



**SCENARIOS AND PERSONAS: TOWARDS A
METHODOLOGY FOR PORTRAYING THE CARBON-
INTENSITY OF UK LIFESTYLES TO 2030**

by

Scott Milne

RESOLVE Working Paper 06-09



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Sponsored by the UK's Economic and Social Research Council (ESRC) as part of the Research Councils' Energy Programme, RESOLVE aims to unravel the complex links between lifestyles, values and the environment. In particular, the group will provide robust, evidence-based advice to policy-makers in the UK and elsewhere who are seeking to understand and to influence the behaviours and practices of 'energy consumers'.

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Abstract

As part of the RESOLVE programme, a PhD study is underway to develop scenarios to depict the carbon-intensity of lifestyles through to 2030. This paper introduces the study, beginning with a definition and description of scenarios and how they are developed. A recent critique of existing low carbon energy scenarios is then discussed, along with a recent attempt at portraying the role of lifestyles in reducing future energy demand, with lessons for this research identified. The notion of 'lifestyle' is then explored, with a discussion of the centrality of consumption to this concept. Relevant consumption categories that will be used in communicating the scenarios are identified, along with a series of external factors that play a role in influencing this consumption. Finally, each stage of the proposed methodology is outlined.

Key Words: Scenarios, Scenario Planning, Foresighting, Futures, Futures Thinking, Energy Futures, Lifestyles, Lifestyle Change, Behaviour Change, Energy Behaviour, Low Carbon Society.

1. Introduction

In recent years the threat of climate change has received increasing attention in mainstream media and has risen high up the political agenda. Governments around the world have come to accept the scientific consensus on anthropogenic climate change established through the Intergovernmental Panel on Climate Change (IPCC). Attention has now shifted to questions around the extent of the impact and on strategies for mitigation and adaptation.

1.1. Policy and Legislation on climate change

As a result of the Rio Earth Summit in Rio de Janeiro in 1992, an international treaty was signed known as the United Nations Framework Convention on Climate Change (UNFCCC). This treaty included provisions for further updates, or Protocols, that would include mandatory targets for reduction of greenhouse gas (GHG) emissions. After lengthy negotiations, the Kyoto Protocol was adopted by the UNFCCC in December 1997.

Along with the other EU member states, the UK ratified the Kyoto Protocol, agreeing to a 12.5% reduction of 1990 UK emission levels by 2012. Moreover, the UK Government believed that a stronger reduction was both possible and desirable, leading to a voluntary domestic target of a 20% reduction by 2010 (HM Government DEFRA 2006).

Later, the UK Government passed the world's first legally binding framework on climate change with the Climate Change Act 2008 (HM Government DEFRA 2008). Key provisions of the Act include:

- GHG emission reduction targets of at least 80% by 2050, CO₂ emission reduction of at least 26% by 2020, against 1990 levels;
- A series of five year carbon budgets;
- Establishment of a Committee on Climate Change, an independent body set up to advise the Government on appropriate measures for achieving targets;
- Plans to include emissions from international aviation and shipping by 2012.

More recently, the UK Government announced the launch of a Low Carbon Transition Plan, outlining specific measure to achieve the goals set out in earlier legislation (HM Government DECC 2009). The plan includes several targets to 2020:

- More than 1.2 million people in green jobs;
- 7 million homes to undergo 'pay-as-you-save' energy retrofits;
- More than 1.5 million households supported in producing clean energy;
- 40% of electricity from renewables, nuclear and clean coal;
- UK gas imports 20-30% lower than they would be without intervention;
- New cars will emit on average 40% less carbon than today's models.

1.2 Energy security and economic uncertainty

The Low Carbon Transition Plan by definition implies a shift away from our reliance on fossil fuel resources. Implicit within the Plan is a recognition of the difficulties across the geo-political landscape and the potential threat to security of UK energy supply. What is also clear from recent developments is the increasing vulnerability to the effect of peak oil/gas in the near future. Indeed, the chief economist to the International Energy Agency has estimated that demand for oil could outstrip supply by 2020. This assessment brings forward the IEA's previous estimate of 2030, due in part to revised estimates of output decline, but also due to the effects of the present economic crisis in reducing expenditure on new exploration and extraction projects (Macalister & Monbiot 2008).

Nor has the economic crisis been confined to the oil and gas industry. The events that have unfolded since July 2007 have been described as the worst financial crisis since the Great Depression (Hilsenrath et al. 2008). The crisis has resulted in governments taking unprecedented steps to prevent a collapse of the global financial sector, including the nationalisation of banks. The drop in house prices, increased unemployment and shortage of credit have all contributed to growing uncertainty for UK households.

