Title: Public prioritisation of energy affordability in the UK

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Abstract:

Much research has focused on the so-called 'energy trilemma' – i.e., three leading energy policy issues: energy security, affordability, and climate change mitigation. Whilst substantial understanding exists of why people support climate-friendly energy policies, little is known about why they think affordability is important. Particularly, what leads members of the public to identify this policy goal as more important than other objectives? Here, we examine this question via a nationally-representative survey of 2441 UK residents and demonstrate that concerns about personal costs explain a small amount of variation in the prioritisation of affordability as an energy policy goal; a range of other factors also significantly contribute. One such factor is beliefs about who is responsible for energy transitions. These findings suggest policy actions to address affordability concerns should go beyond energy prices, and include additional considerations such as distributive justice and equality.

Highlights:
- The oft-cited energy trilemma includes climate, affordability and security concerns
- We examine whether energy affordability is important to the public, and why
- Factors beyond concern about personal cost explain prioritisation of affordability
- Perceptions about energy companies also hold significant explanatory power
- Energy policy on affordability concerns should focus on more than personal costs

Public prioritisation of energy affordability in the UK

1   Introduction

Substantial shifts in how energy is produced and consumed will be necessary to achieve the UK's 2008 Climate Change Act's mandate of an 80% reduction in greenhouse gas emissions by 2050 over 1990 levels (Foxon, 2013; Hammond and Pearson, 2013) and to approach the UNFCCC COP 21's even more ambitious goal of holding the increase in the global average temperature to below 2°C above pre-industrial levels (UNFCC, 2015; Loftus et al., 2015). Given the sizable costs associated with energy system transitions, ensuring energy remains affordable for people is a key policy goal in the UK and in many other countries where similar energy system transformations are taking place (Strbac, 2012; Pye et al., 2014; ETI, 2015; Ault et al., 2008; National Grid, 2015).

Furthermore, government interventions to facilitate energy system transitions will require public support, especially when transition costs are passed along to citizens via taxes or levies on energy bills (Vaze and Hewett, 2012; YouGov, 2014). Research has explored in depth why people support the energy policy goal of climate change mitigation, which is one third of the so called 'energy trilemma' – energy security, climate change, and affordability (Ding et al., 2011; Bruegger et al., 2015; Dietz et al., 2007; Leiserowitz, 2006; Pidgeon, 2012; Brody, 2008; Heffron et al. 2015; Boston, 2013). However, little is known about what motivates the public to view affordability, one of the other central energy policy goals, as important. Some scholars have argued that the goals of climate change mitigation and energy affordability are complementary, based on aggressive pushes for energy efficiency (Ürge-Vorsatz and Herrero, 2012). However, the few research efforts that assign

a price to the costs of pathways for achieving a transition to a lower-carbon society in the UK reveal that most pathways come with non-trivial price tags (Pye et al., 2014; ETI, 2015). For example, three of the four official transition scenarios in the UK are estimated to cost between £350-500/resident/year more than the baseline scenario (not accounting for costs of climate change if no mitigation occurs; DECC, 2011). Even though the costs of experiencing unmitigated climate change could be considerably higher (Foxon et al., 2010), any immediate price increase might affect public perceptions of energy, and potentially influence public support for energy policies.

Increasingly, the UK has sought to fund environmental and social initiatives through levies on energy bills; in 2011, levies represented 6% of gas and electricity bills in the UK – by 2020, they are expected to account for 11% (Vaze and Hewett, 2012). Energy prices are also consistently a politically salient topic in the UK. For example, in a 2014 survey, 39% of respondents identified energy prices as one of the top three issues affecting the nation; it was the third leading issue, only behind the economy (59%) and immigration (49%) – in contrast, only 12% selected 'environment' (YouGov, 2014). Additionally, several high profile proposals to reduce energy prices have been forwarded by political parties (e.g., a windfall tax, breaking up energy companies, a price freeze on energy tariffs, requiring companies to put customers on the lowest tariff, and rolling back green levies; YouGov, 2014). The accompanying political and media rhetoric on the topic of affordable energy is often substantial; for example a survey suggesting that millions of elderly UK residents would be rationing heat (or food) to pay energy bills in winter 2015-2016 received much attention (Ellson, 2016).

