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Transforming the UK Energy System: Public Values, Attitudes and Acceptability

Summary findings from a survey conducted August 2012

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Executive Summary

This report summarises key findings from a nationally representative British survey, n=2441, carried out in August 2012 as part of an interdisciplinary UKERC research project: Transforming the UK energy system - Public values, attitudes and acceptability.

Perceptions of energy system change and its drivers

We find that people want significant change in the UK energy system and agree that changes need to occur both in the way energy is produced and used. Perhaps unsurprisingly, national governments are seen to be responsible for ensuring appropriate changes are made in supply and demand sectors.

The British public are highly concerned about each of the key drivers of energy policy - climate change, aspects of energy security and affordability. Although we find concern is high for all three issues, affordability in the form of household energy bills is considered most important. Concerns relating to secure long-term supplies to prevent shortages in energy (fuel, electricity) are also very high however. When directly compared, climate change is considered less important than energy security or affordability. Nonetheless it is unlikely that a majority of our respondents would accept an energy future in which one long-term goal is significantly traded-off against another.

Perceptions of key energy supply options

Fossil fuels are generally viewed unfavourably and hence respondents identify a need to reduce reliance on fossil fuels. These fuels are perceived to be finite, insecure, imported, costly and environmentally harmful. Knowledge of carbon capture and storage technology is relatively low among our survey respondents and we find that the British public is split on the role it should play in the UK energy system. This may be because it only partly addresses people's concerns about fossil fuels (e.g. it addresses climate change concerns but not concerns about dependence on finite sources).

Renewable energy technologies are viewed favourably by a large majority of respondents in this survey (though biomass is slightly less favourable than others). There is significant support for the inclusion of wind farms in Britain's energy future, particularly for the use of offshore wind farms. Although wind energy is associated with a range of positive notions (clean, safe), strong support for wind energy should not be taken for granted. This is evidenced by mixed views around the specific use and location of wind farms (e.g. whether they are ugly, suitable for all areas, and have impacts on nearby communities).

Opinions over the inclusion of nuclear power in the UK energy system are mixed. Although nuclear power is generally viewed unfavourably, there is some support for the replacement of existing nuclear power stations. We suggest that acceptance of nuclear power within Britain's future energy system is conditional at best and is likely to depend on other situational features of change. A majority of respondents would oppose a new nuclear power station in their area, which is associated with perceptions of nuclear power being a hazard to human health and creating dangerous waste.

Perceptions of electrification options

In principle, the respondents in this survey are willing to consider using electric options with regards to cooking, heating and driving, if certain conditions are met. Comparative running costs play a particularly important role in influencing preferences for these electric options compared to more conventional models. As such cost may be a minimum requirement for acceptance of these technologies, especially if performance and other factors (comfort, convenience, status, etc.) are judged to be lower as well. This is particularly pronounced for perceptions of electric heating.

Perceptions of energy demand options

We find strong support for the idea of overall demand reduction in the UK as a whole, which is linked to notions around wasting less and being more resource efficient. In principle, over two thirds of respondents are willing to play a personal part in reducing energy use, if supported in some way. Support is crucial in transforming this will into action.

We find that a majority of people are interested in further information about their energy use and willing to think about their energy use more than is currently the case. There is also a belief that having this information will help them reduce their personal energy usage.

The British public are highly concerned about each of the key drivers of energy policy… affordability in the form of household energy bills is considered most important.

We also find that people are broadly willing to share their energy use data although a significant proportion of respondents had concerns about this, indicating that willingness to share data is likely to be conditional. We also find a substantial proportion of people that are not willing to share their energy data with anyone. More people are willing to share their data with energy companies than with government organisations. An independent energy regulator appears to be most trusted.

Our data with regards to automation and remote interference with energy use were mixed and highly dependent on the context and situation-specific characteristics. Automation may be considered positively to the extent it enables an easy way of reducing personal energy use, however the retention of control is particularly important within certain highly valued situations, e.g. food storage, showering.

Acknowledgements

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Introduction

1

Energy system change bears upon multiple long-term national policy goals, including the transition to a low carbon economy, energy security and affordability, and mitigating wider environmental impacts. Significant interrelated transformations in the way the UK supplies, manages and consumes its energy will be essential if these aims are to be attained (UK Energy Research Centre, UKERC 2013; Department of Energy and Climate Change, DECC 2011; International Energy Agency, 2010).

This major process of transformation entails considerable uncertainties and contingencies. One aspect of change about which there are wide-ranging uncertainties is that of public attitudes and acceptability - of critical importance in processes of whole energy systems transformation, with the potential to present both opportunities and challenges for the delivery of energy policy and change across multiple areas. For example, considering public values can improve decision-making (particularly if considered early in the process), can avoid views becoming entrenched, and potentially helps to improve dialogue and identify points of significant future conflict.

In this report we examine public perceptions of key issues with regards to whole energy system transformations. The primary aim of this report is to present topline findings of a survey conducted in August 2012 as part of a wider interdisciplinary project on public values, attitudes and acceptability of whole energy system change. The overarching objectives of this project are listed on the right hand side of this page. These objectives are addressed through three separate but interlinked empirical work packages; including targeted interviews with stakeholders, public deliberative workshops (Butler, Parkhill and Pidgeon, 2013), and the current national survey. The findings from this survey (WP3) therefore provide a generalisable data set on UK-wide public perceptions, attitudes and acceptance of key issues within future energy system change, but also form part of the wider project data sets - including detailed qualitative data from experts and publics (WP1, 2).

Transforming the UK Energy System: Public Values, Attitudes and Acceptability – Project Objectives

1. Identify the degrees of public acceptability of whole energy system transformation, in particular identifying important trade-offs.
2. Build knowledge and understanding of public attitudes, values and acceptability in order to support development of sustainable transitions in the energy sector.
3. Create qualitative and quantitative data sets for examination of the perspectives of varied publics across the UK on whole energy system transitions.
4. Develop and utilise innovative methodological approaches for examining public values, attitudes and acceptability.

Transforming the UK Energy System: Public Values, Attitudes and Acceptability – Project Work Packages

WP 1: All Parties

Scenario Adaptation, Expert Consultation and Material Development.

WP 2: Butler, Parkhill & Pidgeon

Deliberating Energy System Scenarios and Trade-offs

WP 3: Demski, Spence, Pidgeon & Whitmarsh

Innovative national survey on whole energy system transformations

Survey construction and content

The national survey presented in this report covers a large range of issues relevant to energy system change. Some of the findings in this report can be embedded into existing research in the field (e.g. climate change perceptions), however many of the current survey findings concern public perspectives that are not yet well understood.

In constructing the current survey, we particularly draw on previous research from the domain of public perceptions towards climate change and energy supply technologies. The current team have been involved in previous national surveys in this area, in particular a 2005 survey exploring public perceptions of nuclear power, energy options and climate change in the UK (Poortinga et al., 2006) and in 2010 a survey exploring public perceptions of energy and climate change (Spence et al., 2010). Although we draw upon these to interpret and provide context for the current survey findings, a direct comparison is not the aim here[1].

Other aspects of energy system change are relatively novel, and research in this area is limited (e.g. around demand side management, Mert et al., 2008). In addition, some of these issues are likely to be unfamiliar to the public and therefore the findings provide initial reactions rather than fully formed views on these topics. These responses, although likely changeable depending on the specific context, do provide insight into the kinds of things people draw on to inform their responses (Lichtenstein & Slovic, 2006). As such the questionnaire has been carefully designed to keep this in mind.

The project in which this survey is embedded employs a novel 'whole energy system' lens. To date, research has focussed on what the public think about individual energy supply technologies (e.g. wind energy) or issues (e.g. heating, transport) but has not examined how the public understand both supply and demand sides of the energy system and the relationships between them.

Although methodologically it is difficult to conduct a survey keeping the whole system in mind at all times, questions have been constructed to examine basic preferences and acceptability as well as their conditionality, attached concerns, and the contexts in which preferences might differ. This explicit framing allows us to draw inferences about public perceptions and acceptability beyond simple support for and opposition towards proposed changes. Questions were also designed to examine perceptions at a lower or more specific level, for example attitudes towards the inclusion of specific technologies, and at a more super-ordinate level such as preferences for overall demand versus supply-side changes.

The questionnaire findings will also be combined with additional data sets collected as part of the overarching UKERC project (See Section 8 'after note'). Nonetheless, the topline findings presented in this report already provide a basis for examining how the British public views major energy system transformations, what the major obstacles might be and where opportunities for change exist. Specific issues examined in this report include attitudes towards:

- Energy policy frames, i.e. climate change, energy security and affordability
- Key supply options (e.g. nuclear power, renewables, carbon capture and storage)
- The role of electrification in energy futures
- Demand management and reduction at national and personal levels
- Overall system change including preference for changing the way we produce vs. use energy

This report is intended to be used as a reference for relevant stakeholders involved in UK energy transitions. Note that there are several aspects of this survey that will be developed in future analyses and publications. In addition to the further theoretical interrogation of the data we will examine group differences in public perceptions enabled by our oversampling in Scotland and Wales and inclusion of a number of demographic and psychological individual differences. In addition, the findings in this report do not include responses to the My2050 tool used in the middle part of the survey procedure (see method section). Respondents' completion of the My2050 tool (including created 'energy futures' and how these are impacted by different framings) will be analysed in-depth in an additional publication.

The remainder of the report is divided into several sections including methodological details and five sections on findings. It concludes with a discussion of the key findings. Raw topline data is included as Appendix B to this report.

[1]It should also be noted that Poortinga et al. (2006) and Spence et al. (2010) employed different methodologies to the current survey (face-to-face versus online here) which means direct comparisons should only be made with caution. Additionally, the framings of the surveys differ; i.e. order of topics within the survey, overall set up and information provided to the respondents.

Methodology

2

Survey Procedure and Questionnaire

A national survey instrument was developed by Cardiff University in consultation with Ipsos MORI in order to examine public perceptions of the UK energy system and its future development. Data was collected for this online quantitative survey between 2nd and 12th August, 2012 by Ipsos MORI. Electronic script routing was included in the questionnaire in order to ensure that respondents were only asked questions of relevance to them.

The survey was made up of three parts. The main questionnaire (part 1) included questions on perceptions of key issues relevant to energy system change and energy futures including views on

1. policy framings such as climate change, energy security and affordability
2. key energy supply options including fossil fuels, nuclear power and wind energy
3. electrification of cooking, driving and heating
4. demand reduction and demand side management issues, and
5. overall system change. All the questions and additional text presented to respondents (in order) can be found alongside the topline findings in Appendix B.

After the main questionnaire, respondents were asked to complete a version of 'My2050'[2] (part 2), an online tool developed by the Department for Energy and Climate Change (DECC) and Sciencewise-ERC to engage people with UK energy system transitions. They were then asked to answer some follow-up questions (part 3). The findings in this report are taken from the main questionnaire (part 1). Responses to the My2050 tool and relevant follow-up questions will be reported separately.

Overall questionnaire length, including the My2050 tool, was designed to take approximately 45 minutes to complete with 30 minutes for the initial questionnaire and 15 minutes for the My2050 tool and following questions. The median length of time it took respondents to complete the survey was 48 minutes[3].

Respondents and Sample Characteristics

A nationally representative quota sample of the British population (i.e. England, Scotland, Wales) aged 18 years and older completed the online survey (n=2,441). All respondents were taken from the Ipsos MORI Access Panel (see Appendix A for further information about the panel's recruitment and maintenance). Panellists were recruited using an email invitation including a link to the online questionnaire. The email contained information about the length of survey and incentive points. Quotas were monitored on a daily basis during fieldwork and reminder emails were sent to all panellists who had not completed the survey. Quotas were set according to key socio-demographic variables including gender, geographic region, age, and employment status.

Table 1 shows a breakdown of the unweighted and weighted samples. (Further characteristics of the sample can be found in Appendix B, Q65-72a.) The findings from the British sample of 2,441 are based on the core sample to which the Wales and Scotland booster samples are added. The data were then weighted to the profile of the known British population on the basis of gender, age, employment status and geographic region. Quota data were based on Labour Force Survey statistics from 2006 (the most recently available data for all these variables).

Reported results at the sample size of 2,441 are accurate to within +/- 2.0% (the full confidence intervals are 1.2% at a 10% or 90% finding, 1.8% at a 30%/70% finding and 2.0% at a 50% finding).

The drop-out rate (22%) was in line with other surveys of this kind (length and topic) and evenly distributed across all sections of the survey. Response rates are not indicative when using online quota-sampling as non-response cannot be easily defined and demographic information should be consulted instead (Dillman, 2007). In addition to the key weighting variables, information is available about educational attainment and social grade for most of the sample. Although a spread in educational attainment and social grade is evident, we acknowledge that on average this sample has achieved a somewhat higher educational attainment when compared to available 2011 census data[4].

[2]The My2050 tool is a simplified representation of the UK energy system which gives respondents a 'whole system' perspective on energy usage and production. This allows them to explore different supply and demand-side options in order to reduce the UK's carbon emissions by 80% compared to 1990. This interactive tool was initially developed by the digital democracy company Delib for the UK Department of Energy and Climate Change and Sciencwise-ERC. A version of this tool can be found here: www.my2050.decc.gov.uk

[3]To allow flexibility in responding to the questionnaire, panellists were allowed to exit the survey and re-enter at a different time point to complete their response. The start and end times only record the points at which the respondent starts the survey and submits their completed response. It therefore includes periods of time when respondents have exited the survey, and in some cases is across more than one day. All respondents who completed the survey in less than 20 minutes were excluded from the final sample for quality control purposes (1.57% of respondents who completed the survey).