1.3 Lifestyle and behaviour change

The opportunities and challenges posed by climate change, peak oil and the economic crisis will involve unprecedented changes over the period to 2030. Clearly, the transition to a low carbon society will require substantial technological innovation both in terms of energy efficiency improvements and in the development of revolutionary products and processes. Many of these technological innovations will occur 'behind the scenes', e.g. supply side innovations in electricity supply, new agricultural methods etc. However, in addressing these three challenges, significant change will also be required on the part of citizens and consumers in society. In many cases the changes may be subtle, i.e. economic (dis)incentives may influence consumption patterns towards less energy intensive versions of the same goods and services. In other cases, more radical behaviour change will be necessary, such as modal shifts in transport use, installation of micro-generation renewable energy technologies or retraining for green collar jobs.

It is essential that these opportunities and challenges are explored in order to inform policy and decision making to support a low carbon transition. Numerous ongoing research programmes are exploring the technological innovations necessary for a low carbon transition. However, less attention has traditionally been paid to the role of lifestyle change. As a result, policy and decision makers have access to an array of robust evidence-based research on the feasibility of various technical options, but have limited understanding of the opportunities for intervention aimed at individual and household behaviour change.

1.4 Objectives of this paper

Before exploring the methodology developed for this scenario study, the concept of scenarios will be summarised including a review of definitions from the literature and an explanation of the different schools of thought on scenario planning. Then, a recent critique of low carbon energy scenarios shall be reviewed, including an investigation of the weaknesses identified in those and recommendations for future scenarios addressing a low carbon transition. Also, a recent attempt at portraying the role of lifestyles in future energy demand will be examined and the shortcomings of that study discussed.

Having provided some context for the current research, the groundwork will then be laid for exploring the methodology, by describing how 'lifestyles' are understood in this research, in particular highlighting the role of consumption. The methodology itself will then be explored stage by stage.

2. Scenarios

Various definitions of “scenario planning” were collected by Chermack and Lynham (2002) in their review of the literature. A total of 18 definitions were collected, the earliest being from 1985, despite scenarios having been used since the 1960s. Almost half of the definitions had been published in the five year period between 1997-2002, suggesting increased attention to scenario planning in academic literature during those five years. After analysing these definitions the authors developed an 'integrative definition' of their own which reads:

“Scenario planning is a process of positing several informed, plausible, and imagined alternative future environments in which decisions about the future may be played out for the purpose of changing current thinking, improving decision making, enhancing human and organization learning, and improving performance” (Chermack & Lynham 2002, p.376)

Commenting on Chermack and Lynham's analysis, Nicol (2005, p.35) points out that their list includes definitions of both scenario planning and scenarios themselves and concludes that their integrative definition told us “a lot about what scenarios were and the purposes to which they were put, but about scenario planning only that it was a process”. Nicol (2005, p.28) followed a similar approach involving a study of existing definitions, analysis of key elements and creation of a new definition, but was clear on seeking a definition of “scenarios” specifically. The following twenty elements were found repeatedly in the definitions reviewed by Nicol:

- | | |
|--------------------------|------------------------------------|
| i.internally consistent | xi.time-limited |
| ii.coherent | xii.ordering perceptions |
| iii.plausible | xiii.based on assumptions |
| iv.interconnected events | xiv.different possibilities |
| v.relevance | xv.based on past/present |
| vi.challenging | xvi.based on pre-determined events |
| vii.representative | xvii.trend outcomes |
| viii.external | xviii.imagined |
| ix.narrative | xix.decision-making tools |
| x.boundaries/framework | xx.progressive |
- (Nicol 2005, p.31)

Nicol then constructed a four-part statement incorporating each of these elements (Nicol 2005, p.32) before providing a summarised definition:

“Scenarios are narratives, grounded in present knowledge, that have the purpose of communicating bounded possibilities for the future, challenging entrenched thinking and providing a framework for decision-making.” (Nicol 2005, p.33)

Taking account of Nicol's critique that the definition provided by Chermack and Lynham is more appropriate for a definition of scenarios than scenario planning, these two definitions give a broadly similar account of how scenarios are understood in this research, i.e. as:

Informed narratives describing plausible alternative futures in which decisions can be played out, helping to challenge current thinking and assist decision making.

