backcasting processes

Having looked at participant thoughts on the application of backcasting within government processes, the question of whether participants would consider drawing upon the results and processes within their own personal work settings is now addressed. Question three of the Transition survey explicitly asked individuals if they would consider “a) drawing on the output of today’s workshop, and b) employing any of the processes implemented in Consensus research (e.g. visioning, long-term transition planning, interdisciplinary collaboration)?” Beginning with output, 73% of participants from the Heating Transition Workshop and 84% of those from the Washing Workshop responded positively, indicating at least a stated intention to draw upon the output of the backcasting process in their professional work contexts. In elaborating their responses, participants often reiterated the innovativeness of the ‘people’ based measures and the practice oriented approach. Others were less specific, for example one architect commented: “not many radically new ideas or any ‘shock’ thoughts but some positive, interesting ideas for investigation” while an energy supply representative said that participating had provided “a few new ideas that would be worthy of further exploration”. These comments show a stated intention of further reflection on workshop output beyond the boundaries of the event itself. A representative from a washing device company stated that “there were some great commercial ideas which could be considered for individual engineering / innovation projects within the university” while an energy product developer made similar comments. Although it was hard to secure private sector attendance, these comments show that the backcasting process appealed to professionals in technology development who could potentially have been considered a harder audience to impress given that visioning exercises are more normalised within corporate settings.

When asked whether they would consider “employing any of the processes implemented by Consensus”, 73% of participants from the Heating Transition Workshop provided a ‘yes’ response, while 52% of the washing attendees answered similarly with no discernible pattern in responses between professions. Interdisciplinary collaboration was the most common quality that participants said they would employ followed closely by attention to ‘people’ interventions.
and long-term strategy development. Those who did not provide a definitive ‘yes’ response tended to fall into two categories. Firstly, there were those who tended to be from private sector, research, architecture or design fields who stated that they already applied similar techniques of brainstorming and interdisciplinary collaboration (although not necessarily visioning or backcasting). Secondly, some participants stated they would have limited opportunity to apply similar approaches as they would be “outside the scope” of their current job descriptions. This stance was more prevalent in feedback from the Washing Transition Workshop although only one attendee explicitly stated that they would not apply similar techniques. The lower number of ‘yes’ responses to the question of personal application amongst washing compared with heating workshop participants could in part be due to the relative familiarity and wider usage of visioning and forecasting techniques in the energy sector. In addition, sociological enquiry and the notion of designing interventions to shape norms and expectations of household water consumption practices was considered a more novel approach by washing attendees - perhaps owing to the relative familiarity amongst energy stakeholders with notions of “demand management”. The following response to the question of personal application typifies the current supply-side focus of water management in Ireland, whilst showing flexibility to alter agendas to include demand considerations in the future:

“Perhaps in the future, not on current projects (water-mains rehab and leakage analysis and reduction). Domestic demand (as well as leakage from water mains) are significant components of overall demand and the issues and ideas learned today will be very important in the future”.

A number of respondents in the Heating Transition Workshop commented on the immediate relevance of learning gained on the social practice approach. An architect conducting research in the field of sustainable energy consumption stated that the practice oriented backcasting process was “particularly relevant….[and] will slightly shift focus of my research interest”. Similarly, another architect commented: “the research being conducted closely aligns with my own work. It provides valuable ‘social practice’ insights into the manner in which people occupy and operate buildings”. For these participants, it would appear that conceptual learning took place such that their modes of professional practice and thinking may be affected going forward. Likewise, a researcher in the field of water innovations for the developing world showed intentions to apply similar techniques: “processes were excellent and produced a good range of ideas in a short space of time. I would certainly consider trying something similar for my research”. From the perspective of a private sector attendee from a heating technology company, the practice orientation was considered of use for marketing purposes “to find out about customer needs and views”. This illustrates the varying ends for which backcasting exercises may be used, not all of which may be compatible with goals of overall consumption reduction. It also highlights the range of divergent motivations amongst participants when there is involvement across public, private, and civil society spheres. Despite the democratic and

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98 For example, many workshop participants were aware of the Sustainable Energy Authority of Ireland’s 2050 Energy Roadmap, along with the EU’s set of 2050 Low Carbon initiatives and the IPCC climate change scenarios.
collaborative aspirations of participatory backcasting processes, they are not immune to power plays given clear differences in access to resources and alternative drivers and motivations on the part of participants and indeed orchestrators alike. This raises the issue of whether the range of interests involved (especially those of the private sector based on capital creation) can be aligned with goals of sustainability within backcasting plans. This reflects the long-standing yet unresolved problem of how to create an effective environmental governance architecture that is participatory, adaptable, accountable, legitimate and fair (Biermann et al., 2010).

At the other end of the spectrum of responses on personal application of backcasting processes were those who stated that they already apply variants of backcasting and visioning exercises in their own fields of work. For example, one Department of Environment urban planner commented; “Yes, I've previously undertaken planning & community workshops and building on the concept of a design/planning charter. This transition planning is similar in a number of ways”. In the main, participant experiences with similar processes remained limited to that of interdisciplinary brainstorms, as one city council architect from the heating workshop stated; “I frequently use interdisciplinary collaboration. Visioning and long-term transition planning may have more limited immediate applicability but may prove of use later on”. This comment is illustrative of the high regard that participants had for the backcasting approach but also shows the practical constraints they faced in considering how such processes might be usefully applied in their professional contexts.

8.7 Conclusion

This chapter has evaluated the key qualities of the backcasting process as identified in survey responses from participants in the Visioning and Transition Workshops. The attributes of liberation, collaboration, holism and long-termism were identified as key stimulants to processes of higher order learning amongst participants, in particular with respect to promoting alternative conceptualisations of sustainable consumption problems and solutions. A shift in the definition of sustainability problems and perceived solutions is according to Brown et al. (2003) one of the key indicators of higher order learning from backcasting experiments. Survey evidence suggests that the experience of participating in the backcasting workshops shaped participants’ knowledge, understandings and conceptions of sustainable household water and energy consumption problems. Their preconceptions about innovating for sustainable practices of heating and washing were often challenged, sometimes modified and even radically altered through participant interactions and the holistic, liberated and long-term thinking that the workshops promoted. Although reflective processes are said to be ongoing and, according to physchoanalysis, perhaps mostly unconscious (Bondi, 2005), survey responses revealed particularly stark moments of overt reflection (Davies et al., 2012a). This is evidenced in the many comments from participants stating that the workshop provoked them to “review”, or
“reconsider previous views on certain topics”, or that the process “challenges pre-conceived ideas” and generates “new ways of looking at old problems”. These responses illustrate the self-reflexive processes that the backcasting workshops promoted that would suggest higher order, conceptual learning on the part of participants.

A key finding, reflected in both the quantitative and qualitative feedback, was that it was not the stand-alone scenario concepts or intervention proposals that were the most highly rated by participants, rather it was the processes behind their creation that participants considered of most value. This reflects findings by Carlsson-Kanyama et al., (2003: 15) of the ToolSust sustainable cities backcasting project who concluded that “the process quality was higher than the quality of results” - an outcome the researchers mainly attribute to the lack of variety in views and expertise amongst participants. Similar sentiment from participants in this PhD research could also stem from the unknowns relating to follow-up and the lack of agency of the resultant outputs given that the backcasting project was an academic-led process. Nevertheless, interdisciplinary collaboration was rated very highly by participants and there was evidence that this produced social learning; an important outcome given its reported significance for spin-off activities (Quist et al., 2011). In addition, participants strongly valued the sense of perspective permitted by the liberated thinking and long-term timeframe that saw them looking back from 2050 at the interactions between interventions through time. Their responses suggested that it is not the paucity of solutions for sustainable consumption that is a key hindrance; rather it is the enmeshing and coordination of socio-technical innovations and interventions (existing and novel) that represents the primary obstacle. This obstacle is maintained due to the intellectual and administrative challenges that such a systemic and collaborative approach would require, and more importantly, from the political and economic difficulties of advocating strategies that aim to reduce personal consumption in the name of sustainability - an argument that will be extended in the Conclusion Chapter.

At this stage, it is useful to refer to the three key factors that Falk and Dierking (2000) identify as influencers in context-based learning. These are: the socio-cultural context; the physical context; and the personal context. The socio-cultural context refers to the format of socio-cultural mediation and interaction, which in this case was found to promote high levels of interaction and social learning. The “physical context” – refers to the physical space within which the learning exercise takes place. Prior to the physical intervention of the workshops, the participants existed as separate entities each with their own personal motivations, interests, expectations, knowledge, beliefs and choices. In addition to these “personal” attributes, research has shown that policy makers operating within environmental spheres can often hold a different set of perspectives towards nature and the environment in their professional practice than those they hold within their personal lives (Craig et al., 1993; Butler and Acott, 2007). Craig et al. (1993) report that while policy makers tend to hold personal beliefs about biodiversity and the environment based on moral and intrinsic evaluations, these particular understandings are rarely articulated in policy making arenas where rational and pragmatic arguments based on
economics or ecological science are elevated in decision making. However this stance perhaps obscures the “scientification of politics” whereby politicised or value-laden decisions can be legitimised by being advocated in the name of science (Barry, 2009). A key quality identified in this research was that the suspension of vested interests and conventional institutional roles in the backcasting process, created more room for the articulation of personal perspectives and values rather than solely institutional stances or political dogma. Normative perceptions and emotional evaluations therefore played a vital role in this process, which are typically stifled by the prioritisation of intellectual and objective knowledge. A wide variety of both personal and professional values, framings and norms of practice were therefore represented at the workshops helping to improve the richness of ideas and opportunities for leaning between attendees. Qualities of liberated and holistic thinking from the practice orientation were found to stretch cognitive framings of sustainable consumption problems (promoting conceptual learning) while the long-term and strategic quality of backcasting stimulated learning with respect to procedures and tools for targeting sustainable consumption (operational learning). The constituent components and attributes of the participatory backcasting process are presented in Figure 8.2 below, illustrating how their collective evolution and reinforcement led to processes of higher order learning.