[4]Comparisons of educational attainment levels can be made using the 2011 census data for England and Wales (the Scottish data was not available at the time of publication). Note that the census includes persons of age 16+ and the current survey only includes people of age 18+.

Table 1. Characteristics of the 2012 Survey sample (n=2,441 unweighted)

Characteristic	% (un-weighted)	% (weighted)
Gender*		
Male	47	48
Female	53	52
Age*		
18-24	11	11
25-34	16	17
35-44	19	20
45-54	17	17
55-64	20	18
65+	16	18
Region*		
North East	3	4
North West	8	12
Yorkshire and Humberside	6	9
West Midlands	6	9
East Midlands	5	7
East Anglia	6	10
South West	6	9
South East	10	14
Greater London	9	13
Wales	21	5
Scotland	21	9
Employment Status*		
Employed full time	38	39
Employed part-time	13	13
Self-employed	8	8
Unemployed – looking for a job	3	3
Unemployed – not looking for a job/permanently disabled/looking after house/children	16	16
Retired	17	16
In full time education	7	6

Continued on next page

*Variable used for weighting

Table 1. Continued

Characteristic	% (un-weighted)	% (weighted)
Highest Educational Attainment		
Pre GCSE	9	9
A-Levels/Advanced GNVQ	19	19
GCSE/Intermediate GNVQ	17	17
Vocational (NVQ)	5	5
Post-Graduate	15	16
Graduate	33	33
No data	2	2
Social Grade[a]		
A	**2**	**3**
B	**25**	**26**
C1	**32**	**31**
C2	**9**	**9**
D	**10**	**9**
E	**11**	**11**
No data	**11**	**12**

[a]Social grade is a variable computed based on the occupation of the Main Earner (which is the previous occupation for those retired or unemployed and current occupation for others). The Main Earner occupation variable is populated according to ISCO (International Standard Classification of Occupations). Note: this is only a proxy indicator in the current survey and not the same as the full classifications used in face-to-face interviews (e.g. Spence et al. 2010).

Energy Policy Framings

3

The survey begins by examining key beliefs about climate change, and aspects of energy security and affordability. Here we are interested in public perception of these key issues which commonly frame energy policy decisions. The term 'framings' refers to a particular focus or lens through which an issue is understood (e.g., as a 'solution' to a particular problem), or what contextual information is provided (e.g., alternatives). How an issue is framed has been shown to strongly influence perceptions of and responses towards it (Lichtenstein & Slovic, 2006; Spence and Pidgeon, 2010; Corner et al., 2011).

Beliefs about climate change

Previous research suggests that the majority of people (mostly in Europe and the US) believe the world's climate is changing and are concerned about it. However it has also been suggested that concern may have reached its peak in the last few years and that a gradual rise in scepticism has recently been observed in the UK (and several other countries; Poortinga et al., 2011; Smith & Leiserowitz, 2012; Pidgeon, 2012). This is particularly so in relation to anthropogenic causes of climate change although suitable trend data (i.e. tracked questions using identical wording and methodology) is needed to provide evidence of any long-term changes.

We asked respondents a series of questions about their beliefs around climate change (Q3-6 in Appendix B).

- Almost three quarters of respondents are very or fairly concerned about climate change (74%, Figure 1).
- An even higher proportion (79%) of respondents believes that the world's climate is changing. In addition a majority (62%) disagree with the statement 'I am uncertain that climate change is really happening'. These findings suggest that trend scepticism[5] is low and related uncertainty is also quite low in the current sample.
- A substantial majority believe that climate change is at least partly caused by human activity (80%). Furthermore, 57% of respondents believe that most scientists agree that humans are causing climate change. This suggests that attribution scepticism is low in this sample and, again, related uncertainty is quite low as well.
- On the other hand impact scepticism is somewhat higher with 30% of people agreeing that the seriousness of climate change is exaggerated (47% disagree). Uncertainty over impacts is even higher with a majority of the respondents agreeing that it is uncertain what the effects of climate change will be (60%).

Overall our findings are in line with the trend observed in earlier surveys where a reduction in concern and belief in climate change was recorded between 2005 and 2010 (Spence et al., 2010). However, the current data does suggest that both belief in climate change and concern has stabilised in the last few years and not declined further (see also Shuckburgh et al., 2012).

Scepticism and/or uncertainty are somewhat evident around the impacts of climate change, rather than in relation to the existence of climate change or its anthropogenic nature. Uncertainty may manifest itself particularly in relation to the severity and extent of climate change impacts. Previous research has found that psychological distancing may occur in relation to impacts of climate change, where impacts are believed to be more severe for people temporally and geographically removed from us (Spence et al., 2012).

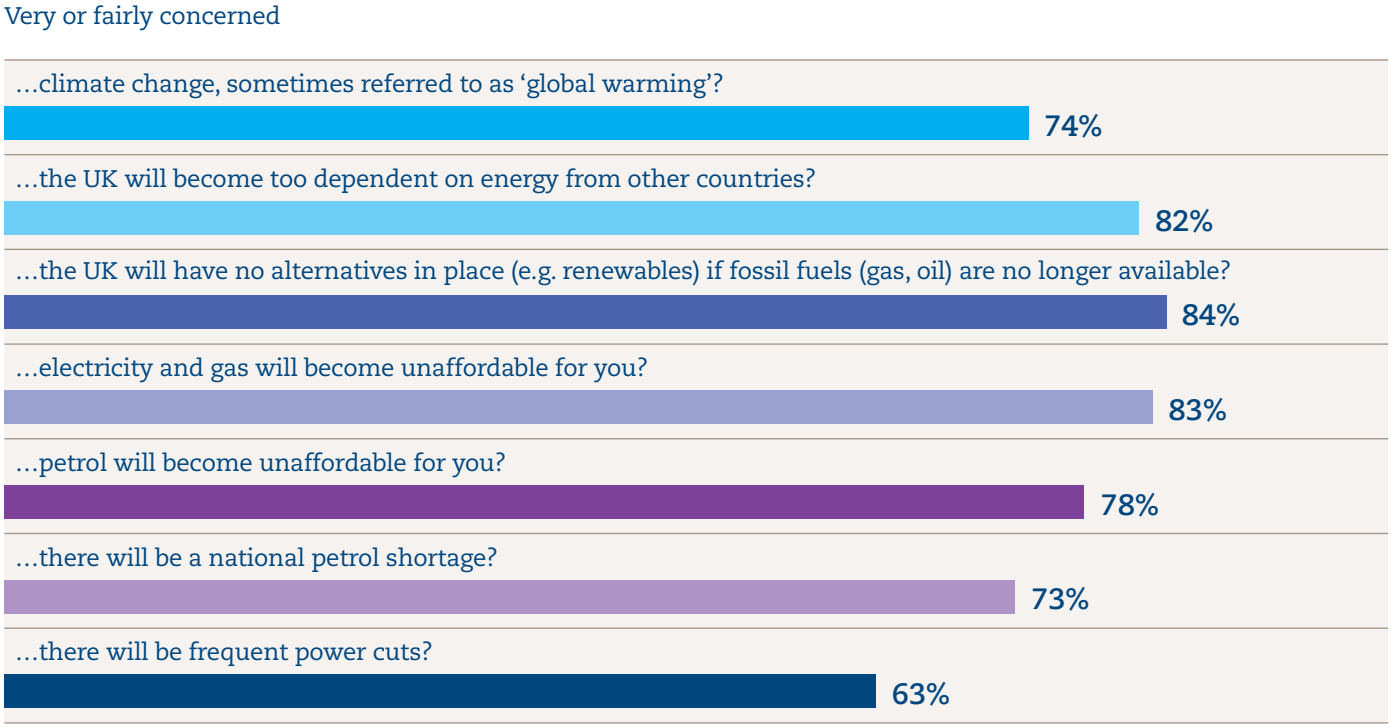
Beliefs about energy security aspects and affordability

Beliefs about energy security have been researched much less than climate change beliefs although when people are explicitly asked to think about energy security, concern has tended to be high (Demski, 2011; Spence et al., 2010). The present data supports previous research and finds that concern is high for all aspects of energy security (as included in this survey, see figure 1, Q7 in Appendix B).

- A large majority is very or fairly concerned about more abstract, long-term future aspects of energy security including dependence on other countries (82%), and having alternatives in place when fossil fuels are no longer available (84%).
- Respondents are also very or fairly concerned about being able to afford electricity and gas (83%). Interestingly, concern over petrol prices (78%) is lower than for electricity and gas, although still notably high.
- Expressed concern is also found for items relating to the interruption of energy services although relatively speaking, this concern is lower than for the other energy security aspects. In this survey, 73% are very or fairly concerned about a national petrol shortage, and a lower percentage (63%) are concerned about frequent power cuts in the next 10-20 years.

[5]Trend scepticism = scepticism about climate change happening (i.e. there is an upward trend in global temperatures); Attribution scepticism = scepticism about climate change being caused by human activity; Impact scepticism = scepticism about anthropogenic climate change causing substantial and detrimental impacts (see Rahmstorf, 2004; Poortinga et al., 2011)

Figure 1. Percentage of respondents very or fairly concerned about climate change and various energy security and affordability aspects (For full question wording see Q3 and Q7 in Appendix B).



These findings show that concern over the price of petrol is lower than for affordability of electricity and gas. In contrast concern over shortages or disruptions is much higher for petrol than for electricity (power cuts). This finding may well be related to the perceived ability to influence costs, as well as previous experiences of shortages or disruptions of fuel.

It is possible that people may perceive a greater sense of collective ability to act against rises in petrol costs compared to other fuel costs. People may also perceive a greater ability to avoid incurring the cost of petrol, for example by using alternative transport options. In contrast, experiences of fuel protests, and the threat of petrol shortages, are still fairly recent in the UK (e.g. queues at petrol stations; BBC News, 2012). As such people may have greater experience (and memories) with regards to fuel shortages compared to electricity shortages. Disruptions to electricity services (e.g. extended power cuts) may therefore seem less likely or relevant (and hence less concerning) compared to petrol shortages.

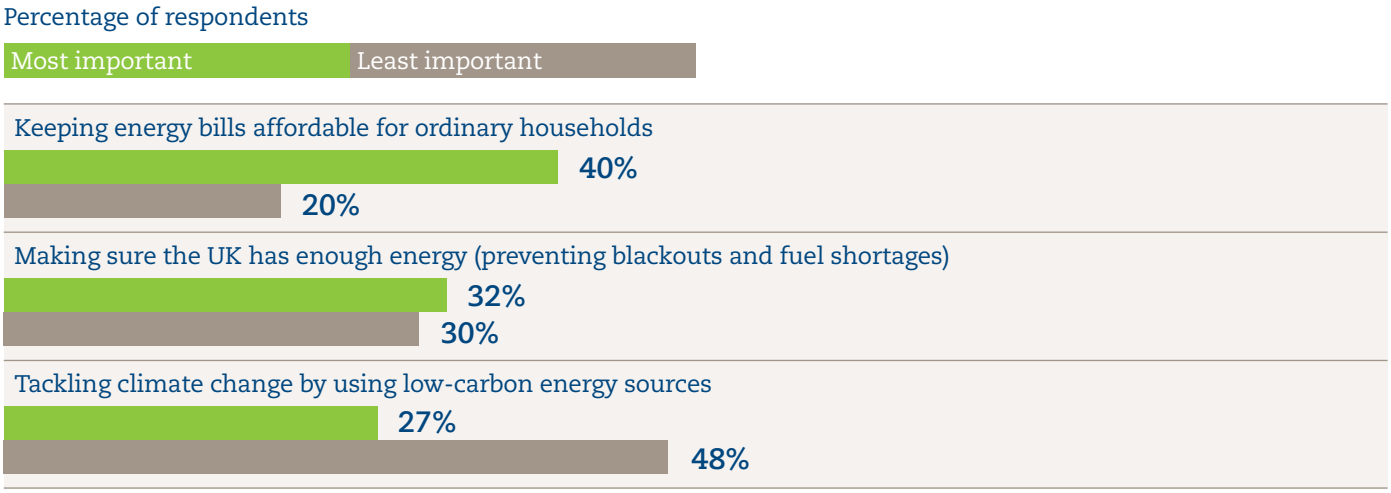
These findings show that concern over the price of petrol is lower than for affordability of electricity and gas.

Policy priorities and importance

Public concern over the three key issues in energy policy – climate change, energy security and affordability – is generally high as the previous sections have shown. We also asked respondents to directly compare the importance of these issues (Q8 in Appendix B, Figure 2):

- Keeping energy bills affordable is seen as the most important priority (40%), followed by making sure the UK has enough energy (32%).
- Climate change is rated as least important by almost half of the survey respondents (48%) suggesting that when placed in direct contrast to more pressing or currently relevant issues, climate change is seen as less significant.

Figure 2. Percentage of respondents ranking each policy issue as most and least important (Q8 in Appendix B).