2.1 Approaches to scenario planning

The term scenario planning does not denote a single, coherent methodological approach. Rather, there are distinct schools of thought which emerged concurrently in the latter half of the twentieth century, often referred to as the *USA Centre* and the *French Centre* (Bradfield et al. 2005, p.797). The USA Centre initiated by Herman Kahn, involved the development of the popular Intuitive Logics approach, as well as Trend Impact Analysis and Cross Impact Analysis. The French Centre and its *la prospective* approach, was established by Gaston Berger and continued after his death by Bertrand de Jouvenel at the Centre d'Etudes Prospectives, before being modified by Michel Godet to form a more probabilistic approach to scenario development. A more thorough discussion of these schools is beyond the scope of this paper. For accounts of the history of scenario thinking, see e.g. (Bradfield et al. 2005; Hughes 2009).

The general approach adopted for this research is the Intuitive Logics approach, pioneered by Shell Group, which traces its existence back to the work of Herman Kahn. This approach to scenario planning is broadly qualitative and narrative based, although there are countless variations many of which do indeed include some quantitative element. As explained by Bradfield *et al*: “when it comes to the intuitive logics model... there are almost as many ways of developing scenarios as there are practitioners in the field” (Bradfield et al. 2005, p.800). The particular methodology developed for this research is outlined in section 4.

2.2 Hughes et al's Critique of Low Carbon Energy Scenarios

Two contributions to the scenario planning literature have recently been produced (Hughes 2009; Hughes et al. 2009). The first paper, by Hughes, provides an historical overview of the scenario planning technique. The second paper, by Hughes *et al*, offers a critique of low carbon energy scenarios, with a review and analysis of 21 such scenario studies. Hughes *et al* argue that these studies have made an important contribution by beginning to imagine and articulate a range of low carbon futures, thus prompting consideration of the necessary first steps. Nevertheless, the critique identified several shortcomings that must be addressed if low carbon energy scenarios are to move beyond this imaginative stage to offer strategic insight regarding appropriate actions to be undertaken by specific actors. The authors identified three main obstacles to be overcome.

2.2.1 Exogenous constraints

Many of the studies reviewed in the paper portray scenarios that are bounded by a 'normative exogenous constraint', typically a carbon emissions reduction target. The authors warn that such a constraint “creates an illusion of inevitability” regarding the achievement of that goal, which can “diminish and underestimate the significance of certain potentially highly significant obstacles” (Hughes et al. 2009, p.39). Crucially, by imposing a target as an exogenous constraint, it is removed from the interplay of actors and their motivations, and elevated to a realm where it is no longer clear how that goal might be brought about by particular actors and institutions within the system. The authors compare this to the ancient Greek concept of 'deus ex machina', a storytelling device where “the characters within the drama are unable to resolve a situation through their own efforts, but are saved by a force completely external to the previously established plot, and thus completely implausible within the structure of the drama previously established” (Hughes et al. 2009, p.40).

If scenarios are to portray the transition towards certain goals, then these should first be attributed to particular actors in the scenario, such that the supporting and conflicting forces that might affect the achievement of these goals can be explicitly drawn out.

2.2.2 High level trends

Hughes et al argue that the scenario studies reviewed are “overly reliant on high level trends” (Hughes et al. 2009, p.40). Common high level trends include “consumerism, environmentalism, globalisation, fragmentation etc” (Hughes et al. 2009, p.4). Typically, two of these trends are selected as bisecting axes to form a 2x2 matrix.

The authors question the ability of high level trends to generate meaningful representations of the world. In any ongoing social/technical/economic/political development, a multitude of conflicting forces operate simultaneously. Over time, some of these forces will dominate, some will fade, others will adapt and yet more will emerge. With the benefit of hindsight, it may be possible to identify and isolate those dominant forces for the purposes of summarising key historical developments. Thus, high level trends may be useful in developing narratives intended to provide a broad *retrospective* summary of events. However, the dynamic interplay of a multitude of forces is precisely what is required in thinking *prospectively*, for only then can we begin to identify points of intervention and gain strategic insight for future action. Therefore, “an actor-based perception of the evolution of events would be much more useful than one based in high-level trends” (Hughes et al. 2009, p.41).

2.2.3 Co-evolution of social, technological, economic and political factors

In the 21 scenario studies investigated by Hughes *et al*, the focus is predominantly on the development of the technological energy system, at the expense of other considerations such as social, political and environmental factors. Where social and political dynamics are included, this is done either in a post-hoc manner, where a technology mix is proposed with a socio-political landscape then painted around this, or else a socio-political system is described first and a technology mix chosen as deemed appropriate. In both cases, such descriptions can fail to account for the dynamic co-evolution of these systems.