**Figure 8.2 Practice oriented participatory backcasting: learning processes**

The extent to which the learning processes stimulated through participation in the backcasting project can be translated into change and an uptake of research outcomes by societal actors remains a key uncertainty. However, feedback revealed intentions for further reflection on the methodology and concepts generated and requests from participants to circulate attendee lists following the events suggest that the impact of the backcasting workshops could spill over into other arenas, albeit in an undefined and unpredictable way. Indeed, many participants indicated
that they would have preferred additional time for networking amongst attendees, as one participant commented: "lots of interesting people, not time to talk to enough of them". While this may have increased the chances of further post-workshop collaboration and action, there was a trade off to be made between allowing sufficient time for networking and holding workshops that were not too time demanding so as to discourage attendance. As evidence from organisational learning suggests (March and Olsen, 1975; Argyris and Schon, 1978), there is the inherent possibility that the cross-fertilisation of ideas generated in visioning exercises may be temporally bounded. Equally, learning impacts may be transient unless ‘tacit’, or context specific knowledge gained by workshop participants can be successfully translated into ‘explicit’ knowledge that can be incorporated into the modus operandi of the organisations from which participants derived (Kolb, 1984). Rennie and Stocklmayer (2003: 760) make similar arguments on the difficulty of developing enduring learning experiences through singular interventions;

"Learning rarely, if ever occurs and develops from a single experience. Rather learning in general, and science learning in particular, is cumulative, emerging over time through a myriad of human experiences".

While the evidence from the backcasting workshops suggests that both higher and lower order sustainability learning took place in the short-term at personal and inter-personal levels, to embed this learning, a supportive environment that champions creative activities by staff allowing room for experimentation and learning would be required. The final chapter of this thesis discusses whether and how practice oriented, participatory backcasting processes may be usefully applied within formal environmental governance settings in Ireland. It argues that the use of similar processes can serve as spaces for exploration and learning which may seed more transformative processes of change.
CHAPTER NINE:
CONCLUSION
9.1 Introduction

To date, interventions aimed at reducing the environmental impacts of household consumption practices in Ireland have focused on improving supply-side and technical efficiencies along with strategies of information provision. While these steps are important, a productivist approach alone is insufficient to bring about larger societal transformations towards sustainability. In this context, it is necessary to seek alternative ways of thinking about and promoting more sustainable consumption practices. As social practice theory is gaining traction within academic sustainable consumption research, there is increasing need to see how it may be practically applied to develop action plans and insights to speed the transition towards sustainable living. A gap was identified in the literature regarding how social practice theory might be integrated into a backcasting study. The research therefore aimed to explore how a practice oriented, participatory backcasting approach could be operationalised and the kinds of insights and innovations that may be developed as a result. The most energy and water intensive practices in Irish households, space heating and personal washing, were selected as appropriate test-beds for experimenting with this process. The overarching aim of the research was: to design, apply and analyse a practice oriented, participatory backcasting process for more sustainable home heating and personal washing practices in Irish households. Towards this aim, the following questions were formulated:

1. How might a practice oriented, participatory backcasting process be operationalised targeting sustainable household consumption?
2. What outputs can be developed from the practice oriented, participatory backcasting process as applied to sustainable home heating and personal washing practices in Irish households?
3. What are the benefits and limitations of the practice oriented, participatory backcasting procedure as reflected in participant feedback and the levels of learning stimulated among them?

The research therefore had both a product and a process focus. It was concerned with the products that could be produced in the form of future scenarios and transition frameworks that could provide new insight for policy makers, private sector and civil society interests on how to encourage sustainable consumption. In terms of process, the research aimed to make a practical contribution to research on the operationalisation of social practice theory and to extend participatory backcasting methodologies, whilst also analysing the learning processes that took place among participants in the research. Questions one and two were addressed in chapters five to eight which evaluated the design of and results from the Visioning, Citizen-Consumer and Backcasting phases. Question three was addressed in the final empirical results chapter which analysed the qualities of the participatory backcasting process as identified by participants and its contribution to higher order learning. Having reported on each discrete phase of the backcasting process in a chronological manner in the results chapters, to offer a
sense of perspective and more critical judgment, it is necessary to step back and reflect on the process in its entirety. Therefore, the first section of this chapter (Section 9.2) identifies the key contributions and main findings from the practice oriented, participatory backcasting process with regard to its design and outputs, suggesting future research agendas to build upon the research initiated here. The section is divided into three sub-sections relating to: the practice oriented visioning process; citizen-consumer engagement; and developing transition framework interventions. A final table is presented at the end of Section 9.2 summarising the main challenges and issues relating to the design of the practice oriented, participatory backcasting process and how these may be tackled in future applications within academic and environmental governance settings.

The results presented in this thesis show that the approach was successful on two of the most commonly cited measures for assessing backcasting research – that of the products it produces and the learning processes it provokes. Another important measure (although rarely explored, with the exception of Quist et al., (2011)) is the extent to which these outputs stimulate spin-off activities including policy, R&D, entrepreneurial and community action. As noted previously, the influence of the researcher is limited in spheres beyond the bounds of the research project. Thus extended stakeholder engagement and research would be required to stimulate and assess its long-term impacts. Nevertheless, participant feedback suggests that significant institutional barriers exist, reducing the possibilities for participants or other stakeholders to act upon knowledge produced from the research. As the literature review showed, the overarching sustainable development strategy in Ireland has been characterised as incremental, reactive, piecemeal, lacking in ambition and unduly shaped by powerful vested interests (Taylor and Horan, 2001; Davies et al., 2012b). It could be said that these traits stand in direct opposition to the qualities that participants rated most highly in the backcasting process, namely its holistic, long-term, liberated and collaborative qualities. This has a bearing on the important question addressed in the second main section of this chapter (Section 9.3) i.e. whether and how practice oriented backcasting could be upscaled as a tool to promote sustainability transitions within environmental governance processes. Having trialed the process, this addresses the important issue of ‘where to next?’. Although this form of backcasting could be orchestrated by societal actors from academic, public, private and non-governmental sectors for a variety of purposes, Section 9.3 focuses mainly on its application within deliberative environmental governance contexts (Kern and Smith, 2008). This reflects the central role of government to consciously orient society onto a pathway of sustainable development by coordinating a collective approach through deliberate engagement with public and private actors (Smith et al., 2005). It is argued that simply transplanting the practice oriented, participatory backcasting approach in its current format into environmental governance settings would be challenging, if not potentially infeasible, given its mismatch practically and ideologically with current norms and practices of policy development in Ireland.
Beginning with practical challenges, there are clear tensions between the practice oriented, participatory backcasting process and conventional practices of environmental governance in Ireland, and indeed most western countries. This is because the process involves changes in the way policy is made, the sets of interventions that are applied, the temporal scale of action, and those involved in the process of governance. These practical challenges are elaborated in turn according to two key themes: 1) the disjuncture between conventional, short-term, disjointed policy making and long-term, practice oriented thinking, and 2) the challenge of organising institutions and actors around practice oriented processes. Ideological challenges are dealt with lastly. These stem from the normative nature of backcasting and the requisite for direct societal intervention to achieve sustainability goals, in contrast to current ideology that advocates non-interventionist, neo-liberal strategies (Castree, 2008). The chapter closes by reflecting on the contribution that geographical insight can make to the field of futures research.

9.2 Evaluation of the practice oriented, participatory backcasting process and outputs: benefits, limitations, recommended modifications and future agendas

9.2.1 Practice oriented visioning: from scenarios to Promising Practices

This research concludes that the practice oriented visioning process was successful in its generation of provocative “counter-images” depicting distinguishable strategies for conducting heating and washing practices in the year 2050. These served as effective stimulants to debate in the citizen-consumer workshops and end-points to work towards in the ultimate Transition Phase. Nevertheless, some participants experienced difficulty working with the practice orientation. Operationalising the approach also presented challenges. Regarding the sustainability evaluation process, it is concluded that outcomes were less influential on the proceeding phases than was expected. However it served as a useful tool for reflection and deeper analysis of the scenarios from a new economics perspective.