Despite this rhetoric and occasional opinion polls, we know almost nothing about how and why members of the public perceive the issue of energy cost and affordability as they do. One might assume, as many media articles often do, that people predominantly care about affordability in terms of minimising financial costs to themselves. Indeed repeated surveys have shown that the public are concerned about energy prices (YouGov, 2014; Demski et al., 2014); for example, Demski and colleagues (2013) reported that 83% of their survey sample were very or fairly concerned that electricity and gas will become unaffordable for them in the next 10-20 years. As such, concerns about personal energy costs may be an important predictor for explaining people's perceptions of energy policy goals more generally. However, previous research also suggests that people's preferences for approaches to energy transitions are multifaceted and might encompass a range of other important values such as fundamental concerns about fairness and justice (Demski et al., 2015; Butler et al., 2013). This suggests that people's thoughts about the cost of energy, and the price of transitioning to a lower-carbon, more sustainable, and more secure energy system, might not only be dependent on a low personal price tag, but are also connected to conceptions of equitable cost sharing. For example, qualitative research by Butler and colleagues (2013) suggested that the distrust in UK energy companies might, in part, be connected to a perception that the companies pass on costs to consumers whilst increasing their own profits.

In the current study, we sought to identify the extent to which members of the British public prioritise affordability as an energy policy issue and to understand what attitudes, beliefs, and values are associated with such a prioritisation. This focus is an important addition to research which, to date, has extensively examined public perceptions

of other energy policy issues, for example, why people are interested in climate conscious government policies (Whitmarsh et al., 2011; Lorenzoni et al, 2007). Yet, little research has explored reasons for the general public raising affordability as an energy policy priority. In addition, previous research has tended to examine public attitudes towards energy policy goals such as climate change, energy security and affordability in isolation of each other (e.g. Sovacool, 2016; Demski et al., 2014; Steentjes et al., 2017); here we examine relative importance directly by asking which policy goal people consider a priority. Although people may legitimately express high concern about a range of energy system issues simultaneously (Butler et al., 2013), different policy issues can compete for public attention, particularly when played against each other in political discourse. If we know the extent to which and why the public is concerned about affordability, carefully designed policies might be better able to address those concerns and focus attention on other relevant policy goals.

In the following sections, we explore public perceptions of energy policy issues with findings from a survey of public perceptions of transformations to the UK energy system. Our aims are twofold: (1) we examine to what extent members of the public prioritise the policy issue of affordability compared to other energy policy issues, and (2) we identify factors that predict why people do or do not prioritise affordability. By doing so, we produce a number of insights into public perceptions of energy costs and affordability that require further attention in research and policy-making.

2   Methods

A UK national survey was conducted by [removed for peer review] to examine public perceptions of the UK energy system and its future development. The questionnaire included questions on perceptions of a wide range of issues germane to energy system change and energy futures. Questions relevant to the current analysis are presented in section 2.2. Data were collected online from 2-12 August 2012[1].

2.1   Sampling

A nationally-representative quota sample of the British population (i.e., England, Scotland, and Wales) aged 18 years and older completed the online survey (n=2441). Panellists were recruited from the Ipsos MORI Access Panel using an email invitation containing information about the length of survey and available incentive points. Quotas were set according to population averages for key socio-demographic variables including gender, geographic region, age, and employment status. Quota data were based on Labour Force Survey statistics from 2006.

The survey had a drop-out rate of 22%, (evenly distributed across all sections) which is in line with surveys of this kind (length and topic). When using online quota sampling, response rates are not calculated because non-response cannot be easily defined. As such demographic information should be consulted instead (Dillman, 2007). The exact procedure and demographic profile of the population is documented in more detail in [removed for peer-review – available upon request].

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[1] It is important to acknowledge that British public perceptions and prioritisation of energy policy goals might change in the future (after the survey was conducted), nonetheless, the dataset provides a unique opportunity to analyse the relative importance that people assign to different energy policy goals (whereby other surveys often only ascertain their perceived importance independent of one another).