In reality, social systems are not constructed independently of technological systems. Instead, the various systems (social, technological, economic, political) develop in an “iterative and reflexive” manner (Hughes et al. 2009, p.44). Thus, what is politically feasible depends on what is socially acceptable, technologically possible and so on. Similarly, what is technologically (and economically) feasible depends on policy interventions, social trends and more.

Hughes *et al* stress again the importance of understanding the role of different actors in this co-evolution process, a demand that is all the more important in the present research given the explicit consideration of psychological factors among those other systems.

2.2.4 Lessons for Lifestyle Scenarios

A common theme across all three characteristics described above is the need to better portray the role of actors in bringing about change. Whether as citizens, consumers, communities, firms, local authorities or governments, the developments that will shape the future should be attributable to these actors, and not merely abstracted to megatrends, if scenarios are to provide opportunities for strategic insight. If previous scenario studies might be forgiven for focusing on technology given the supply-side nature of those studies, any scenarios depicting the carbon-intensity of lifestyles must clearly incorporate the role of actors in society if they are to achieve credibility among decision-makers.

As well as the actors themselves, the social, technological, economic, political (and environmental) systems should be represented in terms of a process of dynamic co-evolution. This representation will be aided from the outset by efforts to portray actors and their motivations. However, special care should be taken to ensure this co-evolution of systems is researched and represented in a rigorous manner.

2.3 UK ERC lifestyle scenarios

Although the focus of previous energy scenarios has tended to be the technological system, recent work by the UK Energy Research Centre attempts to portray the role that lifestyles might play in reducing energy demand to 2050 (UKERC 2009). The focus of these lifestyle scenarios is on household energy use and personal transport, “the forms of energy most directly controlled by the individual” (UKERC 2009, p.104).

The report details a series of assumptions regarding changes in energy behaviour by 2050. For household energy use, these include: a high standard of insulation; social unacceptability of over-heating; low-carbon heating systems; phasing out of incandescent lighting; improved efficiency of appliances; rolling out of smart meters. For personal transportation, assumptions include: social norms demoting large cars, single occupancy, speeding and air travel; efficient, low-energy transport systems replacing petrol and diesel car-based systems; increased localism resulting in shorter average distances; new models of car ownership; increased role of Information and Communication Technology in making cost and energy use transparent; radical changes in work patterns and business travel including teleworking and video conferencing; the appeal of air travel fading due to social unacceptability and inconvenience. These assumptions are then used to investigate energy demand for 2050 using three different models. The report explains how the general assumptions listed above are translated into more specific assumptions suitable for input into these models.

This scenario complements the range of earlier scenarios focusing more on the technological energy system and represents a step forward in thinking about the

opportunities for reducing energy demand (and thus carbon emissions) through lifestyle change. In exploring possible changes in household energy use and personal transport by 2050, the report makes a significant contribution to discussion regarding energy systems, energy policy and economics. What is absent in this scenario though, is a meaningful reflection on how lifestyle change might come about. The report states that: "If Government is pursuing ambitious carbon emissions, this is likely to be consistent with social acceptance, and therefore it is probable that attitudes and personal behaviour will change." (UKERC 2009, p.103). By way of an explanation for the assumptions given for 2050, the following brief synopsis is provided:

"The basic storyline of the scenario is of steadily changing social attitudes to the environment, with increasing understanding leading to a widely held belief that human activity is having a serious impact on the global climate. This is followed by a broad social consensus that personal consumption is a key driver and needs to change. We do not assume complete social agreement, nor widespread frugality, but majority support geared to improving quality of life without increased material consumption in rich countries. Starting with some key opinion leaders, social norms emphasise 'green housing'; and 'community living' and 'accessibility' replace 'mobility' as aspirations." (UKERC 2009, p.104)

In the executive summary, the report makes it clear that further work remains to be done:

"There is little existing evidence of how to bring about comprehensive changes in people's lifestyle and behaviour that will lead to reduced energy demand and CO₂ emissions... ..Research is needed to understand the conditions under which people would voluntarily take on lifestyles embodying these types of behaviour." (UKERC 2009, p.7)

It therefore remains an aim of this research to add to this literature by exploring the specific conditions under which lifestyle change might occur, and in which directions. In this way, it will be possible to examine the intricacies of behaviour change in relation to other socio-technical systems and to better inform policy and decision-makers on possible points of intervention en route to a low-carbon future.