Summary of findings

The British public are highly concerned about each of the key drivers of energy policy – climate change, aspects of energy security and affordability. When directly compared, climate change is considered less important than energy security or affordability. This is in line with findings that environmental issues are generally less salient or concerning compared to other economic or social issues (Weber, 2010). The current "issue importance" of climate change and environmental issues may be particularly low in the context of the economic downturn, coupled with strong concerns about increasing energy prices.



Key Energy Supply Options

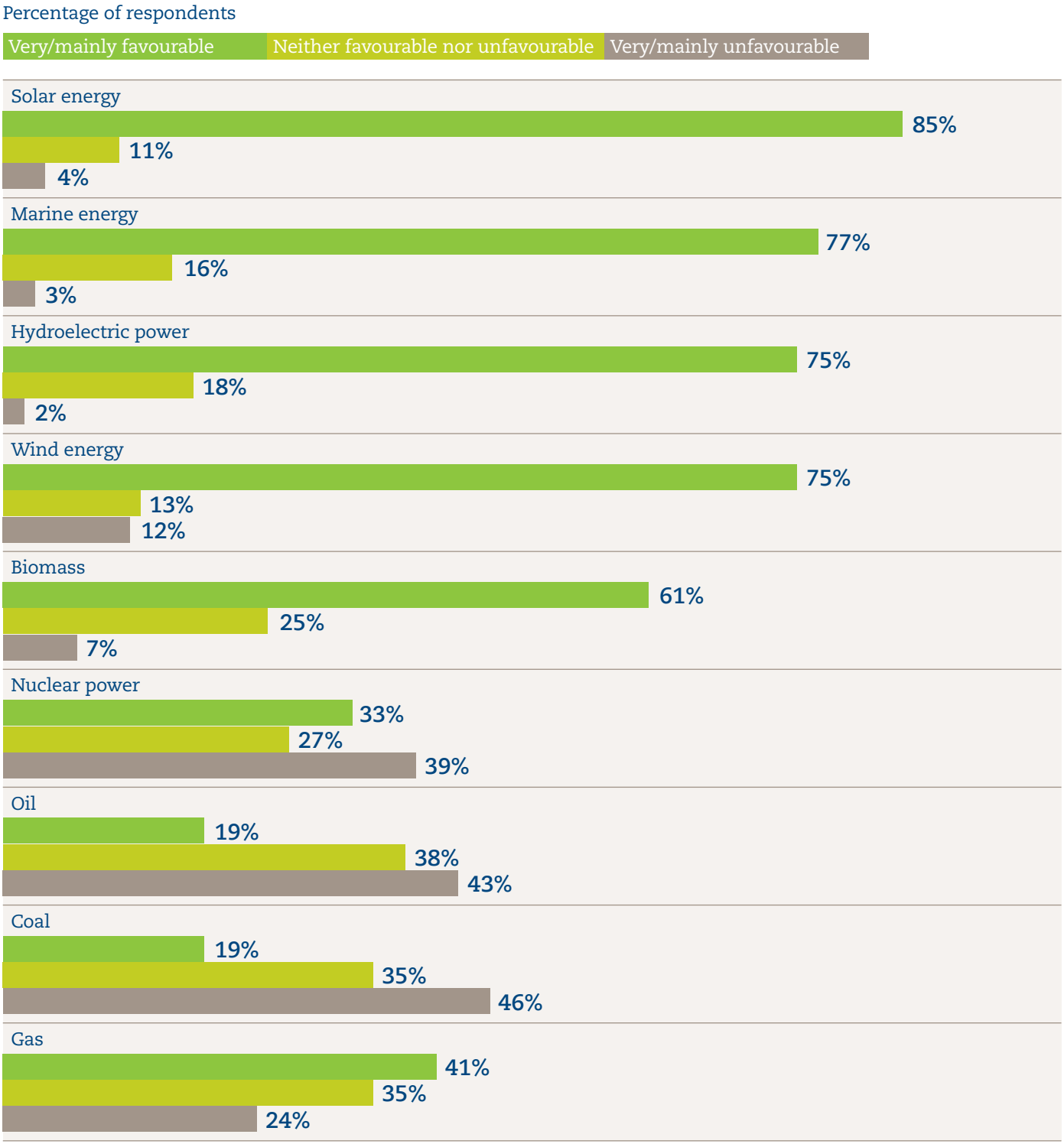
4

The survey examines favourability towards a diverse range of energy sources, and goes on to explore preferences with regards to the role of fossil fuels, nuclear power and wind energy in more detail.

Favourability towards different forms of electricity generation

We explored attitudes towards different forms of electricity generation (Figure 3; Q1 in Appendix B). Findings are generally in line with previous surveys (e.g. Spence et al., 2010; Whitmarsh et al., 2011):

Figure 3. Favourability towards energy sources for electricity generation (Q1 in Appendix B).



- Generally, renewable energy technologies are highly favoured by a majority of the respondents in our survey, and this is most evident for solar power (85%); although marine (77%), wind (75%) and hydroelectric (75%) energy are also viewed favourably by three quarters of the respondents.
- Biomass is lagging slightly behind the other renewable technologies in terms of favourability (61%). It is potentially less closely associated with the central perceived characteristics of renewable energy (i.e. clean, infinite) and more closely associated with attributes of other fuels that are burnt (i.e. fossil fuels; also see Demski, 2011 and Butler et al., 2013). Biomass is also more likely not to have been heard of (6%) compared to other renewable energy technologies.
- Coal and oil are the least favourable forms of electricity generation (both 19%). Gas is judged more favourable (41%) than unfavourable (24%), which might be linked to its general perception of being relatively cheap and clean compared to coal and oil.
- The public is relatively split on their attitudes towards nuclear power although they are slightly more unfavourable (39%) than favourable (33%).

Beliefs and attitudes towards fossil fuels and carbon capture and storage

This survey focused on energy system change in particular, and a major part of such a transition in current UK energy policy would include moving away from a fossil fuel-based energy system. A move away from fossil fuels would reduce carbon emissions as well as dependence on non-renewable forms of energy production. The potential use of carbon capture and storage (CCS) is a key issue here (Q9-Q12 in Appendix B).

- A large majority agree that the UK should reduce its use of fossil fuels (79%).
- The majority has either never heard of CCS (42%), or know next to nothing about it (26%), only 9% report knowing a great deal or a fair amount.

Table 2. Motivations underlying the need to reduce fossil fuel use in the UK

The table below summarises the main findings from an open-ended question (Q10)[1] following agreement/ disagreement with the notion of reducing fossil fuel use in the UK (Q9)[2]. The answers presented in the table pertain to the 79% of the sample (1,930 respondents[3]) that agreed that the UK should reduce its use of fossil fuels, and therefore provide an indication of the underlying motivations that drive this view. Respondents could provide more than one reason and therefore percentages in the table do not sum to 100.

Responses were coded into overarching concepts and are presented below (Table 2). Codes were not designed to represent completely separate categories but rather key reasons for why fossil fuels should be reduced. As such links were evident in responses; e.g. fossil fuels are seen as a finite resource, and their finite nature also makes them increasingly expensive to extract over time. As evident in the table below, two clear categories emerged as dominant (fossil fuels are running out and are environmentally harmful), with a particular focus on the finite and unsustainable nature of fossil fuels.

The need to reduce fossil fuels in the UK – underlying reasons	Total %
Fossil fuels are 'finite'/running out/unsustainable/not renewable	48%
Fossil fuels being harmful for the environment/pollution/dirty/not clean	19%
Fossil fuels causing climate change/global warming	17%
Cost associated with fossil fuels/expensive	7%
Dependence on imports/other countries to obtain fossil fuels	5%
Other sources are better and available/fossil fuels as old way of doing things	5%
Negative association with fossil fuel industry/governance (e.g. conflicts)	1%
Other (mix of very nuanced opinions and very generic comments, e.g. 'it's important to reduce')	9%
Don't know/No opinion/No response	2%
Unclassified answer (e.g. unrelated/unclear comments)	4%

Base: 1,930 respondents

[1]Q10 "Why have you given this answer?"

[2]Q9 "To what extent do you agree or disagree that the UK should reduce its use of fossil fuels?"

[3]Note that this sample is unweighted for the open-ended answers and therefore contains a disproportionate amount of respondents from Wales and Scotland (see Table 1). The percentage of respondents who agree that the UK should reduce its use of fossil fuels is not significantly different in the weighted and unweighted samples.

- When given a brief description of CCS[6] and asked about the potential continued use of fossil fuels with CCS, more people support (36%) than oppose this idea (21%). Though perhaps unsurprisingly, just under half of respondents either 'don't know' (12%) or 'neither support nor oppose' (31%) this idea.

Support for reduction of fossil fuels is in line with other findings within this survey, i.e. low favourability towards fossil fuels compared to renewables, and prioritising changes to energy production within energy policy[7]. Interestingly, a slight majority of people who express an opinion on CCS support the continued use of fossil fuels with CCS. However, the majority of respondents do not provide an opinion here, which is in line with two thirds reporting next to no knowledge about the technology.

The potential support for the use of CCS by just over a third of our respondents suggests that carbon emissions might be one of the main reasons why people want to reduce the UK's reliance on fossil fuels. Although we find this to be true in more qualitative data collected as part of this survey (see Table 2), we find that motivations behind a desire to reduce fossil fuels are not based on climate change alone and focus more on a desire to reduce the perceived negative consequences of relying heavily on finite sources and imports. Therefore, although climate change motivations and framings of CCS might play a role, they are unlikely to be the only or strongest predictor of acceptability. In line with this, previous research has shown that support for CCS is conditional at best when framed in terms of climate change, and serious local opposition has been recorded in countries that have implemented CCS projects (De Best-Waldhober et al., 2009; Dütschke, 2011).

In addition we note that because CCS is an unfamiliar technology, public perceptions are heavily influenced by the information and framing provided by the researchers (Malone et al., 2010). In this survey the description of CCS was constructed very carefully in consultation with a range of experts; preference instability is nonetheless to be expected.

Beliefs and attitudes towards nuclear power

Unconditional acceptance of nuclear power as a form of electricity production is generally found to be low among the British public. We found that the public is split in terms of their favourability towards and support for nuclear power, and concerns are expressed in relation to disposal of radioactive waste and the risk of accidents. This is in line with previous research (e.g. Pidgeon et al., 2008; Poortinga et al., 2006).

Although previous evidence has indicated that the accident at the Fukushima Daiichi Nuclear Power Plant in Japan in March 2011 did result in a drop in public support for nuclear power in the UK, recent findings indicate that this is not a lasting effect. Public support has subsequently returned to levels seen just prior to the Fukushima accident (Ipsos MORI, 2012b).

We examined a range of different perceptions about nuclear power, and what role it might play in the UK's future energy system (Q13-Q16 in Appendix B):

- Nuclear power is perceived to cause dangerous waste (75%), to be a hazard to human health (52%), to pose risks to wildlife (45%), and to spoil the landscape (40%). However, it is also perceived to produce a reliable electricity supply (68%).
- A relatively large proportion of respondents disagrees with the notion that nuclear power causes climate change (37%); however one in five (21%) still agree with this statement. This finding indicates that misconceptions regarding nuclear power still persist, although it is also possible that some respondents were considering embedded carbon (e.g., that produced in constructing power stations) in addition to emission-based carbon.
- In terms of nuclear power's role in the UK's energy future, public opinion is relatively split. About a third (32%) does not think existing nuclear power stations should be replaced (although only 9% prefer that nuclear power stations be stopped immediately). Conversely, 26% of respondents think existing nuclear power stations should be replaced with new ones, and a further 21% think the number of nuclear power stations should increase.

[6]Question 11 in Appendix B

[7]Question 2 in Appendix B

- However, a majority of respondents would oppose a new nuclear power station in their area (54%) which is perhaps connected with perceptions of nuclear power being unsafe, a hazard to human health and causing dangerous waste.
- Framing nuclear power in terms of different energy policy drivers or supply combinations increases the acceptance of nuclear power as part of the UK energy system. This is most pronounced when it is positioned in terms of being developed alongside renewable energy resources (66%).
- Slightly more people think that continued use of fossil fuels with CCS is a better way of tackling climate change than using nuclear power (30% versus 22%). However there is a large proportion of neutral (32%) and don't know (16%) responses here; this is not surprising given the unfamiliarity of CCS and the difficulty of making such a comparison.

Our results indicate that risk perceptions of nuclear power are still high, especially around the production of nuclear waste. Interestingly, a significant proportion of people also believe nuclear power partly causes climate change. The public is undecided on whether nuclear should play a part in Britain's energy mix. Notably, acceptance is higher if nuclear power is placed in the context of an overall energy mix. Depending on which framing is used, public acceptability of nuclear power can increase (if framed as tackling climate change and energy security) and decrease (e.g. when placed in contrast with renewables). Although some support for a role of nuclear power in energy futures is evident, a majority are not prepared to host a new nuclear power station in their area.