Various iterative processes were described in this thesis relating to the development and refinement of images of future sustainable personal washing and home heating practices. This process began with Visioning Workshops, a Scenario Elaboration Phase and ultimately the creation of Promising Practices in the Transition Phase. In order to operationalise and explain theory on social practices at the Visioning Workshops, ‘people’, ‘organisation’ and ‘hardware’ elements were highlighted as being key influencers of everyday practices, representing routes for innovation and intervention. The inclusion of ‘organisation’ in this framework was perhaps a contributory factor to the tendency to widen discussion beyond the immediate practice, reinforcing infrastructure and resource based solutions. However it was important to consider
broader institutional and provision contexts given their role in shaping patterns of demand, user relationships, and expectations in household consumption practices. It is asserted that the ‘people’, ‘organisation’, ‘hardware’ framework should make a useful contribution to researchers seeking to integrate practice theory into backcasting processes. With regard to the framing of visioning brainstorms, the guiding question was: “What ‘people’, ‘organisation’ and ‘hardware’ innovations can we imagine that might encourage more sustainable personal washing [or home heating] practices in the year 2050?” Thinking of the desired end-results or needs of these practices was found to be a particularly successful way of stimulating alternative innovations for their fulfilment (bearing in mind that concepts of need evolve through time). The visioning brainstorm led to the generation of discrete ‘people’, ‘organisation’ and ‘hardware’ concepts which had to be re-integrated into complementary configurations. Another way of framing idea generation could have been to encourage participants to think of complete practices rather than disaggregated practice elements, such that the question would become: “Imagine you are washing yourself in the year 2050, what alternative motivations do you have, what devices are you using, what rules are governing your behaviour?” The risk of this approach, over the ‘people’, ‘organisation’ and ‘hardware’ framework, is that the task could have been too cognitively challenging for participants. As it was, the approach adopted was found to lead to the successful generation of a high volume and variety of proposals. Despite the development of briefing packs and the delivery of a stimulating introductory presentation, additional visual, audio or textual aids could have been developed to foster creative thinking. However, it is important to pay heed to the fine line between leading participants and stimulating them. It is concluded that the design of the practice oriented visioning brainstorm and its physical setting in a modern, architecturally striking and bright space, made a real contribution to promoting the circulation of ideas and people throughout the Visioning Workshops.

A central tenet of visioning processes is that they lead to the production of novel proposals. It is worth noting that a number of ideas produced in this research, particularly those from the Heating Visioning Workshop, showed continuity with other backcasting studies on sustainable living (such as Quist et al., 2001; Carlsson-Kanyama et al., 2003; SPREAD, 2012). For example, in striving to reduce energy consumption, backcasting studies often show a recurrence of concepts for smaller home sizes, shared spaces, up-skilling in self-sufficiency, and a higher penetration of decentralised renewable energy. In addition, the roots of many of the proposals were found in present day solutions. This was to be expected given the futility of dismissing current solutions in their entirety. Considering that some of the visioning ideas could be encountered before, one might question the point of the visioning process. In the case of this research, the novelty arose from bringing together participants representing rarely integrated forms of knowledge and mindsets. This led to the creative combination of ideas (existent and imagined) that in Ireland normally remain confined by professional spheres and specialised areas of action. The ultimate scenarios were therefore characterised by their creative synthesis of practice elements including new devices, systems of provision, procedures, norms and expectations. In their visual and written formats, the scenarios were considered by stakeholders
and citizen-consumers alike to represent a break from current trends embodying provocative alternatives to current heating and washing practices.

In visioning literature it is often assumed that people are equally capable of creating imaginative future images (Shipley, 2002). However this research found a clear divergence in participants’ abilities for abstract, visual reasoning shaped by their experience with similar techniques in their own professions. Indeed, it is likely that had a different set of attendees been present, different ideas may have been proposed, just as would have been the case had an alternative way of organising the practice oriented visioning process been employed. With the emphasis of the Visioning Workshops on liberated, blue-skies thinking, compared with the more practical orientation of the Transition Workshops, it might have been valuable to include a greater proportion of participants with professional backgrounds in the creative industry such as artists, fiction writers and designers. Indeed it is these types of participants, in particular science fiction authors, who drive many industry-led visioning experiments (Doctorow et al., 2011). However, the primary driver of these industry-led visions is the end product rather than the process. From the perspective of this research, it was more important to include a wide range of participants representing actors and professions who collectively shape how we wash and heat ourselves in order to engage them in a collective process of discovery, reflection and learning. Furthermore, it was the intention to encourage the same participants to attend the Transition Workshops where practical knowledge played a more prominent role with the ultimate hope that the interpersonal connections and insight stimulated might subsequently be acted upon in their own professional spheres beyond the temporal and physical confines of the research setting. A significant challenge was faced in the Scenario Elaboration phase to develop linkages between the disparate Visioning Workshop concepts to create complete, coherent scenarios. This process began in the Visioning Workshop, and indeed if time permitted could have been advanced further at this stage, as the process was, in the main, a back-office activity. A rigorous, schematic scenario elaboration process was developed based on processing and assessing individual visioning concepts for their embodied socio-cultural, regulatory and technological implications. This was a rather intensive process, however it was considered to successfully contribute to continuity and transparency in the scenario development process.

Future research may develop more sophisticated sustainability indicators for scenarios of future consumption practices. However the qualitative evaluation framework served as a useful tool to improve understanding of the implications of each scenario from a new economics perspective and provides substance for progressing academic discussion in the field. An attribute of the sustainability evaluation framework was its integration of social, economic and environmental concerns and its ability to contribute a more critical perspective on the potential benefits and limitations of each scenario and the potential interactions between scenario components. Although some scenario proposals were ruled out from the Promising Practices following this process (such as the water quota ‘thumb print’ concept, the ‘nano-shower’ and ‘spot heating’ devices), the Scenario Sustainability Evaluation did not play a hugely influential role in shaping
the proceeding phases. This raises the question of the timing of the sustainability evaluation phase. For example, holding the assessment after the citizen-consumer focus groups could have provided more insight regarding the scenarios’ supposed impacts on the ‘individual wellbeing’ and ‘community building’ indicator categories which were found to be problematic to assess. Following analysis of citizen-consumer responses and the results of the sustainability evaluation phase, one further iteration was made to the scenarios in order to refine their practice focus and extract the most promising features for further attention in the Transition Workshops. This resulted in the creation of a set of three Promising Practices, each of which scripted different procedures around the practices of heating or washing that could be pursued collaboratively or in isolation depending on future situations and further studies.

While separate sets of scenarios and Promising Practices were developed for the personal washing and space heating studies, it would be valuable to conduct further research to consider the sustainability interactions between these and other household consumption practices. This research agenda would enable the identification of mutually reinforcing goals and possible negative rebound effects that may occur through pursuing potentially contradictory strategies. Comparing the ultimate Heating and Washing Promising Practices, commonalities are seen to emerge in their underlying values, skillsets and rules. Recurrent themes were: the use of moral and citizenry obligations for wise water or energy use; adaptive heating and washing strategies based on environmental conditions; and alternative norms and expectations for heat and cleanliness. As for new skills, many of the Promising Practices required more engagement, reflective skills and conscious resource management on the part of practitioners along with a seamless engagement of “stuff” in the bodily performance of practices. Although there was some difficulty in distinguishing between the Promising Practices at the Transition Workshops, it was found that participants were largely very appreciative and complementary of the practice theoretical lens. Their feedback showed that the approach offered a more creative, multidisciplinary perspective than they were used to, revealing softer, and potentially less money and material intensive routes for innovation. This was reflected in the high rating of 4.1 out of 5 that participants assigned to the “usefulness of the practice based approach in thinking about solutions for sustainable consumption”. This positive assessment of the usefulness of practice theory does not however mean that participants can easily apply this conceptual learning in their professional work as Section 9.3 will discuss.
9.2.2 Citizen-consumer involvement in the practice oriented backcasting process

The focus groups were useful in identifying the appealing and unappealing dimensions of the future scenarios, highlighting conditions for their acceptance from the perspective of citizen-consumers. The research found that the detail of each scenario concept was of less concern to participants than how these concepts reconfigured relationships between people, technology and institutions in the future washing and heating practices. A preference was revealed for heating and washing practice solutions that permit user-adaptability, personalisation, efficiency, controllability, personal wellbeing, equality, and enhanced connection with nature. This feedback was useful in identifying the Promising Practices and beyond this, builds conceptual understanding of heating and washing practices from a social practice perspective. It is argued that the output from citizen-consumer focus groups would be worth re-visiting should any of the scenario or intervention concepts from the research be further developed.

Within backcasting experiments there is a large variety in the forms and types of engagement with the public (Quist and Vergragt, 2006). Following the format recommended by Green and Vergragt (2002) this research involved members of the public representing green, mainstream and dynamic typologies after the scenario development and assessment phases and before the ultimate Transition Phase. This reflected “normative”, democratic requirements for public engagement in governance processes, and “substantive” arguments for their engagement given the valuable input they can make because of their role as creative and active practitioners of everyday heating and washing practices (Wildson and Willis, 2004). Natural grouping methods were used to recruit participants reflecting green, mainstream and dynamic profiles of environmental action. This was found to be a successful means of securing participation and promoting positive group dynamics. Although the ‘green’ focus groups showed more sensitivity towards issues of equality and democracy in the future scenarios, their environmental orientation did not appear to have a strong bearing on their personal acceptance of, or opinions about the scenarios. Indeed, rather than participants’ environmental orientation (as delineated by the mainstream, green and dynamic groupings) more powerful shapers of opinion stemmed from each individuals’ personal experiences, value frames, life-stage, technical proficiency, and trust in social and political institutions. This perhaps calls into question the use of environmental lifestyle groups as the means to segment citizen-consumers in a social practice oriented study. Nevertheless, these groupings were intended to be illustrative rather than representative and were successful in that they had sufficient levels of internal consistency to cultivate positive group dynamics with appropriate variances in age, socio-demographic background and geographic profile to produce substantial insight.
The future scenarios encouraged participants to bring typically unconscious habitual behaviours into conscious consideration. In this way, the why’s, what’s, how’s and when’s of current personal heating and washing practices were challenged. Voting patterns showed that Aqua Adapt was the most popular washing scenario, followed by Efficiency-Sufficiency. It is interesting to note that these responses correspond with the aggregated indicators of the sustainability evaluation phase where Aqua Adapt scored the highest and Efficiency-Sufficiency came next. By contrast, the top rated scenario in the sustainability evaluation i.e. Community Core, was found to be the least appealing by citizen-consumers who preferred Second Skin and Carbon Control assigning an equal number of stars to these scenarios. A rich qualitative analysis of citizen-consumer feedback led to the identification of key themes shaping their responses. These related to: human-technology interactions; nature, health and wellbeing; regulatory extension into personal consumption practices; and individual versus collective responsibility and space. In citizen-consumer feedback a preference was revealed for smart and efficient technologies and those that enhanced personal wellbeing. Opposition was directed towards technologies that represented manifestations of tighter government control over consumption. An additional finding was the resistance of citizen-consumers towards scenario proposals that led to a perceived scientification or automation in personal washing and heating decisions such that practical know-how and personal discretion were undermined.