3. Portraying Lifestyles

In defining lifestyles, a useful starting point is the United Nations Environment Programme (UNEP) Marrakesh Task Force on Sustainable Lifestyles (MTFSL) (UNEP 2008). In its concept paper on Sustainable Lifestyles the Task Force argues that:

"Lifestyles is a way we live our lives that allows us to fulfil our needs and aspirations. They serve as "social conversations", in which people signal their social position and psychological aspirations to others. Since many

of the signals are mediated by goods, lifestyles are closely linked to material and resource flows in the society." (UNEP 2007, p.2)

In a 2004 report on Sustainable Lifestyles, the Centre for Sustainable Development at the University of Westminster argued:

"what this term [lifestyle] describes is an accumulation of patterns of behaviour, resource use and consumption, as well as choices about employment and the best ways to live." (Bedford et al. 2004, p.3)

The report continues:

"As patterns of consumption replace employment type as the primary social marker (Miller, 1995), the goods and services that individuals and households consume become the most important elements in demonstrating social class, wealth and identity. They become the means by which individuals express their values and their desires as well as the way individuals are judged by others (Giddens, 1991)." (Bedford et al. 2004, p.4)

For Bedford *et al* then, consumption is central to the notion of lifestyles. However, a more complete understanding of lifestyles requires an appreciation not only for what people do, but also why they do it. Thus, there is a need to consider values, behaviours, attitudes in any portrayal of lifestyles, as will be discussed later. Importantly though, as expressed by Bedford *et al* (2004, p.4), these values and attitudes often find their expression in consumption, so it seems appropriate that consumption should play a central role in any framework on lifestyles.

3.1 Consumption

Bedford *et al* (2004, p.8) use the notion of consumption clusters to group together patterns of actions along with the goods and services associated with a particular area of consumption. Lorek and Spangenberg (2001, p.6) had previously identified the following ten clusters where households can make a difference in reducing environmental impact: clothing, education/training, food, healthcare, construction/housing, hygiene, cleaning, recreation, social life and transport. Lorek and Spangenberg (2001, p.5) estimated that these clusters account for over 95 per cent of environmental impacts from household consumption (environmental impacts being material extraction, energy consumption and land use). It is estimated that housing/construction, food and transport together account for 70 per cent of those impacts (Lorek & Spangenberg 2001, p.6). Lorek and Spangenberg argued that three of those clusters consist primarily of *public* consumption, namely education/training, healthcare and social life (by which they mean the police, military and other public services, as distinct from recreation).

In 2006 the Sustainable Consumption Roundtable investigated opportunities for more sustainable consumer lifestyles (Sustainable Consumption Roundtable 2006). The Roundtable organised a Consumer Forum involving over a hundred people, inviting them to discuss their aspirations and how these related to policies for sustainable consumption. Arising out of these discussions were four areas of our lives where significant change could begin to take place (Sustainable Consumption Roundtable 2006, p.10):

- how we run our homes;
- the food we eat;
- how we get around;
- holiday travel.

These equate neatly with the main three consumption clusters identified by Lorek and Spangenberg and used by Bedford *et al*, with transport being disaggregated into day-to-day travel and holiday travel. In addition, the fact that these four categories arose out of the expressed aspirations of forum participants makes this framing of our consumption activities more accessible in terms of communicating potential future lifestyles to stakeholders.

3.2 Drivers of Consumption

In developing a lifestyles framework for this scenario exercise, it is also necessary to consider those external factors that drive consumption. In the initial planning stage of this research, a standard set of five external factors were used to frame the research question, namely: social, technological, environmental, economic and political (STEEP). A further examination of the literature provides another perspective on these external factors.

The UNEP MTFSL list five external factors, broadly similar to the STEEP factors listed above but with some variation (UNEP 2007, p.4). These factors are: economic, technological, policy, socio-psychological, cultural/historical. The first three of these are covered by the STEEP factors (taking policy and political to be interchangeable). Interestingly for a sustainability task force, MTFSL have omitted the term environment. Although some environmental factors may impact on lifestyles only indirectly through e.g. social influences, many specific environmental changes such as deforestation, resource and water scarcity could affect lifestyles more or less directly. For scenarios through to 2030 then, it is important to retain an explicit recognition of environmental factors.

The remaining difference between the original list of STEEP factors and those put forward by MTFSL is the sub-categorisation of social factors into socio-psychological and cultural/historical. Within the RESOLVE group however, there exist two separate strands covering the psychological and the sociological. Dealing with these two areas as important factors in their own right would mean that each of these two strands within RESOLVE had a clear opportunity to contribute to the building of the

scenarios. Thus, the cultural/historical factors will be treated as part of the social category for the purposes of this research. These two categories serve the important function of introducing beliefs, attitudes, values and behaviours into the framework, providing a context for the consumption clusters described above.