Beliefs and attitudes towards wind energy

Previous survey research suggests that wind energy is one of the most familiar sources of renewable energy and that the UK public is favourable towards its use (McGowen & Sauter, 2005; DECC, 2009a). This finding has been consistent over the last decade although in more recent years increasing attention has been paid to opposition to wind farms both in academic literature (e.g. Devine-Wright, 2010; Bell et al., 2005) and in political and media debates. As with nuclear power, we asked respondents about their perceptions of wind energy, as well as to what extent they support different forms of wind energy (Q17-Q22 in Appendix B):

- Wind energy is seen as clean (88%), safe (81%), and good for the economy (58%).
- No significant risks were identified for wind energy, although there were mixed views on whether wind farms look ugly, spoil the landscape, or are good for communities nearby.
- We find substantial support for building wind farms. Offshore wind farms attract significantly more support (79%) than onshore wind farms (63%) with low opposition to both.
- A majority of respondents would also support a wind farm in their area (57%).
- As such, over half of the respondents believe Britain should make extensive use of wind farms as part of its energy future (54%), and very few believe Britain should not build any more wind farms (9%).

We note that there is substantial support for wind energy (both onshore and offshore) in terms of Britain's energy future. However, this general support should not be taken for granted particularly because mixed views are evident in relation to the local siting of wind farms. Attention should be paid to the specific local context in which wind farms are to be implemented, including location, ownership and fair process (e.g. Devine-Wright, 2010; Pidgeon and Demski, 2012). This would ensure that the positive values attached to wind energy are realised in practice.

Summary of findings

Most survey respondents would clearly favour a move away from fossil fuel energy production towards the use of other energy sources. The role of CCS within energy system change is unclear because of its unfamiliar nature. It appears to only partly address people's concerns about fossil fuels (e.g. carbon emissions are reduced but it involves continued dependence on finite sources).

Similarly, nuclear power is somewhat supported in the context of addressing climate change and energy security but the siting of new nuclear power stations would most likely face opposition, especially on sites without a history of such operations. In contrast, support for wind farms remains high. A move to renewables generally is seen as desirable and aligns with underlying support for system change held by the majority of the British public (also see section 7). However, this of course does not mean there are no qualifications and concerns attached to these preferred options of energy production.

Electrification

5

Willingness to use electric options (cooking, heating and driving)

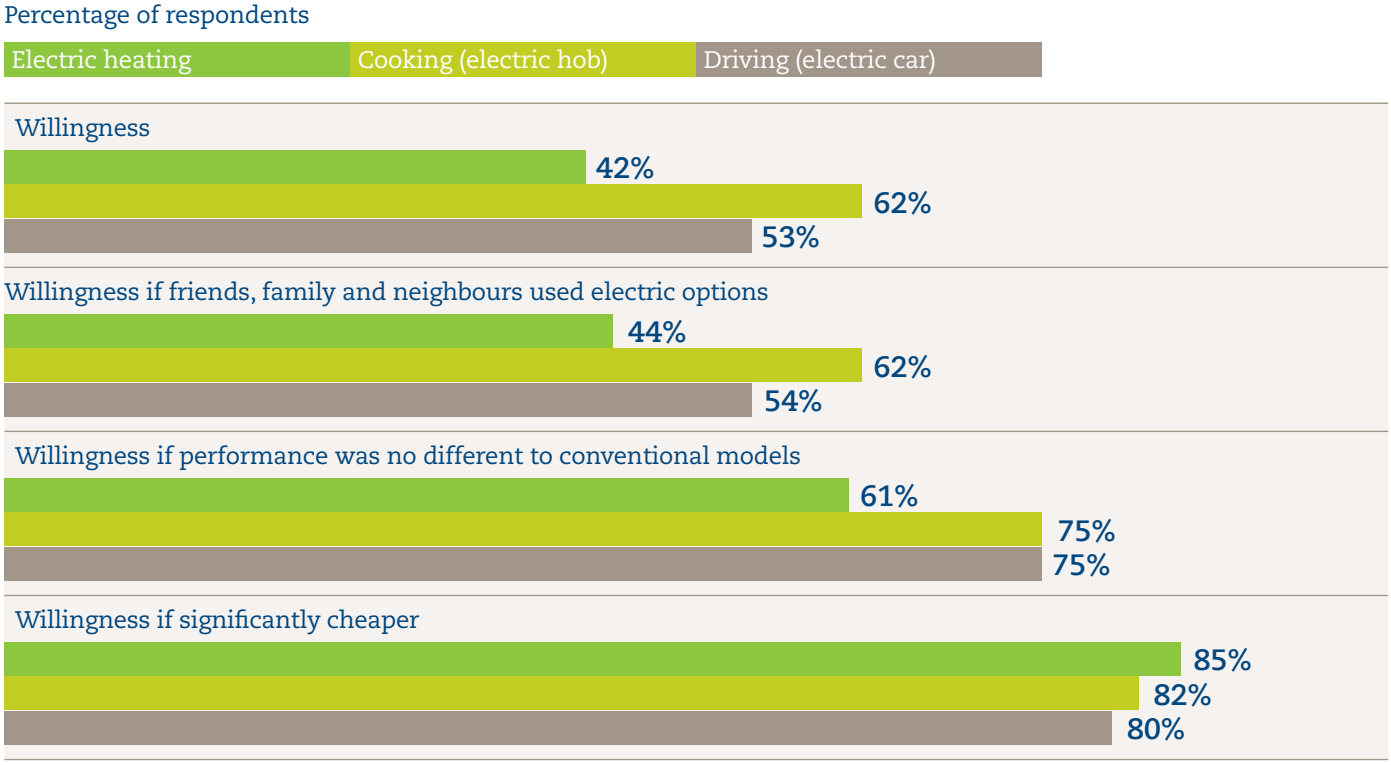
The transport and heating sectors are currently very reliant on oil and gas respectively. Electrification of these would provide a significant level of decarbonisation if accompanied by a low-carbon electricity supply. This in turn would help to reduce carbon emissions and simultaneously reduce dependence on fossil fuels (DECC, 2009b; UKERC, 2013).

Moving towards a more electric future would entail significant changes in the domestic sector. Particularly for heating and driving, electric options currently only account for a fraction of the market share (DECC, 2011). We explored public acceptability of electric heating, cooking and driving, and how acceptance may be impacted by societal factors (Q23-Q37 in Appendix B).

- A slight majority of respondents generally felt positive about cooking with electricity (60%) and driving an electric car (54%). Feelings towards electric heating were much more diverse with only 36% reporting positive feelings.
- We asked respondents how willing they would be to use electric options for cooking, heating and for their car (Figure 4):
- A majority of respondents were willing to cook with electricity (using an electric hob, 62%). Initial willingness was lower for driving an electric car (53%) and for using electric heating (42%).
- Willingness to cook, heat or drive using electricity did not increase if it was explicitly stated that friends, family and neighbours were also doing so.
- Willingness did increase conditional upon performance of the electric option matching that of existing models. This increase was especially noticeable for electric cars (increase from 53% initial willingness to 75%). Willingness to use electric heating (if performance matches existing models) still lags behind cooking and driving options though (61%).
- If electric options are cheaper than the current standards, an overwhelming majority indicates willingness to use them. At this point, all three (heating, cooking, driving) are at, or above, 80% willingness. Notably, electric heating now has the highest willingness of 85% (doubled from initial willingness of 42%).

Figure 4. Percentage of respondents willing to cook, heat, or drive using electricity.

Please refer to Appendix B for exact wording of questions (Q24-27, electric heating; Q29-32, electric hob; Q34-37, electric car).



From these results, it certainly seems that if electric options are significantly cheaper than alternatives, then, in principle, a large majority of the public is willing to use them. With respect to electric heating these results are particularly interesting, finding relatively low willingness initially but reaching high levels of potential willingness if cost (and performance) is addressed. These findings suggest that electric heating may be viewed as an expensive and inefficient way of heating currently, which is likely to impact or impede public engagement with electric heating models in the future.[8]

These findings are in line with other research showing that electric options are evaluated in direct relation to existing technologies. In particular, electric heating may face additional challenges due to the stigma attached to current models of electric heating as inefficient and expensive, especially when compared to conventional gas heating. Similarly, gas hobs and ovens are often preferred due to their quick response (Hoggett et al., 2011; Butler et al., 2013). These are qualities that are likely to continue to be valued in the future.

For electric cars, previous research shows that there is still relatively low knowledge about electric car options. Barriers to widespread adoption of electric vehicles include high cost, the perceived unproven nature of the technology, concerns that current models will become obsolete and perceived poor performance in comparison to combustion models (e.g. range, charging facilities, speed; Graham-Rowe et al., 2012; Franke et al., 2012; Butler et al., 2013). The current findings demonstrate that if some of these factors – performance and cost - are addressed directly, a large proportion of the public would consider using them.

Summary of findings

In principle, the British public is willing to consider using electric options with regards to cooking, heating and driving if certain conditions are met. Comparative running costs and perceived performance play a particularly important role in influencing preferences for these electric options compared to more conventional models. Cost may be a minimum requirement for acceptance of these technologies, especially if performance and other factors (comfort, convenience, status, etc.) are judged to be lower as well. This is particularly pronounced for perceptions of electric heating.

[8]It should also be noted that any future electrification of heating is likely to involve technologies like heat-pumps rather than relying on existing technologies like storage heaters (DECC, 2011). Heat-pumps are however a very unfamiliar technology to the public and it is unlikely that heat-pumps were thought about when answering these questions. Instead people are likely to have drawn on their experiences with existing electric systems (Butler et al., 2013).

Energy Demand Options

6

The survey examines public perception of both demand reduction and demand management options through a series of linked questions.

Attitudes towards demand reduction

In this section of the survey we asked respondents about the role demand reduction should play in Britain's energy future, as well as their willingness to reduce personal energy use (Q38-Q40a in Appendix B):

- A substantial majority of respondents think Britain should reduce its energy use (73%) and only very few respondents think Britain should allow its overall energy use to increase (3%).

Table 3 describes responses to an open-ended question probing why people thought we should reduce our energy use. A wide range of responses is evident, although the perception of waste and unnecessary use of energy was a prominent theme. Reasons pertaining to the finite nature of current energy sources, their effect on the environment, and costs were also evident.

- We find that 81% want to reduce their personal energy use; although only 58% are prepared to greatly reduce their energy use.
- Moreover, 73% of respondents indicate willingness to greatly reduce their energy use if support is available.
- Only 27% agree that they are not able to reduce their energy use any further.

Table 3. Motivations underlying the need to reduce overall energy use in Britain

The table below summarises the main findings from an open-ended question (Q39)[1] following a question about Britain's overall energy use (Q38)[2].

The answers presented in the table pertain to the 73% of the sample (1,764 respondents[3]) that chose **we should reduce the amount of energy that we use,** and therefore provide an indication of the underlying motivations that drive this view. Respondents could provide more than one reason and therefore percentages in the table do not sum to 100.

Responses were coded into overarching concepts and are presented below (Table 3). Codes were not designed to represent completely separate categories but rather key reasons for why people thought we should reduce our energy use. A wide range of responses is evident, although the perception of waste and unnecessary use of energy was a prominent theme, coupled with thematically related ideas. For example the notion that we use too much energy and that we can reduce our energy use so we should do this, was clear. Reasons pertaining to the finite nature of current energy sources, and their effect on the environment, as well as cost concerns were also evident.

The need to reduce overall energy use in Britain – underlying reasons	Total %
Much energy is wasted, taking it for granted, unnecessary use, too much use	31%
Running out, need to conserve what we have, save resources that are finite	17%
Cost/bills concerns (cost reductions both personally and nationally as a result of reducing energy use, cannot afford to increase energy use)	17%
To help climate change/global warming	13%
Better for the environment/planet	11%
Everyone should reduce, we can reduce, we have responsibility to reduce, little things help so we should do them	9%
Generally unsustainable to keep increasing (because demand is increasing anyway, e.g. through increases in population, gadgets etc.)	5%
Reduce energy, then we need to produce less (e.g. build less power stations, reduce strain on network)	4%
It would help/better for future/it's a good thing	3%
Reduce energy, then we need to import less, it will reduce dependence on other countries	2%
Other	6%
Don't know/No opinion/No response	2%
Unclassified answer (e.g. unrelated/unclear comments)	4%

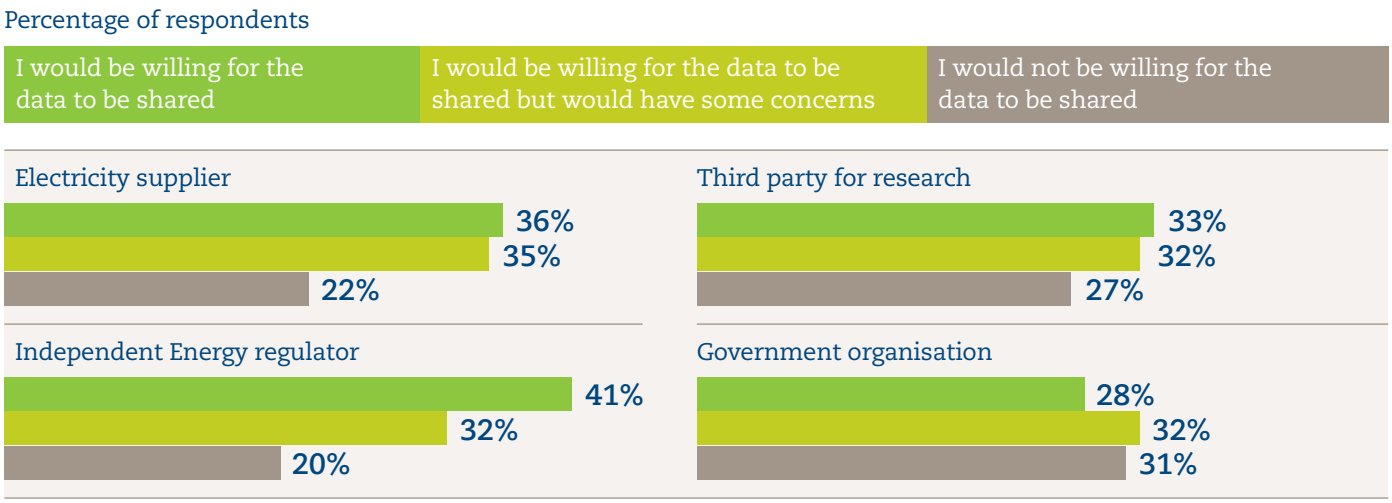
Base: 1,764 respondents

[1]Q39 "Why have you given this answer?"