2.2   Measures and analysis

The results section (sub-section 3.1) examines responses to two questions

measuring the extent to which people prioritise and ascribe importance to a range of

energy policy issues, including that of affordability. The introductory text and first question

were:

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.

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.

Response options:
1. *Changing the way we produce energy (being less reliant on coal, gas and oil),*
2. *Affordable energy prices,*
3. *Energy independence for the UK (i.e., not having to rely on buying energy from other countries),*
4. *Helping to prevent climate change,*
5. *Reducing the amount of energy we use as a country,*
6. *Avoiding blackouts and fuel shortages,*
7. *Don't know.*

The second question, asked later on in the survey, included response options to

directly test people's prioritisation of the three key energy policy issues within the energy

trilemma:

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'.

Response options:
1. *Keeping energy bills affordable for ordinary households,*
2. *Making sure the UK has enough energy (preventing blackouts and fuel shortages),*
3. *Tackling climate change by using low-carbon energy sources*

Sub-section 3.2, below, examines key predictors of people's prioritisation of affordability as measured in the two foregoing questions. Predictors include: *personal energy costs concerns, climate change perceptions, energy security concerns, beliefs about the need to reduce fossil fuels, beliefs about responsibility for energy transitions, environmental values* and *voting intention*.

Personal energy costs were measured using two items: 'How concerned, if at all, are you that in the next 10-20 years electricity and gas will become unaffordable for you?' and 'How concerned, if at all, are you that in the next 10-20 years petrol will become unaffordable for you?' Both items were measured using a 4-point uni-directional scale (not at all concerned, not very concerned, fairly concerned, very concerned). Climate change perceptions were measured by two items using a 5-point scale (strongly agree, tend to agree, neither agree nor disagree, tend to disagree, strongly disagree): 'The issue of climate change is very important to me personally' and 'I am uncertain climate change is really happening'.

Energy security concerns were measured using two items using the 4-point concern scale (see above): 'How concerned, if at all, are you that in the next 10-20 years there will be frequent power cuts?' and 'How concerned, if at all, are you that in the next 10-20 years the UK will have no alternatives in place (e.g. renewables) if fossil fuels (gas, oil) are no longer available?' Beliefs about the need to reduce fossil fuels were measured by asking respondents 'To what extent do you agree or disagree that the UK should reduce its use of fossil fuels?' (5-point agree/disagree scale).

Beliefs about responsibility for energy transitions was measured by asking respondents: '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?' Response options included: national government, environmental groups, individuals and their families, energy companies, local authorities, European Union.

Environmental values were measured using a 4-item scale, which collapsed onto a single factor due to high inter-item correlations (a factor analysis revealed 82% variance explained, all loadings of at least 0.88, Cronbach's alpha of 0.93). The items asked for perceived importance of: (1) preventing pollution: protecting natural resources, (2) respecting the earth: harmony with other species, (3) unity with nature: fitting into nature, and (4) protecting the environment: preserving nature. A 5-point scale uni-directional was used (not at all important, not very important, fairly important, very important, extremely important). Voting intentions were measured by asking respondents: 'How would you vote if there was a General Election tomorrow? (if undecided: Which party are you most inclined to support?)' Response options included a list of official parties. For the purpose of the current analyses, all those choosing one of the minor parties were grouped into an 'other' category (see Table 1).

Table 1 provides relevant statistics for two binary logistic regression analyses that predict prioritisation of affordability (as opposed to prioritisation of one of the other energy system goals we asked about in the initial two questions presented in this section). We must note that our original regression analyses included two additional predictors – the cost of the respondents' electricity and gas bills (estimated self-report); both were non-significant. These two predictor variables had high numbers of missing cases because

respondents were unable to provide bill estimates either due to not knowing or paying

both gas and electricity together. A number of respondents also reported not having gas in

their home. Inclusion of these variables would have excluded (using listwise deletion)

almost 40% of the sample. Therefore, we do not report the regression analyses here.

However, the pattern of significant findings does not change if bill estimates are included in

the model.

3   Results and Discussion

3.1   To what extent is affordability prioritised as an energy policy issue?

We examined to what extent our sample considered affordability an important

aspect within energy policy and transitions to a lower-carbon, more sustainable, and more

secure energy system. Despite the two survey questions directing respondents to consider

energy priorities from somewhat different perspectives (see section 2.2), affordability was

a leading choice in both questions.