Amongst citizen-consumers, there was a preference for “natural” scenario concepts, cast as those that were more familiar, involved less resource manipulation and enhanced connections with environmental fluctuations. Another theme related to vital issues regarding the appropriate and necessary levels of regulatory intervention into personal consumption domains, spurred through debate on concepts such as the ‘carbon quota’ and the ‘energy crash course’. A primary observation was the acceptance of regulations for more measured consumption as long as principles of equity and fairness were adhered to and the outcome did not involve excessive time demands or impinge majorly on other ‘normal’ everyday practices such as entertainment. Other scenario concepts embodied new socio-spatial relations and collective governance such as the ‘collective rainwater harvesting’ concept of Aqua Adapt and Community Core’s ‘greenworks’ proposal. These provoked discussions on notions of individual and collective responsibility in strategies for sustainable consumption and there was a negative gut reaction towards concepts that were seen to undermine personal trends for privacy and individualisation. The social relations accompanying the scenario practices were therefore of significant importance to citizen-consumer opinions. A key finding was that although there was a propensity for citizen-consumers to prefer ideas that were less challenging to personal norms and routines, a deeper reading of their responses revealed an appreciation of the flexibility of washing and heating practices across time and space showing openness to new practice norms, procedures and tools in the future. In addition, comparing responses between heating and washing workshops, citizen-consumers were found to be more open towards different modes of heat delivery in comparison to personal washing where water was strongly valued for its therapeutic qualities and its use was less negotiable. Put simply, when it comes to practices
of personal washing, citizen-consumers value the water as equally (if not more) than the end-result, whereas, it is the end result that takes predominance over the mechanism of delivery for heating. At present, energy is an intangible ingredient in the hardware of warmth delivery and there was less emotional attachment to this resource.

The variance in citizen-consumer responses showed that there is no such thing as “one practice fits all” given different and ever-changing personal situations, practical capabilities, preferences and emotions. The focus groups also reflected findings that practice innovation is not just about technology or pricing fixes but about people’s perceptions, emotions and interactions with each other and their physical surroundings. This confirms the fallacy of relying on rationality alone to change people's habits, or to influence their acceptance of interventions for sustainable water or energy consumption. An operational challenge faced in the focus groups stemmed from the hypothetical nature of the scenarios and their components which were open to interpretation by citizen-consumers. Thus while many focus groups have to contend with the mismatch between stated values, opinions and personal action in the present (Davies, 2002), potentially more room was made for this mismatch given that the discussion was about future, hypothetical actions. Owing to conditions of future uncertainty, participants found it hard to be definitive in their assessments and emphasised that their opinions would change subject to the social, economic, political and environmental context in the future, along with considerations of functionality and equality in application of the scenario innovations.

The citizen-consumers had many creative ideas and proposals for improving the scenarios along with suggestions for new socio-technical innovations. This raises the question of when to involve them in future backcasting processes. If it was not for the stakeholder action and learning orientation of the research, everyday citizen-consumer perspectives could have been included in a more proactive, rather than reactive format, perhaps involving them in the preliminary development of the scenarios at the Visioning Phase. However stakeholders present at the Visioning Workshops, whilst having professional backgrounds are also practitioners of personal washing and heating practices and it is clear that this knowledge percolated into the visioning brainstorms. Had the focus been only on visioning without the ultimate backcasting dimension, then the case for greater and earlier citizen-consumer involvement would have been strengthened. Earlier engagement would have implied a higher level of co-design (Scott et al., 2009) for citizen-consumers, and would reflect trends for interdisciplinary, problem focused research. This according to Gibbons et al. (1994) emphasises the role of layman’s knowledge, versus academic, investigator initiated research, characterised by discipline based knowledge production.

Indeed future studies may also consider using the variety of online Web 2.0 platforms currently available for accessing the creativity of a high volume of individuals in order to generate alternative solutions to societal and environmental problems. These would include forms of open source innovation, crowdsourcing, and innovation contests that generate new seeker-solver relationships (Davies, 2012b). Such distributed innovation networks often aim to facilitate
innovation in the private sector, however social innovation platforms are also growing in popularity.99 Another way of extending engagement with the public in the design and consideration of future practices of sustainable living is through dedicated interventions in public museum, gallery or creative spaces. This form of engagement was trialed in an offshoot of this PhD research. The future scenarios for sustainable personal washing were displayed in the Dublin Science Gallery as part of their ‘Surface Tension: The Future of Water’ exhibition.100 Entitled, ‘WaterWise: Future of Washing’, the exhibit consisted of three scenarios for washing in the year 2050 illustrated by a professional artist in the style of ‘in-flight safety instructions’ and displayed in a pseudo bathroom set-up, with comment tags available for visitors to leave feedback. Images of the exhibit are presented in Figures 9.1 and 9.2 while more details can be found in Appendix X and in King’s (2011) review of the exhibition as featured in the journal Nature.

The Science Gallery typifies the emerging trend of using artistic forms and installations to engage the public in debate on future directions of science and technology and to encourage participation in live experiments. It is thus strongly rooted in traditions of citizen science (Hand, 2010) and critical design where installations often presenting hypothetical products, services and systems from alternative futures are used to “explore the space between reality and the impossible…speculating, imagining and even dreaming in order to encourage debate about the kind of technologically mediated world we wish to live in” (Dunne and Raby, 2010: 131). This represents an alternative format for portraying possible futures and exploring feedback from non-experts, which if trends continue will be more prevalent in coming years. Indeed, the ‘Surface Tension’ exhibition was visited by over 50,000 people in Dublin and has since travelled overseas to the New York Eyebeam Technology Centre. There is therefore potential to engage a high volume of members of the public in these settings, and further longitudinal studies would be useful to examine the affects of their visit and to consider fruitful formats of engagement for harnessing their feedback and proposals. If any of the scenario innovations or the proposed interventions identified in this backcasting process were to be advanced, it would be useful to re-visit relevant feedback from the citizen-consumer analysis. At a later stage, some of the practice innovations could be piloted amongst everyday householders, perhaps using ‘eco-team’ support systems while technological proposals could be prototyped and trailed similarly, even in Science Gallery settings.

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99 Examples of social innovation platforms were provided in Chapter 3 and include Simpl, SiCamp, and the One Planet Initiative. In terms of private sector led initiatives, organisations such as InnoCentive Inc and Innovation Exchange Inc specialise in open source innovation for the private sector, especially those in technology and science.
100 http://sciencegallery.com/surfacetension/exhibits
Figure 9.1  WaterWise: Washing Futures exhibit in the Science Gallery

Figure 9.2  WaterWise: Washing Futures exhibition detail
9.2.3 Pathways towards the Promising Practices

The Transition Workshops were successful in their generation of a complementary suite of interventions to build towards the heating and washing Promising Practices. For the stakeholders involved, practical difficulties stemmed from the cognitive challenge of blending creative and technical thinking. Nevertheless, the process was highly rated by participants for its ability to foster understanding on the interactions between intervention proposals and to show how radical innovations in heating and washing practices can be encouraged incrementally over time. If implemented in their entirety, the question of whether the intervention timelines would lead to the achievement of the Promising Practices is uncertain; more research and development activities, and assessments of the cost and sustainability implications of transition interventions would be required. Promising Practice goals and interventions would also need to be subject to continual review through reflexive governance processes.

The Transition Phase culminated in the development of comprehensive Transition Frameworks to lead towards the future heating and washing Promising Practices. This phase was of particular importance given common criticism that inadequate attention is paid to how interventions are identified in backcasting studies. According to Wilson et al. (2006: 146) this is in part because visions are typically "considered useful starting points for policy makers, determining the freedom of action in a policy sense, rather than as a detailed structuring device for formulating specific interventions". The research found that on their own, the ultimate interventions echoed current economic, communication and market based strategies, however new understanding was provided on how these interventions may be refined and upscaled and more importantly on how they could be bundled in synergistic combinations. Therefore, in common with other backcasting research on sustainable lifestyles (Green and Vergragt, 2002; SPREAD, 2012) and practice oriented research (Gram-Hanssen, 2010), this research does not entirely reject conventional interventions, however it does contribute a systemic perspective, providing insight on their interrelationships. In this sense, the whole (Transition Framework) is worth more than the sum of its parts (the individual interventions). In the workshops, participants were found to make connections with domains ranging from urban planning to family welfare, fashion and health, revealing broader options to leverage change by co-ordinating action across these spheres.