[2]Q38 "Please select which of the following statements best matches your opinion about Britain's overall energy use. (We should allow our energy use to continue to increase/We should maintain our current levels of energy use/We should reduce the amount of energy that we use/Don't know)"

[3]Note that this sample is unweighted for the open-ended answers and therefore contains a disproportionate amount of respondents from Wales and Scotland (see Table 1). The percentage of respondents who agree that we need to reduce overall energy use in Britain is not significantly different in the weighted and unweighted samples.

Figure 5. Percentage of respondents willing to share smart meter data about their energy usage with four different groups/organisations (Q45 in Appendix B).



- A majority indicate both climate change and cost reasons as equally important motivations for their intended reductions in energy use (58%). From the remaining sample, there are slightly more respondents who want to reduce their energy use to save money (24%) than do for climate change reasons (17%).

These findings show that there is strong general recognition and support for the idea of demand reduction and demand-side change among the British public. A majority is also open to considering playing a personal part in reducing energy use.

We note that previous research has shown that simply a willingness to reduce energy use is not the sole factor which will lead to reductions. We also find that preparedness to act increases significantly if help is available to support people taking personal action. Factors including economic (personal income, cost, etc.), structural (location, home ownership, household size, etc.), and social (status, meaning, identity, etc.) considerations are all known to be important here (Whitmarsh et al., 2011). It is likely that attention to these factors, for example making alternatives more accessible, affordable, and improving quality, is needed and expected before this willingness is translated into action for the majority of people.

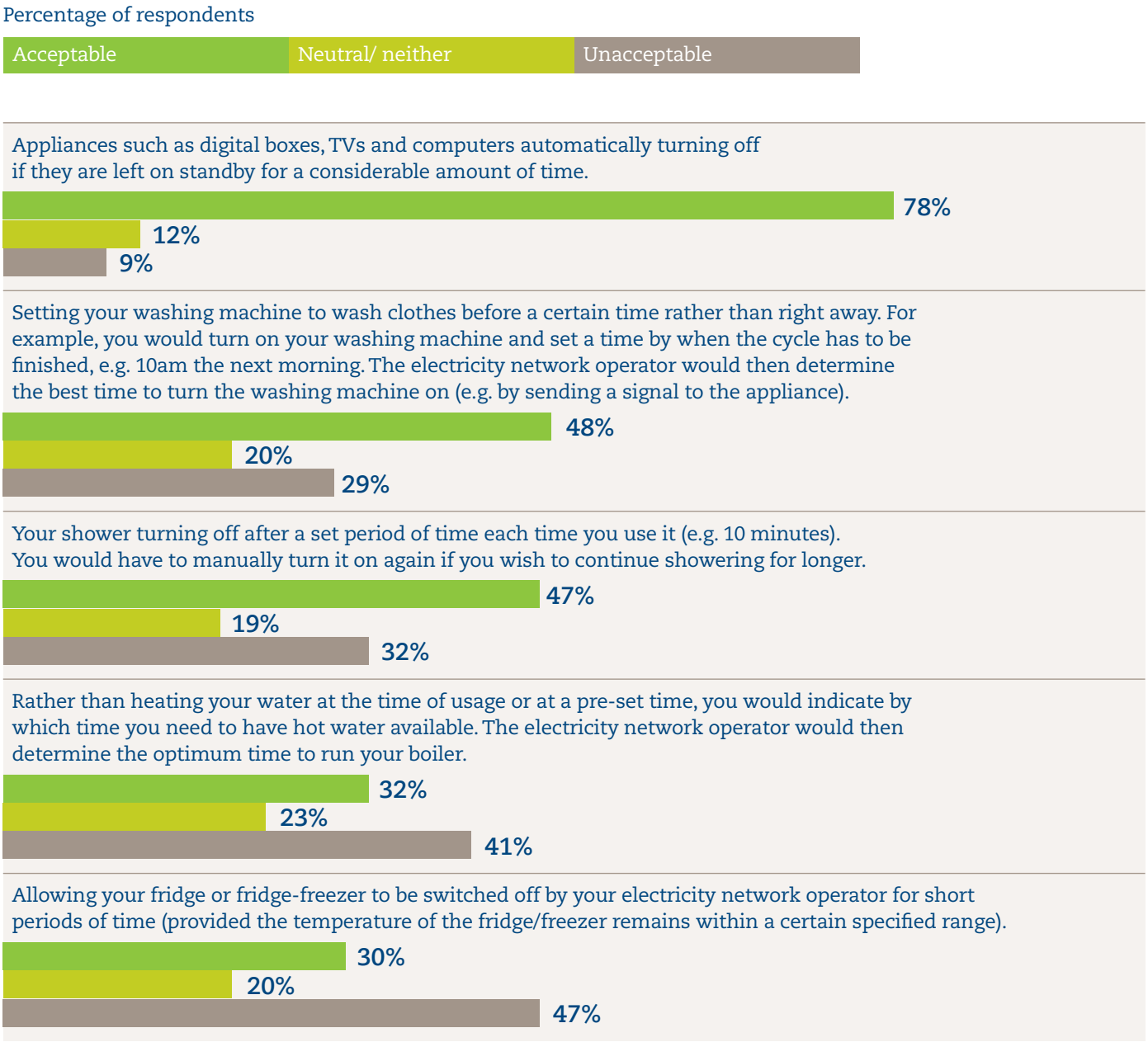
Attitudes towards energy demand management

Demand side management (DSM) is a key feature of future UK energy systems scenarios. By controlling and actively managing fluctuations in demand (particularly with regards to electricity), peaks in demand can be avoided and demand can be shifted to better match supply (Strbac, 2008). This is particularly important in an energy system with high levels of intermittent energy generation, for example wind energy. The UK government proposes that smart meters and in-home energy displays should be rolled out to every home and small business in the UK (by 2020) and these could enable a range of DSM strategies (DECC, 2013a). These may operate through incentives such as variable pricing tariffs, or through automated services such as running or reducing certain functions depending on current grid capacity (Defra, 2008). In either case, this will require public acceptance and involvement.

To explore public perceptions on different aspects of DSM we asked a series of questions about respondents' thoughts about and interest in energy, their willingness to share energy usage information and the acceptability of several DSM scenarios (Q41-Q47 in Appendix B):

- Around half of all our respondents report currently spending a fair amount (44%) or a great deal (6%) of time thinking about their energy use.
- A large percentage is also willing to spend a little more time (71%) thinking about their energy use. Only a small percentage is willing to spend a lot more time thinking about their energy use (8%).
- There is substantial interest in energy use information, particularly for appliance-specific (69%) and cost related information (67%).
- Furthermore, 74% believe this information will help a fair amount or a great deal in reducing personal energy use.
- Most respondents (71%) would be willing to share their smart meter information with their electricity supplier but around half of these (35%) would have concerns about it.
- Most would also share energy data with other parties (Figure 5), although this varies greatly between organisations, with government organisations being least trusted.
- Importantly, a significant proportion of respondents (over a fifth) is not willing to share their energy data with anyone (Figure 5).

Figure 6. Acceptability of different demand side management scenarios (Q46 in Appendix B).



A majority of people are interested in energy information, willing to think more about their energy use and believe that additional information would help them to reduce their energy usage. This is in line with other findings in this survey (e.g. willingness to reduce energy use if support is available).

Note however that willingness to spend more time thinking about energy may be particularly changeable depending on the specific context. For example, if technologies or actions do not result in expected changes (e.g. reduced energy bills); this might result in ultimate rejection of the technology and undermine any accompanying behaviour change (Hargreaves et al., 2013; Krishnamurti et al., 2011). By contrast, households that have their own solar panels may already be engaging with their own electricity usage (and production) in quite some detail, as such these households may perceive further monitoring of energy data to be a relatively hassle-free change to their daily activities, especially compared to households without any prior experience of 'active' engagement with their energy use.

The finding that most people are willing to share further information about their energy use is broadly encouraging for plans to roll out smart meters. However, results indicate that blanket acceptance of smart meters is less likely to occur. Some respondents do indicate concerns

and others may actively resist sharing energy data. We note that many people have not heard of smart meters and often misunderstand what they are and how sharing of data may occur (DECC, 2013b), so attitudes may be weak and liable to change in the future.

Interestingly, respondents are most willing to share energy data with an independent energy regulator followed by energy companies. Although energy companies may be distrusted in some respects (e.g. providing a fair price; Ipsos MORI, 2012a; Butler et al., 2013), they are also more open about their motives (profit-making), expected to be responsible to install smart meters and likely to understand consumer needs more accurately. In addition, people already share information about their energy use with energy companies on a regular basis. The finding that the government is least trusted with respect to energy data sharing is not unexpected. Government is often mistrusted and expected to have unknown or unseen agendas (e.g. Poortinga & Pidgeon, 2003).

DSM may involve further changes in the way that people use energy, for example through automation and remote control of appliances. We explored acceptance of some commonly discussed scenarios around DSM (see Figure 6).

- Over a third of our respondents feel negative about an electricity network operator controlling some household appliances for the purpose of balancing the grid. On balance, more people feel negative (40%) than positive (35%) about this notion.
- A large majority find the possibility of having digital appliances automatically turned off as acceptable (78%).
- Acceptance of automation of different individual appliances is very dependent on individual scenario features (see Figure 6).

Scenarios depict different underlying issues in relation to DSM which must be addressed further. Technological 'automation' appears to be more acceptable than remote interference with energy use (also see Butler et al., 2013). Automation may be viewed positively because it is an easy way of reducing personal energy use (which most people want to do) without thinking too much about it. It also involves minimal interference by outside parties who could be viewed as having different priorities or motives in the operations they perform.

Variations across different energy use domains are also evident. DSM possibilities which alter showering or heating practices are much less accepted, and proposals to change fridge or freezer operations are particularly disliked. Acceptance within these domains is likely to be related to considerations of comfort and health, highlighted as important factors in acceptance of DSM in previous research (Mert et al., 2008).

Loss of control appears to be a key factor in the acceptance of automation and 'reassurances' may be needed to facilitate acceptance, for example a fail-safe to stop food thawing in the freezer. It remains to be seen whether manual overrides and fail-safes are enough of a reassurance in highly sensitive areas such as health and safety of food products (Mert et al., 2008).

Summary of findings

These findings confirm that reducing energy use is perceived to be a positive aspect of future energy transitions, and something to strive towards. In principle, over two thirds of respondents are willing to play a personal part in reducing energy use if supported in some way.

These findings are also tentatively positive with regards to future involvement of households in managing their energy use. Sharing information with energy companies is accepted by many; however a significant proportion of people say that they do not want to do this and many also say that they have some concerns. An energy regulator appears to be more trusted than other organisations, indicating the importance of independence of those responsible for consumers' data. Our data indicates that the smart meter rollout will require careful customer engagement to ensure significant opposition does not arise. Furthermore, the specifics of energy monitoring and data sharing should be carefully managed (e.g. considering data protection, potential for negative stigma attached to high energy use; Mert et al., 2008). Caution should also be taken with regards to promised and expected benefits, for example, a reduction in energy bills.

Our findings also suggest that acceptance of automation is variable and may, in part, depend on the type of control systems involved, how they are operated, and trust in who is operating them. Acceptance is also highly dependent on the type of activity or appliance involved. On the one hand, DSM may be viewed as relatively benign and providing benefits, for example reducing energy use. On the other hand it may represent a threat to comfort or health.



Overall System Changes

7

Need and responsibility for energy system change

A few general questions about energy system change were included to refocus on the larger picture around energy futures (Q48-Q50 in Appendix B).

- Respondents overwhelmingly agree (88%) that we (in Britain) need to radically change how we produce and use energy by 2050. Very few respondents disagree with this notion (1%).
- A majority also thinks national government(s) are mainly responsible for ensuring that appropriate changes are made to the UK energy system over the next 40 years (54%) with the next most responsible being energy companies (16%) and then individuals and their families (13%).
- A large majority thinks we should both change how we use and produce energy (84%) rather than focus more on one or the other.

These results are in line with other findings in this survey where respondents see a role for both reducing energy use and moving away from fossil fuels to provide energy. It is perhaps unsurprising that national governments are seen to play the primary role in bringing about this wider change considering the rather wide focus on 'whole' energy system change, and the scale of change required. It may be difficult to imagine how a lone individual can influence such large-scale change.