In the first question, respondents identified the issue they considered most

important to think about when considering changes to the energy system as follows:

Affordable energy prices (24%) and *changing the way we produce energy (being less reliant*

on coal, gas and oil) (25%) were considered the top priorities. This was followed by:

energy independence for the UK (i.e. not having to rely on buying energy from other

countries) (17%); *helping to prevent climate change* (17%); *reducing the amount of energy*

we use as a country (10%); and *avoiding blackouts and fuel shortages* (7%).

In the second question, when asked to rank three UK government energy priorities

from most to least important, *keeping energy bills affordable for ordinary households* was

chosen as most important by 40% of the sample, followed by *making sure the UK has*

enough energy (preventing blackouts and fuel shortages) (32%) and *tackling climate change*

by using low-carbon energy sources (27%).

We clearly saw that affordability was an important issue for respondents.

Nevertheless, it was not the only issue that respondents prioritised; a significant

proportion of people opted for issues such as changes to energy production and aspects of

energy security issues. Therefore, we explored next what factors were associated with the

belief that affordability is the most important issue relative to other issues. In other words, what attitudes, beliefs, and values predict whether a person ascribes most importance to affordability, over other energy policy issues and goals?

3.2   What explains prioritisation of affordability?

We conducted two binary logistic regressions, each using one question enumerated in section 3.1 as the dependent variable. If a respondent selected affordability as most important, this was coded as 1; otherwise it was coded as 0. We included a range of potentially relevant predictor variables, including climate change perceptions, energy security concerns, beliefs about who has responsibility for making changes to the energy system, as well as personal energy affordability concerns, environmental values, and voting intention.

For the first question, that asked respondents to choose from six options in considering which issue was most important when considering changes to the energy system (Q1 in Table 1), the strongest predictors of responding that affordability was the most important issue (as defined by highest odds ratios) were: (1) concern that electricity and gas will become unaffordable for the respondent (odds ratio = 2.29) and (2) the belief that energy companies are mainly responsible for changes to the UK energy system (as opposed to the national government; odds ratio = 1.70). Whilst it seems intuitive that the lead predictor of selecting affordability should be concerns about personal affordability of energy, this additionally sheds some light on the extent to which affordability is being judged as an individual (affecting me) versus societal issue (problem for others generally).

The second leading predictor of selecting affordability is more revealing. Thirty-six percent of people who indicated that energy companies were most responsible for changes to the UK energy system selected affordability as the most important issue, whilst only 9-25% of people who selected other actors as most responsible identified affordability as the most important issue. The significant connection between perceptions that energy companies are responsible for energy system changes and thinking affordability is important raises further questions as to why such an association exists. Nevertheless, this finding is in line with the notion that people are not only concerned about the actual amount they pay, but perhaps also that they consider the perceived fair and equitable distribution of costs amongst actors in the energy system important (Demski et al., 2015; Balta-Ozkan et al., 2014).

When interpreting these data, it is important to keep in mind the other response options to the question that forms the dependent variable. Because 'changing the way we produce energy' and 'helping to prevent climate change' were other options that also received considerable support as 'most important' issues, the factors explaining selection of a response other than affordability are, perhaps, unsurprising. The leading predictors of answering that some factor *other* than affordability was most important (as defined by the lowest odds ratios) were: (1) beliefs that the UK should reduce its use of fossil fuels (odds ratio = 0.73), (2) concern about the UK having no alternatives in place other than fossil fuels (odds ratio = 0.74), and (3) beliefs that climate change is an important issue (odds ratio = 0.75). All of the variables in Table 1, in concert, explain 20% of the variation (Nagelkerke R^2) in whether or not respondents selected affordability as the most important issue.

For the second dependent variable which asked the respondents to rank the three key pillars of energy policy in terms of importance (Q2 in Table 1), the strongest predictors of responding that affordability was the most important UK energy priority were: (1) once again, concern that electricity and gas will become unaffordable for the respondent (odds ratio = 2.05) and, (2) ascribing responsibility to energy companies for ensuring changes to the UK energy system (odds ratio = 2.06). All of the variables in Table 1, in concert, explain 19% of the variation in whether or not respondents selected affordability as the most important issue in this analysis.