Participant feedback immediately after the workshops, showed a higher appreciation for the holistic, long-term and collaborative qualities of the transition process rather than for the output itself. A contributory factor to this sentiment may have been the absence of requirement for follow-up or implementation given the non-statutory nature of the process. Thus more value was attached to workshop itself and the physical and intellectual space it provided. Contrasting the present situation where policies focus on the short term (5-10 years), while environmental
targets stretch into the future, the transition timelines attempted to consider how interventions could be deployed right up to medium and long-term (40-year) time frames. The ultimate timelines were nevertheless relatively front-loaded owing to uncertainties stretching into the future and the need for on-going processes of review and elaboration of interventions over time to respond to changing circumstances. Viewed in their entirety, the timelines made the Promising Practices appear more achievable; rather than involving radical or controversial interventions, they were actually based on an incremental elaboration of intervention mixes. This is an important quality as research shows that if interventions are too much at odds with current policy practices, processes and toolboxes, there is a low likelihood of them being acted upon (Nutley and Davies, 2000; Simmons and Walker, 2000). Depicting how interventions can gradually build towards Promising Practices also provides greater substance and support to short-term actions by situating them within broader, long-term strategy. Transition Framework documents were sent to all stakeholder participants in the research, providing a detailed outline of intervention proposals, listing potential actors and broader barriers and enablers (contained within Appendix V). These were also sent to key government officials (North and South) and submitted as part of the official consultation processes for the Framework for Sustainable Development Ireland, and for Irish Water, the new state company for water services in the Republic of Ireland. The documents’ design and language was intended to be readily understandable and accessible to a broad range of societal actors working with mainstream discourses. Given the flaws of the information deficit model outlined in this thesis, it is unlikely that these stand alone documents would provoke huge reaction amongst those who did not participate in the collaborative learning experience that led to their creation. This raises the question of whether the textual, rational format of the documents undermines the creativity and imaginativeness involved in their conception, perhaps evoking the rational reasoning which the process sought to distance itself from. However, ultimate extrapolation back to reality is a crucial part of backcasting and therefore it was necessary to work within the system and language of present paradigms. Follow-up research with participants would be valuable to consider how well they felt the Transition Frameworks reflected the entire process and how its proposals could be extended, modified and embedded, especially from the perspective of their own professional institutional settings.

As touched upon in the Transition Frameworks, additional research would be required before implementation of the key interventions, especially those based on technology, to fully assess their social, financial and environmental impacts. It would also be useful to further consider the interactions between and across practices. Indeed a combination of the Promising Practices may result in more environmental impacts compared to the present situation, for example if ‘body heat vests’ of the Thermal Awareness practice were also applied with the bioclimatic and adaptive architecture of Adaptable Homes, rebound effects may occur from the use of multiple technological solutions. This possibility is further complicated given that these practices interact with and may be shaped by other consumption practices that could reinforce or undermine some of the preferred meanings and norms that the heating and washing Promising Practices
aim to promote. The simple fact is that it is very difficult to be definitive about how the meanings, hardware and skills relating to the heating and washing practices would reconfigure and interact in response to the Transition Framework interventions. Research shows that a variety of “cues” shape social practices, such as the presence of a person, place, moment, appliance, mood and money (Verplanken and Aarts, 1999 in Maréchal and Holzemer, 2011). Practices are also strongly influenced by external trends and fashions, and a “horizontal” cross-cultural transfer of practice elements has been observed. Shove (2004) illustrates this with reference to the diffusion of washing machines in the performance of laundry which is leading to a standardisation in technologies and their associated scripts and meanings. The additional example of the spread of the Japanese paperless toilet is also provided in Shove and Walker (2007: 767) and the question remains open as to how attempts to influence practices would respond to the “unexpected diffusion of unsustainable technologies, practices and images”. It is not feasible to control the myriad of internal and external forces shaping practices, however the socio-technical innovations and Transition Frameworks developed as part of this PhD research suggest that an opportunity exists to intentionally stimulate external (hardware, educational and organisational) contexts to help reinforce Promising Practice goals and scripts.

There is a possibility that some of the singular interventions or innovations identified in the Transition Frameworks may spark action amongst stakeholders in the project and beyond. However, whether the Transition Frameworks in their entirety could be acted upon is a moot point for practical and ideological reasons that will be elaborated in the next section. It is certain that a continued push would be required, including more involvement from the research team and commitment from champions in public, private and civil society fields to elaborate, review and assign responsibilities for the Transition Frameworks. Commitment from societal actors, especially those in the private sector and social innovators with the required resources and creative and technical ability is vital considering many of the strategies are reliant upon their actions. For the private sector, there is also the challenge of balancing profit motivations with those of the transition agenda, and traditional reluctance to engage in idea sharing due to intellectual property (IP) issues. However, participation of commercial entities in Dutch and United Kingdom transition management processes and in the recent European level SPREAD project shows a willingness to engage at some level. Based on insight gained from designing and applying the practice oriented backcasting approach for this research, the following table presents a summary of key challenges encountered along with recommendations for improving future applications.
### Table 9.1 Main operational challenges of the practice oriented, participatory backcasting process and recommendations for future studies

<table>
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<th>Backcasting phase</th>
<th>Challenge</th>
<th>Discussion and recommendations for future applications in academic research and environmental governance settings</th>
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| Visioning Workshops, Scenario Elaboration, & Transition Workshops | Stakeholder recruitment & engagement | Commitment should be secured from key stakeholders at an early stage in the research process, perhaps developing official partnerships with business, public sector and civil society actors. This could be established as early as the research proposal phase.  
It is important to manage stakeholder expectations by setting out the benefits of their involvement from the onset to motivate continuous stakeholder input and to prevent ‘consultation fatigue’. It is also important that participants understand that the ultimate aim is for learning and spin-off in the form of interventions, research and new collaborations.  
A successful way of building brand and maintaining interest in this research was through monthly newsletters on the broader Consensus project and presence on Twitter. The online scenario feedback survey also provided a means to demonstrate transparency and offer meaningful opportunity to shape the proceeding phases. More usage of online social media could be explored as a means to provide casual networking and idea sharing opportunities in future practice oriented, participatory backcasting research. |
| Visioning & Transition Workshops | Time demands | To encourage participation, the researcher did not want the workshops to exceed more than a half-day. This was because time was provided freely and a full day’s schedule may have been off-putting for participants, especially given that they were unsure of what to expect from this unfamiliar process. If official partnerships with government or other actors / organisations were secured, this may lead to greater willingness on the part of participants to commit time and intellectual energy.  
Timing was frequently raised in feedback from participants in both the Visioning and Transitions workshops. It is interesting to note that polarised opinions were voiced with some people feeling that not enough time was provided for in-depth discussion, whilst others commented on the fruitfulness of the short intense time period. It is concluded that in its current design the scheduling of the 3 hour Transition and Visioning Workshops was sufficient. However if possible an additional 30 – 60 minutes may ease some time pressure and provide space for networking. This extra time could in particular have been welcomed for the clustering session in the Visioning Workshops and the transition timeline session of the Transition Workshops to allow more discussion of actors, barriers and enablers. |
| Visioning Workshop | Cultivating futures thinking and working with the social practice approach | For the Visioning Workshop, a one-page preparatory note was sent to participants in advance to provide them with basic details on the aim and structure of the workshop. There was also an introductory presentation at the start of each workshop. Nevertheless, participants who were unfamiliar with visioning techniques did struggle initially.  
To enhance creative thinking, preparatory documentation could have been accompanied by more abstract teaser images or videos, and more use could be made of mood boards, audio and visual cues in the Visioning Workshops. Professionals from creative backgrounds should be ‘planted’ in brainstorm groups to ensure an even spread of lateral thinkers.  
The ‘people’, ‘organisation’, ‘hardware’ framework proved to be a successful means for structuring visioning brainstorms and a useful starting point for participants to engage with social practice theory. |
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<th>Visioning &amp; Transition Workshop</th>
<th>Confusion between visions and interventions</th>
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<td>It was found that some confusion existed in the Visioning Workshops between the imagination of future realities and interventions that may pave the way there.</td>
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<td>To overcome this, it is important to promote futures immersion and time travel amongst the participants during visioning brainstorm, perhaps phrasing facilitator prompts as “you are in the year 2050, what do you see?, what are you doing?, what is life like?”</td>
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<tr>
<th>Transition Workshop</th>
<th>Integrating interventions &amp; matching them to Promising Practices</th>
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<tr>
<td>Participants were not always familiar with the contents of the Promising Practices and for future workshops every effort should be made to improve understanding and familiarity.</td>
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<tr>
<td>Few participants had experience working with the varied intervention toolbox of people, policy and business/technology, however feedback showed that this framework was valued by participants, in particular discussion around ‘people’ interventions.</td>
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<th>Sustainability evaluation</th>
<th>Timing of sustainability evaluation and future agendas</th>
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<td>The sustainability evaluation served as a useful tool to further consider the potential positives and negatives of each scenario against new economics principles. The qualitative framework was suitable at this phase given that the scenarios were subject to further iteration following citizen-consumer feedback.</td>
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<td>Further evaluation of the interactions between sets of Promising Practices would be useful to assess their potential to either reinforce or undermine sustainability goals. More precise social, environmental and cost-benefit assessments would be required prior to the implementation of key Transition Framework interventions.</td>
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<th>Citizen-consumer workshops</th>
<th>Levels of citizen-consumer engagement and difficulty imagining the enactment of practices</th>
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<td>The scenarios were hypothetical in nature and open to interpretation making it difficult for citizen-consumers to draw conclusions on personal adoption. However the scenario stories and images provided the most practical way of encouraging them to enter into the future scenarios.</td>
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<td>For future research where the emphasis is on creative idea generation rather than stakeholder learning (i.e. a solutions rather than process focus), it could be wise to consider involving citizen-consumers earlier in the Visioning Phase, perhaps considering the use of on-line innovation platforms or co-design workshops.</td>
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<tr>
<td>To gain more concrete evaluations of specific proposals, innovations within the scenarios could be prototyped and trialed in pilot experiments with peer-to-peer support groups.</td>
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9.3 Future applications of practice oriented, participatory backcasting: tensions with current practices, procedures and ideology of conventional environmental governance

9.3.1 Challenge of extending temporal scales of action

The practice oriented backcasting applied in this research challenges conventional short-term thinking and ecological modernisation strategies for sustainable consumption. Long-term transition plans do not map easily onto policy cycles and the need for multi-actor processes raises questions of implementation, ownership and responsibility. Further application of similar backcasting processes would need to be part of a shift towards meaningful engagement with long-term, integrated and collaborative processes of environmental governance for sustainability transitions.