Summary of findings

Overall, there is strong support for whole energy system change, including changes to both the demand and supply side. National governments are seen to be the party primarily responsible for overseeing a successful energy transition.

Respondents overwhelmingly agree (88%) that we (in Britain) need to radically change how we produce and use energy by 2050.



Discussion and Conclusions

8

This report describes the findings from a nationally representative British survey, n=2,441, of current public perceptions of and attitudes towards key issues in UK energy system transitions.

This survey has been explicitly framed to address perceptions of energy system change and energy futures. As such it includes questions on abstract aspects of system change (e.g. role of overall demand reduction) and on attitudes to more specific aspects of system change (e.g. willingness to use electricity for cooking). These questions also explore basic preferences (e.g. willingness to reduce energy use) as well as more contextualised or conditional attitudes (e.g. willingness to reduce energy use if support is available).

It is important to note that some topics covered in this report have been studied more extensively in the past (e.g. nuclear power and willingness to save energy) whereas others have only recently received attention in the literature, for example DSM. These represent more novel and exploratory aspects of this survey. In addition, some of the ideas covered in this survey are likely to be unfamiliar to people, for example smart meters or CCS. In line with theories around preference construction, these aspects of the survey were designed carefully to guide respondents and allow expressions of reactions and views in relation to these topics.

Together these findings paint a picture out of which public visions for Britain's energy future can begin to emerge. We therefore provide a summary of the key findings and conclusions in this section, as well as some further discussion of what this means for energy transitions in the UK.

Overall system change and policy framings

Starting with an overall view of the energy system, we find that people want significant change in the UK energy system and agree that changes need to occur both in the way energy is produced and used. Changes are perceived to be beneficial on a personal level, as well as for the country as whole. Perhaps unsurprisingly, national governments are seen to be responsible for ensuring that appropriate changes are made in the energy system. This is a finding in line with other research (e.g. responsibility to address climate change is largely seen to lie with national governments, Eurobarometer, 2011). Although we also find substantial willingness to change aspects of personal lives, it may be difficult to imagine how individuals alone could achieve the scale of change required.

As such governments are expected to provide an overarching narrative and leadership, linking up different aspects of change to provide consistency in terms of the overall drivers underpinning energy system transitions. However, we suggest that publics also expect contributions other than leadership, guidance and oversight on behalf of governments, and in fact want to see support for the changes they are being asked, and actively trying, to make in their own lives (e.g. financial and structural support).

We further considered the motivations and reasons underlying a desire for energy system change and its direction. In particular we explored underlying motivations for reducing fossil fuels and reductions in energy use. Generally, respondents identify a need to reduce reliance on fuels that are considered non-renewable or finite, insecure, imported, costly and harmful to the environment (including impacts on climate change). In addition, the notions of wasting (energy and resources) and overconsumption were identified as characteristics that need to be addressed in a new energy system.

In line with this, we also find high concern for the key framings underpinning energy policy - climate change, energy security and affordability. Although concern is high for all three issues, affordability in the form of household energy bills is considered most important, indicating that this is still a top priority for people, and is likely to remain so in the future. Nonetheless, concerns relating to secure long-term supplies to prevent shortages in energy (fuel, electricity) are almost equally as high. These findings must however be considered with some caution as trade-offs like this are hypothetical and context-dependent (i.e. on which options are included). It is unlikely that a majority of respondents would accept an energy future in which one long-term goal is significantly traded-off against the other (evidenced by high concern for all issues).

Energy supply options

On the supply-side, our findings point to a preference for moving away from fossil fuels towards the use of more renewable forms of energy production. The role of specific technologies within this change is to some extent dependent on the context, since preferences are not yet fully formed (e.g. for CCS).

First, fossil fuels are generally viewed unfavourably (especially coal and oil) and hence we find that the British public agrees that a reduction in fossil fuels in the energy system is needed. This view is linked to perceptions of fossil fuels being finite, harmful to the environment and climate, as well expensive.

Although CCS technology would allow for the continued use of fossil fuels, whilst reducing carbon emissions, knowledge of CCS is relatively low and we find that the public is currently split on its role in energy futures. This may be in part because CCS technology does not address the main reason why respondents thought the use of fossil fuels needs to be reduced –because they are running out in the long-term.

Second, and in direct contrast to fossil fuels, renewable energy technologies are viewed favourably by a large majority of respondents in this survey. This is also evident when examining beliefs and attitudes towards wind energy in particular. As such, there is significant support for the inclusion of wind farms in Britain's energy future, particularly for the use of offshore wind farms. Although wind energy is associated with a range of positive notions (clean, safe), and low risk perceptions, strong support for wind energy should not be taken for granted. This is evidenced by mixed views around the specific use and location of wind farms; e.g. whether they are ugly, suitable for all areas, and have impacts on communities. These concerns and conditions are likely to become particularly important during implementation at a local level (Demski, 2011).

Third, nuclear power is a contested aspect of energy system change, and we find a range of opinions towards its use. Although nuclear power is not viewed favourably by the public when placed in relation to many other supply technologies, there is some support for the replacement of existing nuclear power stations in the UK. Nonetheless the public is divided on this aspect as well. Importantly, expressed support for nuclear power can increase (e.g. when presented in terms of tackling climate change) and decrease (e.g. when compared to renewables) depending on framings. We therefore suggest that acceptance of nuclear power within Britain's future energy system is conditional at best and is likely to depend on the particular context of change. Hence, replacing some nuclear power stations alongside an equal or stronger commitment to renewable energy over the longer-term might be acceptable to some people. Equally, the siting of future nuclear power stations would most likely face significant opposition, especially on new sites.

Electrification

Electrification of the heating and transport sectors is likely to play a significant role in energy system transformations to allow a move away from reliance on gas and oil in those sectors. In this survey we find that the British public is broadly positive towards the use of electric options such as electric hobs, heating and cars. However, in line with some of the limited research in this area, willingness to use these electric options is likely to be contingent on addressing cost and perceived performance of these models compared to current (conventional) models. This is particularly likely to be an issue for electric heating and electric cars. If electrification of personal transport and residential heating (as well as cooking) is considered to be a major part of any future energy system, these perceptions must be addressed in a comprehensive and serious way.

Energy demand options

We find strong support for the idea of overall demand reduction in the UK as a whole, which is linked to notions around wasting less and being more efficient with the limited resources we have. The desire for demand reduction also translates to a more personal level where a majority are prepared to greatly reduce their energy use, and want to do so. This is particularly notable when support is available to help people do this, although the exact nature of this support was not specified and this is likely to be important.

The findings are tentatively positive with regards to future involvement of households in managing their energy use. We find that a majority of people are interested in further information about their energy use (e.g. appliance specific information) and willing to think about their energy use more than is currently the case. There is also a belief that having this information will help them reduce their personal energy usage.

Although these attitudes are broadly encouraging, there may be an expectation of benefits as a result of having more information, for example a reduction in energy use and energy bills. The nature of these expected benefits will be of critical importance. If, for example, these benefits do not materialise or cannot be sustained, then ultimate rejection of the technology and/or active energy use may occur.

We also find that people are broadly willing to share their energy use data although a significant proportion of respondents had concerns about this, indicating that willingness to share data is likely to be conditional. We also find a substantial proportion of people that are not willing to share their energy data with anyone. As such, some active resistance to energy data sharing should be expected and responses to this carefully considered. For example, blanket use of penalties for resistance to sharing data may further alienate people because their concerns are not taken seriously.

Our data indicates that more people are willing to share their data with energy companies than with government organisations. This may be, in part, reflective of the existing situation where we already share data with energy companies. However, we also know that energy companies are often distrusted and viewed negatively, for example they are reported to make large profits while repeatedly increasing energy prices for consumers (IpsosMORI, 2012a; Butler et al., 2013; The Guardian, 2013). As such, the actual implementation of the data sharing process is likely to interact with these prior experiences and perceptions of energy companies. For example, if energy companies are perceived to receive the bulk of the benefits from shared data (e.g. through reduced meter reading costs) they may be expected to pass some of these cost savings on to consumers. If they are perceived not to be doing so, this is likely to deepen distrust and reduce the likelihood of further co-operation.

Automation of appliances is often viewed as an alternative to active energy monitoring because it involves little effort on behalf of the individual. Our data with regards to automation and remote interference with energy use were mixed and highly dependent on the context and situation-specific characteristics. On the one hand, automation may be viewed positively because it enables an easy way of reducing personal energy use. As such automation that involves minimal interference by an outside party would be most likely to find acceptance. In addition, trust in that outside party and their motives and transparency of operations will be paramount. On the other hand, automation that interferes with highly-valued aspects of everyday life may be less acceptable. This will be dependent on the type of activity and, critically, the way it is managed. For example, perceived loss of control may be particularly important with regards to acceptance of situations that involve health-related issues (e.g. food storage in fridge). Other DSM scenarios might be considered undesirable because they involve a perceived loss or deterioration of comfort (e.g. altering the length and timing of showering).

Although preliminary, these findings suggest that reactions to DSM will vary depending on which aspect of our lives it interacts with, as well as the type of interaction required. This must be given serious consideration if demand management is to play an effective and successful part in the UK's energy future.

Further considerations

UK energy system change involves transitions along multiple dimensions including technological, societal and behavioural changes. Although public perceptions are only one aspect feeding into policy development and decision-making on these issues, public values and attitudes can both provide opportunities and raise uncertainties on the way to achieving a low-carbon, secure and affordable energy system.

The results presented in this report provide several clear findings with regards to public perceptions and attitudes, especially in relation to the issues of reducing fossil fuels and energy use. These could be viewed as overarching preferences and values that guide what kind of energy future publics might like to see, for example a future which is high in renewable energy because it is 'infinite' and clean, and an energy system which involves less wasteful energy usage through efficiency improvements and more careful thinking about energy use at the household level (possibly including some enabling DSM elements).

However the realisation of this future, as well as the specific elements of a 'new' energy system (including technologies, behaviours and governance) is dependent on a wide range of contextual factors. As such public acceptability of specific proposals (e.g. developments, policies) may be conditional or contingent upon wider framings, such as a serious commitment to tackling climate change or increasing renewable resources in the energy mix. Similarly, support or acceptability may depend on more specific factors, for example details on how change is implemented at the local level. As such siting a wind farm in a new area will require appraising landscape and community impacts, which are generally less relevant at a more abstract level.

These findings also open up several important points for further inquiry, some of which have been highlighted throughout the discussion. For example how the values inherent in renewable energy, and particularly wind energy, can be realised while meeting conditions and concerns arising in a specific context. With the growing expansion of wind energy in the UK, this will become of increasing importance. In addition, the more novel aspects of this survey provide an example where early public engagement and research can, and should, interact with technical and strategic development. For example, the conditions needed for acceptance of smart meters require further elaboration, especially to what extent regulation and assurances are able to address specific concerns people might have (concerns that are still emerging as smart meters become more familiar to people). Similarly, further research is needed to explore the perceived and expected benefits of DSM (e.g. increased comfort, cost efficiencies) and how these interact with potential negatively perceived aspects (e.g. sharing more data, giving up some control over appliances).

Finally, we have discussed the conditional nature of preferences with regards to energy system transitions, and suggested that acceptance of one aspect of change (e.g. nuclear power) may be contingent on other aspects of system change (e.g. commitment to renewable energy). Therefore when we ask people to think about what kind of energy future Britain should strive towards, preferences and choices are unlikely to exist in isolation. Instead one particular choice or preference may change in the context of other preferences. This is an important consideration that has come out of the findings in this survey and will be further analysed in particular using the 'energy futures' that respondents created as part of completing the 'My2050' tool (see section 2 – methodology).

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After Note

As briefly mentioned at the start of the report there is a qualitative phase of research linked to the survey findings we have presented here.

The main findings from the qualitative phase of research have been published in a related report: Butler, C., Parkhill, K.A. and Pidgeon, N. (2013) Transforming the UK Energy System: Public values, attitudes and acceptability. Deliberating energy transitions in the UK. (UKERC: London).

There are connections between the findings of the two reports, illustrated by referencing of Butler et al., 2013 throughout this report. However, points of connection and combined insights emerging out of both phases of research are currently being pursued through a further synthesis analysis. This allows us to build a more detailed understanding of some key aspects of concern about public engagement with energy system change. The synthesis analysis report will be available 16 July 2013.

Appendix A: Recruitment of Sample

This section provides additional information about the Ipsos MORI access panel. This information should be consulted in addition to methodological details in the main document (Section 2).

The Ipsos Access Panel (IIS) is an online panel consisting of a pre-recruited group of individuals or households who have agreed to take part in online market and social research surveys. Ipsos uses a "double opt-in" process for all panellists. Individuals wishing to join the panel first complete the online recruitment survey, where main demographic information is provided by panellists, and accept the terms and conditions of membership. This constitutes the first "opt-in" to panel membership. Panellists then receive an e-mail and are required to click on a link to confirm they would like to participate in panel membership. This constitutes the second "opt-in".