Similar to the previous analysis, predictors of selecting an option *other* than affordability include concern about the UK having no alternatives in place other than fossil fuels (odds ratio = 0.71), and beliefs that climate change is an important issue (odds ratio = 0.77). Perhaps most noteworthy are the findings in relation to voting intentions. The strongest predictors with regards to selecting an option other than affordability are Conservative (odds ratio = 0.50) or Liberal Democrat voting intentions (odds ratio = 0.59; reference category is Labour voting intention). Specifically, only 35% of Conservative respondents selected affordability as the most important energy priority, compared to 48% of Labour respondents. A higher percentage of Labour versus Conservative respondents also selected 'tackling climate change' as the most important priority (29% vs. 19%). Therefore, the difference in importance of affordability can be explained by Conservatives' proclivity, compared to Labour voters, to assign greater import to 'making sure the UK has enough energy' (46% for Conservatives vs. 23% for Labour voters).

Finally, we examined the amount of variance explained if personal energy cost concerns were included as the *only* predictor of affordability prioritisation in the models.

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Here we find that concerns about personal energy costs only predict 3% of variability in the first questions and 5% of variability in the second question. This suggests that whilst concerns about personal energy costs are important, they are only a small aspect of why people prioritise affordability over other aspects of energy policy. A host of other factors, some of which are captured in the full models, are relevant as well.

Table 1. Predictors of affordability being 'most important' (Binary logistics regression analyses[a])

Predictors	Question 1 (1=affordability; $R^2 = 0.20$; n=2029)			Question 2 (1=affordability; $R^2 = 0.19$; n=2020)		
	OR	95% Cl	*p*	OR	95% Cl	*p*
Personal energy cost concerns						
How concerned … that electricity and gas will become unaffordable for you?	**2.29**	**1.86-2.82**	**.000**	**2.05**	**1.72-2.44**	**.000**
How concerned … that petrol will become unaffordable for you?	1.04	0.89-1.21	.639	**1.17**	**1.02-1.34**	**.026**
Climate change perceptions						
The issue of climate change is very important to me personally	**0.75**	**0.66-0.85**	**.000**	**0.77**	**0.69-0.86**	**.000**
I am uncertain that climate change is really happening	**1.17**	**1.06-1.30**	**.002**	**1.19**	**1.09-1.30**	**.000**
Energy security concerns						
How concerned … there will be frequent power cuts?	1.03	0.88-1.22	.707	**0.80**	**0.70-0.93**	**.003**
How concerned … the UK will have no alternatives in place (e.g. renewables) if fossil fuels (gas, oil) are no longer available?	**0.74**	**0.62-0.89**	**.001**	**0.71**	**0.61-0.83**	**.000**
Reducing fossil fuels						
To what extent do you agree or disagree that the UK should reduce its use of fossil fuels?	**0.73**	**0.64-0.83**	**.000**	**0.84**	**0.75-0.95**	**.005**
Beliefs about responsibility						
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? (Reference category: national government)			.005			.000
– Environmental groups	0.53	0.22-1.27	.154	0.87	0.47-1.59	.644
– Individuals and their families	1.09	0.79-1.50	.620	1.30	0.98-1.71	.068
– Energy companies	**1.70**	**1.28-2.26**	**.000**	**2.06**	**1.59-2.68**	**.000**
– Local Authorities	1.14	0.55-2.37	.729	1.20	0.63-2.29	.570
– European Union	0.95	0.44-2.02	.893	1.53	0.85-2.75	.153
Environmental values						
Please rate the importance of the following environmental values as a life-guiding principle for you.	**0.79**	**0.67-0.91**	**.002**	**0.84**	**0.74-0.96**	**.010**
Voting intention						
How would you vote if there were a General Election tomorrow? (Reference category: Labour)			.104			**.000**
– Conservative	0.73	0.51-1.04	.081	**0.50**	**0.37-0.68**	**.000**
– Liberal Democrats (Lib Dem)	0.64	0.36-1.16	.142	**0.59**	**0.37-0.92**	**.021**
– Green Party	0.65	0.28-1.50	.310	0.71	0.40-1.26	.241
– UK Independence Party	0.84	0.48-1.49	.559	0.74	0.44-1.23	.239
– Undecided	0.89	0.64-1.24	.502	**0.71**	**0.53-0.94**	**.016**
– Other political party	1.33	0.87-2.05	.188	1.03	0.71-1.52	.866
– Would not vote / prefer not to say	1.13	0.77-1.65	.524	**0.65**	**0.45-0.92**	**.014**