Incorporating this amendment to the original list of external factors, we now have Social (i.e. Sociological, Cultural/Historical), Technological, Economic, Political, Psychological and Environmental (or STEPPE).

Of course, it must be remembered that these categories are merely a convenience, for the purpose of engaging with interviewees during the environmental scanning phase of the research (see below). The actual trends, issues, impacts etc that are deemed to be relevant to this study may or may not fall neatly into these categories. The purpose of identifying such categories is therefore to stimulate broad reflection and not to act as a limiting factor on the environmental scanning process.

4. A methodology for lifestyle scenarios

As discussed above, the literature on scenario planning reveals a multitude of methodologies under the broad heading of the intuitive logics approach. Bradfield *et al* explain that each variation identifies “a number of discrete steps, varying from five to 15 or more, depending on what features of scenarios are highlighted or ignored.” (Bradfield et al. 2005, p.800). In personal correspondence, Bradfield highlighted this point and argued that “developing scenarios is not science, it is art and craft and as such, the process must be flexible” (personal correspondence, Bradfield 2009). The methodology described here has been developed in light of the known time and resource constraints, as well as the expertise and opportunities available.

Already, a scenario planning panel has been appointed, consisting of five members of RESOLVE. Throughout the research, this panel will be called upon to bring a variety of perspectives to bear on any key decisions, ensuring that those decisions are subject to close scrutiny and conscious reflection. The anticipated involvement of the scenario planning panel is explained in the description of the methodology that follows.

4.1 Environmental scanning

The initial phase of the scenario building process will involve semi-structured interviews with members of RESOLVE. The purpose of this phase is to gather together insights from the different disciplines within the research group to begin to identify the broad issues and trends considered to be important for the future carbon-intensity of lifestyles. Interviewees will be invited to reflect on the social, technological, economic, political, psychological and environmental factors (STEPPE) that they believe will drive lifestyle change. They will be encouraged to discuss these

in terms of the four categories of consumption discussed previously: how we run our homes, the food we eat, how we get around, and holiday travel.

Describing the interview process, Heijden explains:

“interviews are as much as possible of an open-ended nature. This means that the interviewer does not arrive with a ready set of specific questions concerning the business. Instead questions are general, and intended to trigger a free-flowing conversation, in which the interviewee sets the agenda.” (Heijden 2004, p.145)

This open-ended approach ensures that the interviewee is able to bring to the fore those issues which they believe to be pertinent to the research, rather than the interviewer deciding in advance on a pre-selected range of issues to be discussed. The difficulty comes in preparing an interview protocol that encourages the interviewee to focus on lifestyles and the relevant external factors, whilst leaving the discussion sufficiently open to ensure the issues solicited have not been contaminated by the interviewer's own agenda.

The interview usually begins by allowing the interviewee to explain their background and perspective on the area of interest. This helps to settle the interviewee and get the discussion flowing before the main part of the interview begins (Heijden 2004, pp.145-6). A number of possible trigger questions are then suggested by Heijden, intended to ensure the interview flows in the manner described above. The first set of questions are intended to uncover the main uncertainties in relation to the business environment under consideration, in this case the carbon-intensity of UK lifestyles. To begin, the interviewee is asked to imagine that they are able to present three questions to a clairvoyant (Heijden 2004, p.146). The interviewee is invited to elaborate on how they would use these three questions, and to discuss how they would prioritise the various issues they might wish to explore, giving due consideration for the uncertainty and impact of each.

The light-hearted approach of this initial question eases the atmosphere of the interview and helps the interviewee become comfortable in thinking about the future (Heijden 2004, p.146). When the interview begins to slow, the next question is raised. This time the interviewee is asked to assume the role of the clairvoyant, providing the answers to the three questions. Specifically, the interviewee is asked to provide a vision of the future which turns out favourably. Then, they are asked to consider all three questions again but this time within a future which is undesirable. Heijden explains:

“Earlier (Heijden 2004, p.109) I argued strongly that the idea of 'good' and 'bad' futures in the scenario design stage lead to poor quality scenarios. In most circumstances the scenario planner does best to stay away from good and bad worlds, instead focusing on what is plausible and internally consistent. However, in the elicitation interview the

discussion of good and bad worlds tends to be powerful in triggering ideas of what could be important factors to look at, leading to the discovery of underlying driving forces.” (Heijden 2004, p.147)

The development of these issues into actual scenarios will be done at a later stage, thus the subjective visions collected in this interviewing phase are used merely as a tool for eliciting the issues of interest.