The temporal space provided by the backcasting process was found to play an important role in reducing vested interests, and in promoting liberated thinking and creativity. However, when it comes to practical implementation, this temporal distance poses a challenge given that the ultimate interventions stretch well beyond conventional temporal scales of policy action. There is a risk that political drive wanes as long-term visions fade into the distance while short-term objectives and reactive policies dominate (Kern and Smith, 2008). In budget allocation and environmental policy agenda formulation, priority is normally directed towards present day problems where immediate, quantitative gains take precedence over long-term objectives and intangible, potentially un-measurable behavioural changes. Unless pressurised into doing so by the populace or higher tiers of European or international policy making, it is questionable whether any government would consider either participating in or orchestrating long-term, backcasting processes given that these may not meet requirements for immediate gain and the conventional metrics of benchmarking political progress. Moreover, securing long-term responsibility and ownership is doubtful given that implementation processes would transcend five-year government terms and may not necessarily align with a new administration’s political agenda or ideology.

When questioned as to whether / how the practice oriented, backcasting approach could be applied within formal environmental governance settings, stakeholders frequently mentioned the difficulty in aligning short-term interests with long-term societal needs in their survey feedback. Narrowness of vision and risk aversion were attributed by one participant to a lack of thinking “further ahead than the next election.” Many cited absence of space for reflection on long-term sustainably aspirations in their daily professional practice as a major barrier. In Ireland, there is scant evidence of political intention to consider long-term policy to encourage
a meaningful sustainability transition. To date, the Sustainable Energy Authority of Ireland has produced the only long-term sustainability action plans by any Irish public body. These come in the form of “transition roadmaps” for the deployment of cleaner energy in Ireland by the year 2050. With regard to its “residential energy roadmap”, the focus remains on extrapolating scenarios for improving energy efficiency and the penetration of renewable energy in the residential sector up to the year 2050 (SEAI, 2010b). Although this is an important activity, it leaves no room for the exploration of significant transformations to home heating strategies beyond extending current retrofitting programmes and building regulations. These reports reflect the trend in environmental policy where the only engagement with future realms is through distant, abstract targets with no clear impression of what this means for society or how social practices could or should be challenged. For example, the EU target for an 80-95% reduction in carbon emissions by 2050 does not constitute a vision (although it is often called this) while technological roadmaps cannot be considered effective tools for holistic system innovation.

The rhetoric of transitions and visions within Irish policy does not indicate any serious commitment to societal transformation towards sustainability. It is not underpinned by any strong theoretical foundations or understanding of the evolution of socio-technical systems and social practices. This is clearly evidenced in the Framework for Sustainable Development in Ireland (FSDI) which is the Republic’s latest national sustainability strategy (DECLG, 2012a). The FSDI notes the trend for longer-term sustainability strategy, referencing the World Business Council’s ‘Vision 2050: the New Agenda for Business’ (2011), the EC’s recently published ‘Roadmap for Moving to a Competitive Low Carbon Economy in 2050’ (2011c), and the OECD report, ‘Towards Green Growth’ (2011). Drawing upon these studies, the FSDI ends with a commitment to explore longer-term options by developing a clear “vision” of how Ireland can become a “leader in the transition to a low carbon, resource efficient and climate resilient economy” (DECLG, 2012a: 64). In this way, the transition is placed within the economic rather than the societal realm and sustainability is cast in ecological modernisation terms, providing a way to promote economic growth and opportunity. This contrasts with bolder statements within the Fourth Dutch Environmental Policy Plan which was pioneering in the field of transition management, calling for “long drawn-out transformation processes comprising technological, economic, socio-cultural and institutional changes” (VROM, 2001: 30 in Kern and Smith, 2008). Further details on the intended FSDI vision study are provided in the following extract:

“The commitments in this Framework are a first step in setting out a long-term vision for sustainable development in Ireland. Such a vision must be prepared in a participatory manner and should identify the main long-term objectives and describe intermediate steps towards their achievement. This vision must be grounded in the Principles for Sustainable Development set out in this Framework and allow public, private and civil society sectors to implement simultaneous and mutually supportive actions” (DECLG, 2012: 79-80).
Responsibility for the orchestration of this vision has been assigned to the National Economic and Social Council (NESC) which contains representatives of business and employers’ organisations, trade unions, agricultural and farming organisations, civil society and environmental organisations, as well as heads of Government departments and independent experts. This shows a potential openness to long-term visioning exercises through collaborative governance processes. However it is difficult to tell how progressive and innovative the visioning exercise will be, as so far no indication has been provided regarding its intended methodology or the scale at which it will operate (for example, whether it will be a sectoral, societal, or geographical vision).

9.3.2 Challenges of organising institutions and actor networks to fit the practice oriented approach

A common issue for any backcasting process is the question of whose ideals and agendas are manifest in future visions and action plans. A practice oriented, participatory backcasting process in particular requires representation of and action amongst a variety of government, civil society and private sector interests. Including participants with diverse skills, mindsets and positions of power, contributes to democratic representativeness, the design of creative ideas, and the likelihood of co-ordinated implementation efforts. This would be a challenge for present “silo thinking” within environmental policy. It is suggested that task forces could be created around damaging social practices to conduct creative problem solving and long-term goal formulation exercises, potentially involving the upscaling of practice oriented, participatory backcasting approaches.

In Ireland, the associated resource (i.e. water / energy) is typically the starting point for sustainable consumption strategies with responsibility lying with the related government departments (such as the Department of Energy, or Department of Environment). However this research showed that a practice orientation requires moving beyond resource bound thinking to the adoption of a holistic understanding of the complexity of forces shaping daily consumption behaviour requiring the knowledge and agency of a range of societal actors. This is in contrast to the present “silo” nature of Irish policy making according to traditional hierarchical institutions of government, which leaves little room for cross-fertilisation and collaboration (Davies et al. 2012). For example in order to implement any of the washing Promising Practices from this research, collaboration would be required amongst representatives from the housing and planning sections of the Department of Environment, water services sections of city councils, Department of Education, environmental organisations, along with manufacturers and representatives from the building and washing industries. This begs the question as to how to coordinate and integrate such a cocktail of
interests into backcasting processes and the role of government in their instigation and governance.

This practice oriented, participatory backcasting experiment took place outside the bounds of official policy procedures, which had a clear impact on the nature of participants recruited, their attitudes towards the research, and their levels of commitment. On the one hand, the relative neutrality of the research project liberated participants from the defense of professional interests, reducing conflict or tactical behaviour and limiting the role of political ideology. On the other hand, the research project had less weight in terms of recruiting stakeholders from positions of power and influence; there were no obligations for these actors to participate, or to act upon the resultant output. Nevertheless, 64 participants were ultimately recruited for both the heating and washing Transition and Visioning Workshops. Due to the self-selecting nature of the process, a very progressive set of individuals took part, more than likely motivated by reasons of personal interest and professional education. Given these traits, participants may well have fallen into the profile of ‘change makers’ who are more likely to champion innovative proposals and be open to new ways of doing things (Gladwell, 2000; Jansen, 2003).

A clear challenge is the recruitment of a mixture of catalytic individuals, along with those in positions of influence within the socio-technical regime, whilst promoting inclusivity for other interested parties. The difficulty in achieving equitable representation is touched upon by van de Kerhof and Wieczorek (2005, 738) with reference to transition management in the Netherlands. They caution that self-organising transition networks can lead to the dominance of key actors and their connections within the existing regimes, reducing opportunities for innovation and learning. This would be a potential issue in Ireland where industrialists and bureaucrats are said to monopolise the top layers of environmental governance (Taylor and Horan, 2001) complicating the challenge of equal participation and meaningful representation, making some form of moderation preferable. Indeed, Quist et al. (2011) in a comparative review of three backcasting case studies in the Netherlands, concluded that while classical political institutions are not sufficiently powerful enough by themselves to achieve change, government support, funding and resources are crucial to instigating follow-up and spin-off activities.

Compared to Ireland, the Netherlands has stronger traditions of deliberative environmental governance. This is extensively applied within its Transition Management policy where a key feature is the development of positive visions of the future. In orchestrating visioning processes, “strategic innovation networks” have been established in the hopes of “overcome[ing] lock-in in existing systems by engaging diverse societal actors in a reflexive and deliberative learning process” (Kern and Smith, 2008: 4094). These operate on the premise that innovation is both a political, economic and social process requiring networks of diverse actors with appropriate resources, expertise and power to bring ideas into reality. These innovation networks take place around established energy transition themes (including
new gas, chain efficiency, sustainable mobility, green resources, sustainable electricity and
the built environment). In the present institutional and political landscape, it has been argued
that there is an increasing role for such partnerships, networks and distributed innovation
mechanisms when it comes to the identification and implementation of solutions to
environmental problems (Hajer and Wagenaar, 2003; Voß and Kemp, 2006). As reported in
Doyle and Davies (Forthcoming), from the perspective of a practice oriented approach, one
could conceive of task forces representing diverse interests for each of the most damaging
personal consumption practices in Ireland such as washing, heating, personal travel, clothing
and eating. There would be a role for the government in fostering these networks, which
would focus on experimentation, learning and cooperative processes, including practice
oriented backcasting. Mechanisms to empower and encourage layman's perspectives in
these task forces would also be required, potentially using some of the tools outlined in the
previous section. This is important given their role as carriers of practice and due to the
variety of creative ideas and solutions they can propose - as shown in the citizen-consumer
focus groups. Although task forces may be separate, it would be important to build links
between them, given the integration and overlap between consumption practices in everyday
life. Furthermore, similarities were revealed in the values and scripts enshrined within heating
and washing practice elements (i.e. in their related skills, devices and motivations). To exploit
this finding, it would be useful to consider synergies in scripts to reveal and develop mutually
reinforcing agendas (Doyle and Davies, Forthcoming). For example the washing Promising
Practices of ‘Connecting with Nature’ and ‘Adaptive Washing’ and the heating Promising
Practice of ‘Thermal Awareness’ could serve to reinforce each other given their similar skillset
and motivational requirements for greater connection with the natural environment and their
use of flexible and responsive heating / washing strategies.