[a] Odds ratios (OR) and 95% confidence intervals (95% CI); bold numbers indicate significant predictors (*p*<0.05)

5 Conclusions and policy implications

We sought to examine the extent to which members of the British public ascribe importance to affordability as an energy policy issue relative to other salient issues broadly relevant to energy transitions, for example climate change. Affordability was prioritised as the most important goal over all other issues by a substantial percentage of our sample (24% in the first and 40% in the second question we posed). This was the highest proportion for any policy issue that we asked about. Nonetheless, other issues pertaining to climate change and energy security goals were also prioritised by considerable proportions of our sample.

Furthermore, while concerns about personal energy costs are a significant predictor of why people prioritise affordability, this concern by itself only explains a small amount of variation in choosing affordability as most important. Perhaps the most striking finding from this research is that, in addition to concerns about personal affordability of energy, who one thinks is responsible for making changes to the UK energy system is closely associated with affordability being identified as most important. In both logistic regressions, respondents who thought energy companies were mainly responsible for energy transitions were about twice as likely to choose affordability as the most important issue, compared to respondents who identified the national government as most important. This indicates that whilst personal affordability of energy is relevant, beliefs about other aspects of the energy system also strongly influence whether affordability is considered the most important energy policy goal.

Future research could increase understanding of the importance of affordability in the context of energy system change by exploring why perceptions of energy company

responsibility for energy system transitions appear to be important for views on

affordability. For example, existing research points to general distrust in the UK energy

industry when it comes to issues of fairness and transparency (YouGov, 2014). These

values have been found to be important for explaining people's views in energy transitions

more generally (Demski et al., 2015). Perceptions of energy company responsibility might

therefore link to: (1) a lack of trust in these actors (Ricci et al., 2010; Mitchell and

Woodman, 2010; Rayner, 2010; Whitfield et al., 2009; Terwel et al., 2009; Mumford and

Gray, 2010), (2) beliefs about companies not contributing 'their share' to fund energy

transitions, and/or (3) the belief that energy companies can afford to pay for transitions

with their profits, so affordability should not need to be a problem for ordinary households

(Demski et al., 2015; Butler et al., 2013). All of these possible explanations relate to ethical

issues that require further exploration.

Similarly, the finding that intention to vote Labour (as opposed to Conservative) had

a strong influence on importance of affordability in the second regression deserves

additional exploration. It potentially further highlights the relevance and need for further

research on energy affordability as a societal (Moscovici, 1988) and ideological issue

(Kahan and Braman, 2006; Kahan et al. 2011), above and beyond simple personal concerns

around energy prices.

The current research strongly suggests that policies and political discourses that

only focus on personal energy costs may do little to reduce the public's perceived concerns

about affordability. Policies seeking to address affordability concerns should not simply

focus on personal costs but also encompass a wider understanding of what affordable

energy might mean to people. For example, other scholarship on public perceptions of

energy transitions is starting to reveal the importance of equity and distributive justice as an important condition upon which views on energy system change are predicated (Demski et al., 2015; Butler et al., 2013; Balta-Ozkan et al., 2014). Hence, if energy companies are perceived as taking advantage of their customers (e.g. through high profits) then policies that are simply designed to address energy prices are unlikely to address people's wider concerns about the operation of the energy system more widely.

Finally, while the current exploratory analysis was conducted on a UK sample, research on perceptions of energy policy issues in different countries mirrors these UK findings (Steentjes et al., 2017; Sovacool et al., 2012; Knox-Hayes et al., 2013). For example, Sovacool (2016) shows that affordable energy is also seen as an important aspect of energy policy in many other countries around the world. As such, understanding what drives people's high importance ratings with regard to energy affordability is an analysis relevant beyond the UK context; although the precise factors that explain why people ascribe importance to affordability may of course differ across countries. This research suggests that understanding which factors, other than concerns about personal energy costs, shape people's views on affordability is of critical importance.