The panel is continuously refreshed using a variety of sources and methods, the most important being Affiliate Networks. Affiliate Networks enables recruitment from many different sources as affiliates typically run recruitment campaigns in partnership with 20 to 40 different websites at a time. Panels are actively monitored and maintained through a series of continuous quality checks including checks for membership duplication across databases, screening for ineligibility (e.g. IP address tracking), purging of inactive members, and name, email, postcode, and cross-questions validation.

For all studies using the IIS panel, panellists are rewarded with points for every survey they complete. The points allocated depend on the questionnaire length and what the research requires of them (for instance, the number of points would be higher if it required a diary to be completed). Accumulated points can be redeemed on the dedicated panellists' website for a variety of vouchers. Rewarding points is the preferred incentive system on panels as it is seen as a neutral system which does not skew the participation of specific groups of people. Panellists are restricted to a maximum number of surveys they can complete in any given month.

The sample for the current survey was reserved from the panel and quotas applied to ensure a representative sample completed the questionnaire. Panellists were recruited using an email invitation including a link to the online questionnaire and information regarding the length of the survey as well as available incentive points.



Appendix B: Questionnaire and Data Tables

B

The following sections provide the complete data tables for all questions used in the current online survey conducted by Cardiff University. This includes all text and instructions presented to respondents (note that respondents did not see question numbers).

- Results are based on responses to a quota survey carried out online with Ipsos MORI panellists aged 18+ years old living in Great Britain.
- Results are based on 2,441 responses, unless otherwise stated.
- Fieldwork was conducted between 2nd and 12th August 2012.
- Data are weighted by age, gender, region, and working status to the profile of the known population.
- Where results do not sum up to 100, this may be due to multiple responses, computer rounding or the exclusion of don't knows/not stated.
- An asterisk (*) represents a value of less than 0.5%, but greater than zero.
- Questions with multiple items (e.g. Q1) employed randomisation.
- Question sets Q13-16 (nuclear power) and Q17-22 (wind energy) were counterbalanced. In addition, Q63 and Q64 were also counterbalanced.

Q1. How favourable or unfavourable are your overall opinions or impressions of the following energy sources for producing electricity currently?

	Very favourable	Mainly favourable	Neither favourable nor unfavourable	Mainly unfavourable	Very unfavourable	Never heard of
	%	%	%	%	%	%
Biomass, that is wood, energy crops, and human and animal waste	22	40	25	5	2	6
Coal	3	16	35	32	14	*
Gas	7	33	35	19	4	*
Hydroelectric power	39	36	18	2	1	4
Nuclear power	11	23	27	21	18	*
Oil	3	16	38	31	12	*
Sun/Solar power	51	34	11	3	1	*
Wind power	38	37	13	7	5	*
Marine power (tidal and wave power)	38	39	16	2	1	4

The UK government is currently thinking about how our energy system (i.e. how energy is supplied and used) will change over the next 40 years. It is argued that changes in our energy system are needed for a number of reasons, including the outdated and declining state of the existing energy system, the need to tackle climate change by reducing carbon emissions, and the importance of having a secure and continuous supply of energy in the future.

Q2. Below are some of the issues to think about. Please indicate which two you think are the most important, ranking them as the most important and second most important.

	Most important	Second most important	Total
	%	%	%
Changing the way we produce energy (being less reliant on coal, gas and oil)	25	20	45
Affordable energy prices	24	21	45
Energy independence for the UK (i.e. not having to rely on buying energy from other countries)	17	21	38
Helping to prevent climate change	17	13	30
Reducing the amount of energy we use as a country	10	15	25
Avoiding blackouts and fuel shortages	7	9	16
Don't know	*	2	2

Q3. How concerned, if at all, are you about climate change, sometimes referred to as 'global warming'?	
	%
Very concerned	24
Fairly concerned	50
Not very concerned	20
Not at all concerned	6
Don't know	1

Q4. As far as you know, do you personally think the world's climate is changing, or not?	
	%
Yes	79
No	11
Don't know	11

Q5. Thinking about the causes of climate change, which, if any, of the following best describes your opinion?	
	%
Climate change is entirely caused by natural processes	4
Climate change is mainly caused by natural processes	12
Climate change is partly caused by natural processes and partly caused by human activity	48
Climate change is mainly caused by human activity	28
Climate change is entirely caused by human activity	4
I think there's no such thing as climate change	2
Don't know	2

Q6. To what extent do you agree or disagree with each of the following statements about climate change?

	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
I am sure about my opinion on climate change	20	39	30	8	2	2
The issue of climate change is very important to me personally	14	33	31	15	5	1
I am uncertain that climate change is really happening	5	15	17	35	27	1
The seriousness of climate change is exaggerated	9	21	21	28	18	2
It is uncertain what the effects of climate change will be	11	48	19	15	5	2
I have strong opinions about climate change	14	28	38	16	4	1
Most scientists agree that humans are causing climate change	15	42	23	12	3	5

Q7. How concerned, if at all, are you that in the next 10-20 years...

	Not at all concerned	Not very concerned	Fairly concerned	Very concerned	Don't know
	%	%	%	%	%
...electricity and gas will become unaffordable for you?	2	13	38	45	2
...petrol will become unaffordable for you?	5	15	36	42	3
...there will be frequent power cuts?	4	29	38	25	4
...the UK will become too dependent on energy from other countries?	2	12	40	43	3
...there will be a national petrol shortage?	3	20	43	30	4
...the UK will have no alternatives in place (e.g. renewables) if fossil fuels (gas, oil) are no longer available?	2	12	44	39	3

Q8. Below are listed three key energy priorities for the UK government. Please rank them in terms of importance, where 1 = 'most important' and 3 = 'least important'

	1 Most important	2	3 Least important
	%	%	%
Keeping energy bills affordable for ordinary households	40	39	20
Making sure the UK has enough energy (preventing blackouts and fuel shortages)	32	37	30
Tackling climate change by using low-carbon energy sources	27	23	48
Don't know	1	1	3

When thinking about the UK energy system in 40 years time, we may want to change how we produce energy. We will now ask you a series of questions about different ways of producing electricity.

One possible change involves reducing the use of fossil fuel (coal, oil and gas).

Q9. To what extent do you agree or disagree that the UK should reduce its use of fossil fuels?

	%
Strongly agree	35
Tend to agree	44
Neither agree nor disagree	13
Tend to disagree	4
Strongly disagree	1
Don't know	3

Q10. Why have you given this answer?

Some people propose that we can keep using coal and gas as our main means of generating electricity while still tackling climate change. We would do this by capturing the carbon emissions from power stations and storing them underground (e.g. in old gas and oil fields in the North Sea). This technology is called "carbon capture and storage", sometimes referred to as "clean coal and gas".

Q11. How much, if at all, would you say you know about this subject?

	%
I know a great deal about carbon capture and storage	1
I know a fair amount about carbon capture and storage	8
I know just a little about carbon capture and storage	22
I have heard of carbon capture and storage but know almost nothing about it	26
I have never heard of carbon capture and storage	42

Q12. Overall, to what extent would you support or oppose the continued use of fossil fuels with "carbon capture and storage" as part of Britain's energy future?

	%
Strongly support	5
Tend to support	31
Neither support nor oppose	31
Tend to oppose	17
Strongly oppose	4
Don't know	12

If we want to replace fossil fuels, we will have to use other forms of electricity generation. Two options that the UK government is considering as alternative ways to meet electricity demand are nuclear power and wind energy. We will now ask you some questions about both of these.

There are currently 9 nuclear power stations across England, Scotland and Wales, providing between 16-17% of the electricity consumed in the UK.

Q13. To what extent do you agree or disagree that generating electricity from nuclear power...	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
...causes climate change	6	15	28	22	15	15
...causes dangerous waste	40	35	10	5	4	6
...is a hazard to human health	21	31	22	14	5	7
...is cheap	5	21	33	17	7	17
...is clean	10	25	23	19	14	9
...is good for communities living nearby	3	12	29	29	20	7
...is good for the economy	10	32	32	9	5	13
...produces a reliable electricity supply	25	44	18	4	2	7
...is safe	6	21	23	25	17	7
...spoils the landscape	11	29	29	19	7	6
...poses risks to wildlife	15	30	24	16	7	8

Q14. Which of the following statements most closely describes your own opinion about nuclear power in Britain today?	%
We should increase the number of nuclear power stations	21
We should continue using the existing nuclear power stations and replace them with new ones when they reach the end of their life	26
We should continue using the existing nuclear power stations but not replace them with new ones when they reach the end of their life	32
We should shut down all existing nuclear power stations now, and not replace them with new ones	9
Don't know	12

Q15. To what extent do you agree or disagree with each of the following statements about nuclear power?						
	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
I have strong opinions about nuclear power	14	24	40	15	3	3
I am sure about my opinion on nuclear power	19	34	29	10	3	5
The issue of nuclear power is very important to me personally	9	21	45	17	5	3
I am willing to accept the building of new nuclear power stations if it would help to tackle climate change	12	34	25	15	8	6
We need nuclear power because renewable energy sources alone are not able to meet our electricity needs	17	36	22	10	5	9
Britain needs a mix of energy sources to ensure a reliable supply of electricity, including nuclear power and renewable energy sources	24	42	18	8	4	5
I am willing to accept some nuclear power as long as we also focus on increasing renewable energy sources	18	48	18	8	4	4
There is no reason which would make me accept nuclear power as part of the UK's energy future	7	13	25	26	24	5
Promoting renewable energy sources, such as solar and wind power, is a better way of tackling climate change than nuclear power	29	31	20	11	4	5
Promoting carbon capture and storage technology in existing gas and coal power stations, is a better way of tackling climate change than nuclear power	6	24	32	16	6	16

Q16. To what extent would you support or oppose the building of a new nuclear power station in your area? (by 'area' we mean up to approximately 5 miles from your home)?	
	%
Strongly support	7
Tend to support	14
Neither support nor oppose	20
Tend to oppose	20
Strongly oppose	34
Don't know	4

Wind energy is a renewable resource being developed in the UK. Wind energy in the form of wind farms currently makes up between 3-4% of the electricity supply. Wind farms can be placed both on land (onshore) and out at sea (offshore).

Q17. To what extent do you agree or disagree that generating electricity from wind energy...	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
...causes climate change	1	3	14	31	45	6
...causes dangerous waste	2	2	10	30	50	6
...is a hazard to human health	2	3	14	36	41	4
...is cheap	12	27	25	16	9	11
...is clean	44	44	7	2	1	2
...is good for communities living nearby	11	21	37	18	9	4
...is good for the economy	22	37	23	8	4	6
...produces a reliable electricity supply	13	32	23	18	9	5
...is safe	35	46	12	3	1	3
...spoils the landscape	15	23	22	25	14	2
...poses risks to wildlife	5	21	26	29	12	7

Q18. Overall, to what extent do you support or oppose the use of ONSHORE wind farms (built on land) in the UK?	
	%
Strongly support	23
Tend to support	40
Neither support nor oppose	18
Tend to oppose	10
Strongly oppose	7
Don't know	2

Q19. Overall, to what extent do you support or oppose the use of OFFSHORE wind farms (built out at sea) in the UK?	
	%
Strongly support	42
Tend to support	37
Neither support nor oppose	12
Tend to oppose	4
Strongly oppose	2
Don't know	2

Q20. Which of the following statements most closely describes your own opinion about using wind farms to generate electricity in Britain?	
	%
We should not build any more wind farms anywhere (onshore or offshore)	9
We should build new wind farms but only in some areas	32
We should make extensive use of wind farms alongside other electricity sources	46
Most of our electricity should come from wind farms	9
Don't know	5

Q21. To what extent do you agree or disagree with each of the following statements about wind farms?

	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
I have strong opinions about wind farms	15	25	40	15	3	2
I am sure about my opinion on wind farms	23	41	26	6	1	3
The issue of wind farms is very important to me personally	9	22	43	19	6	2
I think wind farms look quite ugly	12	19	21	29	19	1
* Wind farms should only be built in remote areas and out of sight	8	28	27	26	10	2
* We should be building wind farms to reduce our reliance on fossil fuels (oil, gas, coal)	31	47	15	4	1	2
* I have concerns about some aspects of wind farms	6	28	27	24	10	3

*Respondents who chose "We should not build any more wind farms anywhere" in Q20 were not asked to agree/disagree with these statements.

Q22. To what extent would you support or oppose the building of a new wind farm in your area? (By 'area' we mean up to approximately 5 miles from your home)?	
	%
Strongly support	23
Tend to support	34
Neither support nor oppose	20
Tend to oppose	8
Strongly oppose	13
Don't know	3

There might also be changes to our use of energy. For example, in the future more of our energy use in the home may switch to electricity to reduce our reliance on gas and oil. We would like you to consider implications of this for your life and give us your views.

Electric heating

A reduced reliance on gas could mean that most of our domestic heating systems would use electricity (e.g. switch from central gas heating to a form of electric heating).