This links to work by Crompton (2010) on the importance of considering “bleed-over” in values
between different societal agendas from poverty to health, to social security and
environmental issues where it is said that reinforcing values in one agenda can lead to spill-
over in another. Crompton reports that reinforcing values based on personal self-
advancement for environmental action, leads to superficial behaviour changes, but more
importantly can also undermine advancements in other agendas such as equality and moral
responsibility (Crompton, 2010). Building upon this insight, this research found that it was the
values and motivations underpinning the washing and heating practices that were of more
importance than the discrete socio-technical innovations and interventions. Synergistic
thinking between practice task forces would therefore be of vital importance in order to
consider similarities in the skillsets and values they hope to collectively promote. Practice
synergies were not considered in depth in this research due to time and practical constraints,
however further follow-on research would be useful to set agendas for, and to consider how
this form of collaboration may be orchestrated. In addition, there is a question of scale here as
limitations would clearly be met regarding the extent of influence any practice task force could
have if it draws solely upon national stakeholders, particularly when one considers that key
commercial players may not be based in Ireland and given the importance of supranational tiers of policy in shaping national agendas. This touches upon long debated issues of national sovereignty and agency to affect change under conditions of globalisation. Further research would be needed to consider how a practice oriented approach to designing sustainable consumption interventions could or should be coordinated across different scales of governance, along with consideration of the effects of inter-regional and global trends on local consumption patterns.

Paying heed to calls for greater collaboration between the Republic of Ireland and Northern Ireland, both nations were identified for consideration in the Consensus project and for this PhD. A comprehensive review of their policy responses showed strong similarities in their environmental policy narratives and agendas characterised by their ecological modernisation interpretations of sustainability. Taking lead from European Union policy, both have employed similar sets of regulatory, economic and information instruments to target sustainable consumption. While the Northern Ireland administration takes its lead from UK policy, Taylor and Horan (2001: 369) also note the heavy influence of the UK in shaping Irish environmental policy responses which are governed by systems that have a strong sense of institutional memory and display “more in the way of continuity than change”. Amongst workshop participants there was a strong desire for more institutional flexibility and knowledge sharing between both countries, however at present there are limited spaces for collaborative engagement outside traditional areas of environmental protection such as river basin management under the Water Framework Directive. Despite these separate governance systems, they face common sustainability challenges with consumption practices and the focus groups revealed no fundamental distinction in the heating and washing practices of citizen-consumers in ROI and NI, suggesting that both nations would benefit from similar high-level strategy. Further extending the collaborative research started in this project would therefore be beneficial to see how practice based task forces may work inter-administratively, perhaps across larger regions which show broad similarities in consumption practices. One potential champion for this agenda could be the North-South Ministerial Council whose aim is to “develop consultation, co-operation and action within the island of Ireland” but has yet to extend collaboration to issues of sustainable development (NSMC, 2012: 1).

As mentioned previously, within the Republic, NESC has been allocated responsibility for the collaborative development of a long-term “vision” for sustainable development in Ireland. This could provide a potential platform for the experimentation with practice oriented and creative procedures such as practice oriented, participatory backcasting. To date, the ‘Domain Explorations’ project in the Netherlands represents the closest example of a formal application of a social practice thinking within sustainability policy. In this collaborative project between researchers and policy makers, the aim was to consider how national environmental goals could be reached through changes in social practices relating to food, clothing, housing, personal care and travel. However, as is typical of criticism towards Dutch transition
management policies (van de Kerkhof and Wieczorek, 2005; Kemp et al., 2006), the ‘Domain Explorations’ project has also been criticised for its technology focus and the dominance of business actors in its development (Spaargaren, 2003). Kern and Smith (2008: 4099) concur, commenting that there have been no experiments in which behavioural change is central and that “deeper lifestyle issues are not part of the transition policy discourse”. They therefore conclude that; “it seems unlikely that the ETP [Energy Transition Policy] in its current unbalanced form will achieve the original goal of system innovation” (Kern and Smith, 2008: 4102).

On a more fundamental level, other authors argue that a primary reason for downplaying the social changes required in TM policy is the risk that such an approach would pose for powerful politico-economic institutional arrangements that exert a strong influence over research subjects and approaches, constraining policy makers and researchers’ capacities for active intervention in consumption behaviour (Shipworth, 2005). This would be a real challenge for any formal attempt to script goals around promising practices of sustainable consumption especially if they were seen to compromise consumption-fuelled economic growth. Shove (2010) continues this line of argument stating that the current framing of environmental issues based on the use of basic linear ‘attitude-behaviour-change’ models is engrained due to its fit with the status quo and current paradigms of neo-liberal governance. Although the communication and knowledge gap between policy makers and scientists complicates the translation of social theory into actionable policy options (UNEP, 2012), barriers are not just due to simple lack of understanding and arise from deeper ideological and political standpoints. As Shove (2010: 1274) comments:

“ABC [the attitude-behaviour-change model] is a political and not just theoretical position in that it obscures the extent to which governments sustain their unsustainable economic institutions and ways of life, and the extent to which they have a hand in structuring options and possibilities”.

This complicates efforts to work with alternative social practice orientations like the practice oriented, participatory backcasting process used in this research, which necessarily requires a shift in government ideals, philosophy and practices to support more active management of societal demands and expectations in the realms of consumption practices. This would suggest that the practice oriented, participatory backcasting process is not simply a new instrument that can be transplanted into existing contexts. It would appear that a formal application and upscaling of the approach would require three orders of policy change that Hall (1993) identifies as comprising a policy paradigm shift. These are: 1) alterations to the calibration of existing instruments (first order change), 2) new instruments (second order change), and 3) goal alteration (third order change) involving a shift in intellectual frameworks, attitudes and ideological beliefs. The backcasting process itself represents a new instrument, underpinned by third order change based on the articulation of new societal goals. This implies more normative, rather than evidence-based policy making and requires the state to recognise its active agency in societal transformation processes rather than devolving these
to problems of individual choice or absence of environmental motivation. How and whether this broader political shift could be encouraged is an important question to be considered in the penultimate section.

9.3.3 Active intervention in social practices: philosophical and moral questions

For practice oriented, participatory backcasting processes to be institutionalised, a shift would be required in government goals such that more active intervention in domains of individual consumption is considered acceptable. From a moral and philosophical standpoint, this may be considered contentious. However social practice research reveals the already strong role of the state and commercial actors in shaping societal demands. Additionally, citizen-consumer responses from this research showed a flexibility and willingness to negotiate change in daily consumption practices. It is therefore suggested that deliberative and reflexive processes are needed to identify desirable goals and interventions for more sustainable practices. The practice oriented, participatory backcasting process applied in this research produced strong learning and reflection amongst its participants - qualities that are said to be vital in stimulating shifts in policy frameworks, attitudes and ideological beliefs. In this way, such experiments could be framed as agents of change, making possible broader shifts in policy in support of societal sustainability transitions.

At the heart of the transitions thinking embodied in backcasting, is an underlying recognition of the need to articulate guiding visions, social missions and explicit value statements in order to achieve system innovations for sustainability (Vergragt and Brown, 2007). It therefore requires a new conceptualisation of the role of the state in coordinating the delivery of sustainability, raising fundamental questions of principles, democracy, agency, equality and moral responsibility. Tight et al. (2011) note that the historic link between utopian dreams and support for socialist, authoritarian regimes can lead to a wary reaction to processes of visioning arising from their perceived undertones of excessive social control. While the backcasting approach was considered unusual amongst participants in this research, it was rarely cast as an undesirable development or a sign of unwelcome societal steering, but rather was thought to be practical, useful and enlightening. The consideration of desirable norms and guiding values in backcasting processes contrast trends of rationalisation in policy making involving the use of scientific or economic reasoning, which leave less room to challenge the principles underlying policy action (Surel, 2000; Sanderson, 2002). The relationship between values, ideas and policy change, has been the source of investigation by many authors (Davies, 1999b; Dryzek, 2000; Bailey and Wilson, 2009). These researchers report difficulty in establishing causal connections between ideas, ideologies and policy
decisions due to the complexity of interactions between institutions, interests, actors and ideas in the public policy making process. Nevertheless, their findings show that both personal and professional norms come in to play. This is also the case of negotiations between industry and government in the development of science and technology agendas which Wilson and Willis (2006, 35) argue are shaped by “tacit visions” or “imaginaries”. They therefore call for greater upstream engagement with the public and other sectors of society to explicitly articulate these tacit visions and shape the values directing science and technology development. This links to the field of Constructive Technology Assessment (CTA) which advocates engaging non-technical actors early in processes of technology development for the purpose of considering their social effects and goals (Russell and Williams, 2002 in Shipworth, 2005). CTA draws upon insight gained from work on the social shaping of technology which argues that behaviour and choices can be encouraged towards sustainable options through the “inscription” of morals in the techno-material landscape (comprising appliances, technological systems, and building fabric) (Kranzberg, 1986; Jelsma and Knot, 2002).