4.2 Identification of key factors

Heijden suggests that a typical interview “may produce between 40 and 60 important insights” (Heijden 2004, p.151). These insights must then be brought out of the individual transcripts and clustered together. The software package NVivo is a qualitative analysis tool that allows passages of text or audio to be coded, enabling clustering of common themes. Such qualitative analysis software will be necessary if this process of clustering 40-60 insights from each of the interviews is to remain manageable.

Regarding presentation of the individual insights within each cluster, Heijden remarks:

“within each of the clusters the analyst identifies common and divergent views and assumptions. These need to be highlighted as powerful triggers for the feedback meeting. In this way the analyst gradually creates a picture of the [participants'] mental models, including overlap and divergence.” (Heijden 2004, p.154)

The resulting report with all the issues clustered together, perhaps with some issues which do not fit neatly into a category, will then be reviewed by the scenario planning panel. Their role here will be to offer fresh perspectives on how the issues and insights could be interpreted and clustered. The panel members will be given the report in advance of a meeting, wherein the alternative views will be discussed and debated. The panel will then agree on how to present these initial findings back to the group at a research meeting, where two issues will be identified as the key uncertainties. These uncertainties will then form the axes of a working framework for the scenarios, for use in consulting externally. Those other issues identified during the interviews will remain for now – as some of the potential variables to be explored within each scenario.

4.3 External expert interviews

Having identified the general issues and trends of interest to the research group and selected two key trends from those, a series of interviews will then be conducted with external experts. These individuals will be selected for their expertise in

particular areas of interest that require to be explored in the scenarios. Experts will be sought to provide guidance on the housing, food and transport sectors in relation to the STEPPE factors already identified by the research group. Importantly, the experts will also be invited to contribute further issues and trends not previously identified by the research group.

It may be remarked that the prior identification of two key trends by a scenario panel internal to the research group seems premature given the subsequent opportunity for external experts to contribute more of their own.

An alternative approach would be to conduct the internal and external interviews in the same phase in the manner described above, before clustering these into one collection of insights for the scenario panel to review and select from. The approach taken here is justified on three grounds:

- The research group are recognised experts on issues around lifestyle and environmental behaviour. Therefore, it seems reasonable to assume that those individuals can provide important insight into the issues and trends of interest to the study.
- The scenarios will be built in a way that requires close collaboration across the research strands in the group, and will be published under the auspices of the group as a whole. Therefore, it is imperative that the building of the scenarios follows a direction which is appropriate for the exploration of those issues felt to be most significant by the group, thus maintaining support internally.
- The framing of the scenario spaces prior to consultation with external experts allows a more focused approach to be taken at this stage, both in terms of the identification of relevant experts as well as in the preparation and conduct of the interviews in order for these to offer the greatest insight possible.

Nevertheless, in order to ensure flexibility within the methodology and to take full advantage of the expertise available, the working framework will be subject to the scrutiny of these experts during the initial part of each interview. In this way, feedback on the suitability and usefulness of the working framework will be received in an ongoing fashion. Should it become apparent that there is a consensus among the experts for a modification of the framework, this shall be discussed during a meeting of the scenario planning panel. Either way, as the interviews progress, the scenario framework will become increasingly solidified.

The experts will be sought from a variety of sectors, including academia, government and industry. In addition, a variety of academic and professional backgrounds will be brought in to ensure the external consultation is conducted in the same multi-disciplinary spirit as the internal phase. Approximately 15-20 interviews will be conducted at this stage, as required.

4.4 Skeleton scenarios

A second report will be produced at this stage, clustering the views of the external experts under the varying conditions of each scenario, according to the finalised scenario framework. Where the views of the experts are similar enough on any particular issue, these will be consolidated into a coherent 'pathway' articulating the development of that issue within each given scenario. Where slightly greater divergence of views emerges from the process, the scenario planning panel will be consulted to debate and discuss an appropriate synthesis of these views. Where necessary, further desk research and expert interviews may be conducted at this stage to assist with this process.

Where strongly divergent views have emerged from the expert consultations, this potentially indicates a significant degree of uncertainty. In this case, rather than attempt to consolidate these views into one pathway, this diversity will be maintained through to the next phase of the research.

The result of this phase will be a skeleton scenario document outlining the basic characteristics of the key issues and trends under each of the four scenarios. This will include a range of characteristics for some issues, in the case of strong divergence of expert opinion. The document will not as yet attempt to represent these scenarios through narratives.