Q23. How positive or negative do you feel about heating with electricity?	
	%
Very positive	10
Fairly positive	26
Neither positive nor negative	30
Fairly negative	22
Very negative	9
Don't know	2

Q24. Please indicate how willing you would be, if at all, to use electric heating in your home in the future. Please use the sliding scale below.	
	%
1 Very unwilling	14
2	15
3 Neither willing nor unwilling	25
4	27
5 Very willing	16
Don't know	4

Q25. ...what if your friends, family and neighbours used electric heating? How willing would you be, if at all, to use electric heating in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	12
2	14
3 Neither willing nor unwilling	27
4	27
5 Very willing	17
Don't know	4

Q26. ...what if the performance of electric heating was no different to central gas heating systems? How willing would you be, if at all, to use electric heating in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	6
2	9
3 Neither willing nor unwilling	21
4	32
5 Very willing	30
Don't know	3

Q27. ...what if electric heating was significantly cheaper than heating with gas? How willing would you be, if at all, to use electric heating in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	2
2	2
3 Neither willing nor unwilling	10
4	25
5 Very willing	59
Don't know	1

Cooking with electricity

A reduced reliance on gas could mean that we would cook using primarily electric means (e.g. electric hobs and ovens).

Q28. How positive or negative do you feel about cooking only with electricity?	
	%
Very positive	34
Fairly positive	26
Neither positive nor negative	17
Fairly negative	15
Very negative	6
Don't know	1

Q29. Please indicate how willing you would be, if at all, to cook only with electricity in the future. Please use the sliding scale below.	
	%
1 Very unwilling	10
2	10
3 Neither willing nor unwilling	17
4	23
5 Very willing	39
Don't know	1

Q30. ...what if your friends, family and neighbours cooked only with electricity? How willing would you be, if at all, to cook with electricity in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	9
2	10
3 Neither willing nor unwilling	18
4	23
5 Very willing	38
Don't know	1

Q31. ...what if the performance of an electric hob was no different to a gas hob (e.g. it heats up in the same time)? How willing would you be, if at all, to use an electric hob in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	5
2	5
3 Neither willing nor unwilling	13
4	24
5 Very willing	51
Don't know	1

Q32. ...what if cooking with electricity was significantly cheaper than cooking with gas? How willing would you be, if at all, to cook with electricity in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	3
2	3
3 Neither willing nor unwilling	11
4	21
5 Very willing	61
Don't know	1

Electric vehicles

A reduced reliance on oil could mean that most of our cars would be electric instead of using petrol.

Q33. How positive or negative do you feel about driving an electric car?	
	%
Very positive	22
Fairly positive	32
Neither positive nor negative	24
Fairly negative	12
Very negative	6
Don't know	4

Q34. Please indicate how willing you would be, if at all, to drive an electric car in the future. Please use the sliding scale below.	
	%
1 Very unwilling	9
2	9
3 Neither willing nor unwilling	25
4	28
5 Very willing	25
Don't know	3

Q35. ...what if your friends, family and neighbours drove electric cars? How willing would you be, if at all, to drive an electric car in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	7
2	9
3 Neither willing nor unwilling	25
4	29
5 Very willing	25
Don't know	4

Q36. ...what if the performance of an electric car was the same as a petrol car (e.g. speed, range, availability of charging points)? How willing would you be to drive an electric car in the future if this was the case? Please use the sliding scale below.	
	%
1 Very unwilling	4
2	3
3 Neither willing nor unwilling	15
4	27
5 Very willing	48
Don't know	3

Q37. ...what if the cost of buying and running an electric car was significantly less than the cost of a petrol car? How willing would you be, if at all, to drive an electric car in the future if this was the case? Please use the sliding scale below.

	%
1 Very unwilling	3
2	3
3 Neither willing nor unwilling	12
4	21
5 Very willing	58
Don't know	3

We would now like to ask you some questions about levels of energy use.

Q38. Please select which of the following statements best matches your opinion about Britain's overall energy use.

	%
We should allow our energy use to continue to increase	3
We should maintain our current levels of energy use	18
We should reduce the amount of energy that we use	73
Don't know	6

Q39. Why have you given this answer?

Q40. To what extent do you agree or disagree with each of the following statements?

	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
I am prepared to greatly reduce my energy use	17	41	27	11	2	1
I am not able to reduce my energy use any further	5	22	26	38	6	3
I want to reduce my energy use	30	51	14	3	1	1
I am prepared to greatly reduce my energy use but only if I know others are doing the same	5	19	36	25	14	2
I am prepared to greatly reduce my energy use if support is available to help me do this	26	47	21	4	2	2

Q40a. You have indicated that you would like to reduce your energy use. Please use the slider below to indicate where on the 5-point scale best describes why you want to reduce your energy use: (This question was only asked if respondents 'Tend to agree' or 'Strongly agree' for 'I want to reduce my energy use' at Q40.)	
	%
1 I want to reduce my energy use because it will save me money	13
2	11
3 I want to reduce my energy use equally because it will save me money and because it will help prevent climate change	58
4	11
5 I want to reduce my energy use because it will help prevent climate change	6
Don't know	*

Q41. How much time, if any, do you currently spend thinking about the electricity that your household uses?	
	%
A great deal	6
A fair amount	44
Not very much	43
None at all	6
Don't know	1

Q41a. How much more time, if any, would you be willing to spend thinking about the electricity that your household uses?	
	%
A lot more time	8
A little more time	71
None at all	15
Don't know	5

As well as using less energy, we could become more flexible about when and how we use energy, for example in the home. Being more flexible in our energy use helps us reduce the likelihood of periods of extreme demand (when everyone uses a lot of energy at the same time this puts a strain on the overall electricity grid).

One way to be more flexible in our electricity use is through a new technology called smart meters. These new meters will be able to provide you with more detailed information about your energy use. Some of the information that will be available through a smart meter is listed on the next page.

Q42. Please indicate whether you would be interested in obtaining any of this information about your own electricity use. Please select as many as you like.	
	%
Which appliance is using the most electricity	71
Electricity usage by appliance	69
How much you are spending on electricity at a given time	67
Overall electricity use	65
Patterns of electricity use over a day, week, month, years	59
Electricity usage by room	52
Information about how much electricity is used on average by people in homes like yours	42
Other:	3
None of these:	8

Q43. How much, if at all, do you think having this kind of information would help you reduce your electricity use?	
	%
A great deal	25
A fair amount	49
Not very much	18
None at all	4
Don't know	4

Q44. The information collected by smart meters would also be available to your electricity supplier. How positively or negatively do you feel about this?	
	%
Very positive	16
Fairly positive	28
Neither positive nor negative	34
Fairly negative	13
Very negative	6
Don't know	3

Q45. How willing, if at all, would you be to allow the data recorded by your smart meter to be shared with the following?

	Electricity supplier	Independent energy regulator	Independent third party for research purposes	Government organisation
	%	%	%	%
I would be willing for the data to be shared	36	41	33	28
I would be willing for the data to be shared but would have some concerns	35	32	32	32
I would not be willing for the data to be shared	22	20	27	31
Don't know	8	8	8	8

In the future, society might have to manage energy usage in other ways in order to prevent 'peaks' in energy demand (for example when everyone makes a cup of tea in an advert break during a popular TV show).

Q46. Here are some examples of how energy usage could be managed differently. Please indicate your view towards the acceptability of each of the following situations using the sliding scale below.

a) Appliances such as digital boxes, TVs and computers automatically turning off if they are left on standby for a considerable amount of time.

	%
1 Unacceptable	5
2	5
3	12
4	18
5 Acceptable	60
Don't know	1

b) Your shower turning off after a set period of time each time you use it (e.g. 10 minutes). You would have to manually turn it on again if you wish to continue showering for longer.

	%
1 Unacceptable	20
2	12
3	19
4	19
5 Acceptable	28
Don't know	2

c) Setting your washing machine to wash clothes before a certain time rather than right away. For example, you would turn on your washing machine and set a time by when the cycle has to be finished, e.g. 10am the next morning. The electricity network operator would then determine the best time to turn the washing machine on (e.g. by sending a signal to the appliance).

	%
1 Unacceptable	17
2	12
3	20
4	19
5 Acceptable	29
Don't know	

d) Allowing your fridge or fridge-freezer to be switched off by your electricity network operator for short periods of time (provided the temperature of the fridge/freezer remains within a certain specified range).

	%
1 Unacceptable	31
2	16
3	20
4	13
5 Acceptable	17
Don't know	3

e) Rather than heating your water at the time of usage or at a pre-set time, you would indicate by which time you need to have hot water available. The electricity network operator would then determine the optimum time to run your boiler.

	%
1 Unacceptable	25
2	16
3	23
4	16
5 Acceptable	16
Don't know	4

Q47. How positive or negative do you feel about your electricity network operator controlling some of your appliances for the purpose of balancing the electricity grid (such as avoiding peaks in electricity demand)?

	%
Very positive	6
Fairly positive	29
Neither positive nor negative	23
Fairly negative	22
Very negative	18
Don't know	3

Thinking about Britain's energy future and the possible changes that could be made to our energy system, please answer the following questions.

Q48. To what extent do you agree or disagree that we in Britain need to radically change how we produce and use energy by 2050?

	%
Strongly agree	45
Tend to agree	43
Neither agree nor disagree	9
Tend to disagree	1
Strongly disagree	*
Don't know	2

Q49. Which one of these, if any, do you think should be mainly responsible for ensuring that appropriate changes are made to the UK energy system over the next 40 years? Please choose one answer only.

	%
National Government(s)	54
Energy companies	16
Individuals and their families	13
Environmental groups	3
The European Union	3
Local authorities	2
None of these	1
Don't know	8

Q50. We might change how we PRODUCE energy (what energy sources we use), and how we USE energy (how much energy we use and for what). Please indicate on the sliding scale below which of the following best describes your opinion?

	%
1 We should focus on how we PRODUCE energy	5
2	5
3 We should focus on both how we USE and PRODUCE energy	84
4	3
5 We should focus on how we USE energy	2
Don't know	2

Q51–62. are not included here because they involve the My2050 tool and its follow-up questions specifically, which are not the subject of the current report.

Q63. Please rate the importance of the following environmental values as a life-guiding principle for you.

	Not at all important	Not very important	Fairly important	Very important	Extremely important	Don't know
	%	%	%	%	%	%
Preventing pollution: protecting natural resources	*	2	27	37	32	2
Respecting the earth: harmony with other species	1	5	33	32	28	2
Unity with nature: fitting into nature	1	8	36	30	22	3
Protecting the environment: preserving nature	1	3	28	36	31	2

Q64. To what extent to you agree or disagree with each of the following statements?

	Strongly agree	Tend to agree	Neither agree nor disagree	Tend to disagree	Strongly disagree	Don't know
	%	%	%	%	%	%
Science and technology can make our lives healthier, easier and more comfortable	19	55	20	3	1	2
Thanks to scientific and technological advances, the Earth's energy resources will be inexhaustible	4	16	28	30	15	7
Science and technology create as many problems as they solve	6	34	32	20	5	3
It is unwise to put our faith entirely in science and technology to solve our energy problems	9	37	24	19	7	3

Q65. How much is your average electricity bill per month? (Please think about the monthly average. If you pay your bills quarterly or on a meter, please think about how much this would cost per month).

	%
Less than £25	9
£25-£49	37
£50-£74	24
£75-£99	10
£100-£124	5
£125-149	1
£150+	1
I generate my own electricity/sell electricity back to the grid so there is no cost to me	1
Don't know	6
I don't know how much my electricity bill is because I pay for my electricity and gas together	7

Q65a. How much is your average combined electricity and gas bill per month? (Please think about the monthly average. If you pay your bills quarterly or on a meter, please think about how much this would cost per month).

	%
Less than £25	*
£25-£49	11
£50-£74	23
£75-£99	16
£100-£124	22
£125-149	5
£150+	5
Don't know	18

Q66. How much is your average gas bill per month? (Please think about the monthly average. If you pay your bills quarterly or on a meter, please think about how much this would cost per month).	
	%
Less than £25	10
£25-£49	31
£50-£74	23
£75-£99	10
£100-£124	4
£125-149	1
£150+	1
I do not have gas	14
Don't know	7

Q67. As far as you are aware, are you currently on a green energy tariff (a tariff where a substantial percentage of the energy is sourced from renewable sources)?	
	%
Yes	11
No	44
Don't know	45

Q68. As far as you are aware, do you have an "economy7" tariff/meter (which uses a special electricity meter to allow users to have lower-priced off-peak electricity during the night)?	
	%
Yes	17
No	66
Don't know	17

Q69. Do you have a form of electric heating?	
	%
Yes	26
No	72
Don't know	3

Q70. In which of the following ways do you currently pay for your electricity?	
	%
Direct Debit	73
Quarterly payment on receipt of bill (payment on demand)	13
Pre payment meter (PPM, or card or key meter)	11
Other	3

Q71. In which of the following ways do you currently pay for your gas?	
	%
Direct Debit	74
Quarterly payment on receipt of bill (payment on demand)	13
Pre payment meter (PPM, or card or key meter)	9
Other	4

Q72. How would you vote if there were a General Election tomorrow? **Q72a.** (if Undecided) Which party are you most inclined to support?			
	Vote(Q72)	Inclined(Q72a)	Combined
	%	%	%
Conservative	23	13	27
Labour	20	12	24
Liberal Democrats (Lib Dem)	7	9	9
UK Independence Party	5	5	6
Green Party	4	4	5
Scottish Nationalist	2	1	3
British National Party	1	1	1
Welsh Nationalist	*	*	*
Other	1	3	2
Would not vote	8	10	11
Undecided	23	-	-
Prefer not to say	6	42	13

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