Thus, the notion of articulating “tacit visions” and engaging in debate around the inscription of morality in the physical landscape could be extended to include the invisible socio-cultural and organisational fabrics that also collectively shape household consumption practices. The difficulty is that this would require the government to become an explicitly active agent in social change. However as research shows, social practices evolve through processes in which all societal actors are implicated including government, industry and the general public, all of whom should have responsibility in their future elaboration. Indeed whether consciously or not, the structure and past activities of the state have been shown to have a strong influence on shaping resource use including norms and expectations of private practices such as heating or washing. Given the evolutionary dynamics in social practice change through time and the variety of forces and uncertainties involved, backcasting processes therefore require that the future is viewed in social constructivist terms; as Tight et al. (2011: 1580) articulate, “the future is what ‘we’, as a society, make it rather than considering the future as something that can be ‘scientifically’ predicted by the extrapolation of current trends”. Following this, reflexive governance processes are appropriate based on the ongoing, participatory shaping of society in desirable directions, contrasting modernist perceptions of governmental power and rationality (Voß and Kemp, 2006; Shove and Walker, 2007). Quist et al. (2011) argue that the articulation and exploration of visions involved in participatory backcasting exercises are an important strategy for reflexive governance. In contrast to dogmatism and the top-down articulation of utopian end points, a reflexive governance approach would imply that backcasting visions and plans are subject to constant review and revision in response to changing environmental conditions, societal feedback, and advancements in the definitions and values of sustainability. As Shove and Walker (2007) caution, it cannot be assumed that this would be an entirely neutral process however, as
reflexive processes of governance are also subject to issues of access, representation and unequal power.

It is clear that changes in policy frames would be required for the embedding of reflexive, transitions governance processes in Ireland. Returning to Hall’s (1993) classification of policy shifts, policy frames are said to develop not through the presentation of a robust evidence base (as per the information deficit model), but through a re-ordering of existing normative and cognitive structures in which social learning plays a fundamental role. The heating and washing practice oriented, participatory backcasting process as reported in this thesis was confirmed to stimulate higher order learning processes amongst its participants. This served to advance systems thinking and developed an appreciation of the fluidity in social practices across time and space. Participation was secured from those representing a “fusion” of “knowledge across disciplines, sectors and institutions” which, according to Jansen (2003: 237), is a prerequisite for the initiation of system transitions. It could therefore be said that such procedures are exactly the kind of learning experiments that may, over time, promote adeptness in divergent thinking and a shift in the values, goals and logic of policy such that there is institutional support for system innovation processes for sustainability. In the present context, the practice oriented, participatory backcasting process can be interpreted as an agent of change, opening up new problem definitions and solutions and in doing so, provoking critical questions on the validity of current policy conventions, norms and goals (Doyle and Davies, Forthcoming). If reinforced by other experiments that have similar imaginative, collaborative and long-term qualities, this may foster an appetite and initiate broader support for the replacement of current policy frameworks with ones oriented around the achievement of societal sustainability transitions within truly reflexive, deliberative environmental governance forums.
9.4 Concluding remarks: geographical explorations and spaces of hope

In a situation of dwindling resources and imminent climate instability, the legitimacy of current incremental responses is called into question. Indeed, the most recent International Energy Agency World Energy Outlook report made the stark warning that "without a bold change of policy direction, the world will lock itself into an insecure, inefficient and high-carbon energy system" (IEA, 2011b: 1). Hall (1993) and Nutley and Davies (2000) among others, have shown that it is precisely in these crisis situations that windows of opportunity are provided where policy may be open to “bold” changes in direction. Hall (1993) provides the example of the 1970's in the UK when a host of economic crises, including the 1973 oil crisis, stimulated a paradigm shift from Keynesianism to monetarism in macro-economic ideology. Social practice literature also reveals opportunities for change in situations of changing social arrangements; examples would be alterations in energy provision systems like the upscaling of microgenerated energy or the shift from local authority water provision in Ireland to a new national body ‘Irish Water’. This suggests that rather than passivity and incrementalism there is now a need and an opportunity to replace previous “deluded visions of agriculturists and industrialists” based on the “mastery of nature” (Luton, 2001: 68) and boundless consumption with visions that cultivate more reciprocal relationships to sustain ‘one planet’ living. In this context, the PhD research set out to investigate the potential of a practice oriented, participatory backcasting procedure to identify alternative directions, innovations and interventions for instigating more sustainable consumption practices in key areas of home heating and personal washing.

The research affirms that practice oriented, participatory backcasting processes can lead to the production of promising scenarios which represent new configurations of daily consumption practices and open up practical routes for socio-technical innovation. The study also showed that the backcasting process provoked higher order learning amongst participants through the process of problem-reframing and idea sharing across sectoral and interdisciplinary boundaries. It was concluded that further research would be required to assess the ways in which the outputs and learning generated could be acted upon and embedded in professional contexts in Ireland. Other logical steps would be to carry out research and R&D measures outlined in the Transition Frameworks to further evaluate the interventions for the Promising Practices. It could also be useful to carry out practical experiments where householders are supported to enact the Promising Practices, simulating or prototyping any unavailable elements. An additional research agenda would be to consider synergies in scripts and goals across environmentally damaging consumption practices in order to develop mutually reinforcing agendas. The research has therefore generated a range of practical ideas, providing starting points for further research and has advanced understanding on how social practice insight could be usefully integrated into long-term environmental governance processes.
Moving similar processes from the periphery to the core of environmental governance in Ireland would be challenging given identified institutional, process and ideological disjunctures. However this does not mean that room cannot be created for alternative, normative and creative processes like participatory backcasting which can provide physical, intellectual and temporal space for co-learning, co-production and reflection. The potential transformative process that can be set in motion by experimenting with alternative instruments and intellectual frameworks within environmental governance compared with classical observationist and positivist approaches, are dealt with in Wood (2009: 324) who provides a pertinent commentary:

> "Until the twenty-first century, we often used a reasoning process that conflated the ‘unthinkable’ with the ‘impossible’. It is now clear that, by trying to think about impossible things they become more ‘discussable’. Once we can discuss them, they will soon become more ‘thinkable’. Once the ‘thinkable’ proliferates it will become more attainable. Once the merits of the ‘attainable’ are seen to be attractive, they will become more feasible”.

The research reported in this thesis shows that the ingredients for higher order learning are present within the backcasting process, sowing the seeds for change. If reinforced from other angles and with institutional support, this could lead to a situation where there would be broader momentum for developing system innovations for sustainability. There is therefore a strong case for allowing space for dreaming and envisioning new ways of carrying out daily practices, so that practice oriented, participatory backcasting processes could become part of a range of iterative, interactive and collective ‘path-finding tools’ (Jansen, 2003). Workshop evaluation presented in this thesis revealed significance in the variety of spatial practices inherent in the backcasting processes. At one level, there was a clear material geography to the backcasting process manifest in the physical workshop space which provided an opportunity for participants to meet, engage, debate and create that would not otherwise have occurred (Davies et al., 2012a). This conceptualisation of space is familiar within the geographical community, although it remains the locus of much debate (Massey, 2005). Aside from physical space, a clear intellectual space was evident, characterised by a mingling of imaginations across disciplinary and temporal boundaries. Additionally, in contrast to popular discussion of sustainability, frequently characterised by scenarios of impending doom, the backcasting process with its emphasis on solutions creation and collective action, could perhaps be considered to have simulated what Harvey (2006) terms ‘spaces of hope’ (Davies et al., 2012a). This is reflected in a comment from a heritage body representative at the washing Transition Workshop who stated that the process “demonstrates that people working together can deliver feasible and plausible solutions to deal effectively with the issues related to unsustainable consumption patterns”.

Theoretical similarities can be drawn between Harvey’s thesis and work by Deleuze on experimental processes (such as eco-village living) as “windows of opportunity” for societal innovation and challenges to institutional legitimacy (Scott-Cato and Hiller, 2010). It is said
that these micro-level opportunity spaces, can facilitate the development of macro-level creative strategies. The practice oriented, participatory backcasting process as developed, applied and assessed in this thesis provides unique opportunities for geographical enquiry around the co-construction and exploration of imagined futures. This form of activity is supported by critical geographical theory which maintains that research should not only concern itself with explanatory-diagnostic endeavours, but should also consider those in the anticipatory-utopian arena (Gregory, 2009). As articulated by August Lösch (1954: 4 in Barnes, 1984) the task of critical geography is "not to explain our sorry reality, but to improve it". In Little Gidding, T.S. Elliot provides an appropriate analogy for the backcasting process:

“We shall not cease from exploration
   And the end of all our exploring
   Will be to arrive where we started
   And know the place for the first time”.

As Elliot implies, how we understand familiar places and contexts, (or in the case of this research, current problems of sustainable consumption) changes with new points of comparison. The ultimate result is that participants in backcasting processes can gain greater clarity and understanding of the present in light of future scenarios that have been discovered and explored. Geographical enquiry has an important role to play in future research in the field, given its fundamental capabilities in exploring new spaces in time and culture, drawing upon integrative, interdisciplinary and, more recently co-production approaches to generating knowledge.


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