4.5 Stakeholder workshops

The next phase will be to conduct a series of stakeholder workshops, including members of the public, school pupils or students, policy makers and business leaders. This process is intended to address the recommendation by Hughes *et al* (2009) that scenario studies should attempt to better represent the role of actors in the system and their motivations. By drawing out responses from stakeholders to specific characteristics under different scenarios, it will be possible to identify key points of conflict for specific groups on certain issues. Crucially, this process will be conducted iteratively, meaning that responses from one stakeholder group can be fed into the basic characteristics of the scenarios presented to the next group. This will allow responses of members of the public to be taken into account by policy makers, and for the views of policy makers to inform the responses of business leaders etc. Although ideally this process would be conducted in such a way that the groups were able to interact in a truly dynamic way, simultaneously debating and responding to the proposed characteristics of the scenarios, such an approach falls outside of the time and resource constraints of this research. Nevertheless, it is believed that the approach described here represents a significant step forwards in better representing the dynamic interplay of actors and their motivations in considering lifestyle change.

4.6 Personas and scenario narratives

The data gathered through the stakeholder workshops will have helped to refine the basic characteristics of each scenario, as well as offering insights into the dynamic interplay, or co-evolution, between different systems and different actors. This will enable the development of a set of scenario narratives, wherein this co-evolution can be represented in storyline form. As these narratives are the culmination of the scenario building exercise, they shall undergo a systematic process of peer review by the scenario panel to ensure their plausibility and consistency.

In order to better represent individual actors and their conflicting motivations and behaviours, an additional feature will be added to the scenario narratives. A set of 'personas' shall be developed, describing fictional individuals and their lifestyles. Personas are a technique taken from the field of Human-Computer Interaction (HCI) Design. For too long software engineers developed their products without paying sufficient attention to the needs, characteristics, and skills of their user base. In HCI, the user-centred design community has an established history of developing techniques to assist those software engineers in making their products more usable and accessible for all. Personas represent one such technique, where the motivations, skills, (dis)abilities etc of a fictional character are portrayed in the form of a short biography. Typically, the personas are built through a series of interviews with real users. The personas are then presented to the software engineers to encourage them to reflect on how their design decisions might impact on these users.

To identify archetypal groups to be represented through these lifestyle personas, a further examination of the literature will be required. Specifically, a theoretical or methodological approach for clustering different aspects of lifestyles and associated consumption patterns will be needed. In cooperation with research colleagues in RESOLVE, an assessment will then be made of the carbon-intensity of these archetypal lifestyles in the present day. Finally, these personas will be portrayed as progressing in time through each scenario, with relevant actions, decisions and conflicts accounted for. An illustrative forecast of the carbon-intensity of each persona in 2030 will then be provided.

The intention behind the inclusion of personas is very much in keeping with the narrative nature of scenarios, to tell the story of a set of individuals and the lifestyle choices they might make, to try and personalise the scenarios and make them more accessible, more tangible for decision and policy makers.

5. Summary

This research seeks to explore the carbon-intensity of UK lifestyles through to 2030. Where previous low-carbon energy scenario studies have focused predominantly on the technological energy system, this study will investigate the role of individuals' values, attitudes and behaviours and how these may affect energy consumption

under a variety of circumstances into the future. Possible lifestyle change will be explored within the context of a variety of external factors, including: social, technological, economic, political, psychological, and environmental factors.

An extensive methodology has been outlined in this paper, which is aimed at building a set of robust and plausible scenarios to depict lifestyles through to 2030 under a variety of circumstances. To determine what those circumstances shall be, a series of initial interviews will be held with members of the RESOLVE group, before a collective meeting in which two key uncertainties shall be identified. These two key factors will then form the axes of a working framework to facilitate in the interviewing of up to 20 external experts. The experts' advice will be sought on relevance of the framework itself as well as on the possible pathways of issues and trends within this. Over the course of the external interviews, the framework will become solidified until it is suitable for use in a series of stakeholder workshops with members of the public, policy-makers and business leaders. This will ensure that the role of different actors in society is directly addressed within the study, including the potential for conflict between different actors or groups. Having conducted these stages, it will then be possible to build a set of scenario narratives to depict the carbon-intensity of UK lifestyles under a variety of conditions through to 2030. Finally, within each of the scenarios, a series of personas will portray fictional individuals and the particular paths taken by them over this period.

Foresighting activities, including scenario studies, play an ever increasing role in the policy and decision making process. It is intended that these scenarios should make a unique contribution to this process by introducing lifestyles and behaviour change where previous scenario studies have tended to sidestep or generalise this key issue. As a result, it is hoped that policy and decision makers will be facilitated in identifying appropriate points of intervention aimed at reducing the carbon-intensity of our consumption activities.

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