References

Ault, G., Frame, D., Hughes, H., Strachan, N., 2008. Electricity Network Scenarios for Great Britain in 2050: Final Report for Ofgem's LENS Project, UK Office of Gas and Electricity Markets. Available at: https://www.ofgem.gov.uk/ofgem-publications/55665/20081107final-report.pdf.

Balta-Ozkan, N., Watson, T., Connor, P., Axon, C. Whitmarsh, L. Davidson, R., Spence, A., Xenias, D., Cipcigan, L., Taylor, G., 2014. Scenarios for the Development of Smart Grids in the UK - Synthesis Report, UKERC: London.

Boston, A., 2013. Delivering a secure electricity supply on a low carbon pathway. Energy Policy 52, 55-59.

Brody, S., Zahran, S., Vedlitz, A., Grover, H., 2008. Examining the relationship between physical vulnerability and public perceptions of global climate change in the United States. Environment and Behavior. 40, 72-95.

Brügger, A., Dessai, S., Devine-Wright, P., Morton, T., Pidgeon, N., 2015. Psychological responses to the proximity of climate change. Nat. Clim. Chang. 5, 1031-1037.

Butler, C., Parkhill, K., Pidgeon, N. F., 2013. Transforming the UK Energy System: Public Values, Attitudes and Acceptability - Deliberating energy system transitions in the UK. London: UKERC. Available at: http://orca.cf.ac.uk/49203/

DECC, 2011. The Carbon Plan: Delivering our low carbon future. HM Government. Available at: https://www.gov.uk/government/publications/the-carbon-plan-reducing-greenhouse-gas-emissions--2.

Demski, C., Butler, C., Parkhill, K. A., Spence, A., Pidgeon, N. F., 2015. Public values for energy system change. Global Environmental Change 34, 59-69.

Demski, C. C., Poortinga, W., Pidgeon, N. F., 2014. Exploring public perceptions of energy security risks in the UK. Energy Policy 66, 369-378.

Demski, C., Spence, A., Pidgeon, N. F., 2013. Transforming the UK energy system: public values, attitudes and acceptability - summary findings from a survey conducted August 2012. London: UKERC. Available at: http://orca.cf.ac.uk/49247/

Dietz, T., Dan, A., Shwom, R., 2007. Support for climate change policy: Social psychological and social structural influences. Rural Sociology 72, 185-214.

Dillman, D. A., 2007 Mail and Internet Surveys: The Tailored Design Method. John Wiley, Chichester, UK.

Ding, D., Maibach, E., Zhao, X., Roser-Renouf, C., Leiserowitz, A., 2011. Support for climate policy and societal action are linked to perceptions about scientific agreement. Nature Climate Change 1, 462-466.

Ellson, A., 2016. Cameron tells energy firms to cut fuel bills. The Times. (14 January 2016).

Energy Technologies Institute, 2015. Options, Choices, Actions: UK scenarios for a low carbon energy system transition. Available at: http://www.eti.co.uk/options-choices-actions-uk-scenarios-for-a-low-carbon-energy-system/.

Foxon, T., 2013. Transition pathways for a UK low carbon electricity future. Energy Policy 52, 10-24.

Foxon, T., Hammond, G., Pearson, P., 2010. Developing transition pathways for a low carbon electricity system in the UK. Technological Forecasting and Social Change 77, 1203-1213.

Hammond, G., Pearson, P., 2013. Challenges of the transition to a low carbon, more electric future: From here to 2050. Energy Policy 52, 1-9.

Heffron, R., McCauley, D., Sovacool, B., 2015. Resolving society's energy trilemma through the energy justice metric. Energy Policy 87, 168-176.

Kahan, D., Braman, D., 2006. Cultural cognition and public policy. Yale Law & Policy Review 24, 149-172.

Kahan, D., Jenkins-Smith, H., Braman, D., 2011. Cultural cognition of scientific consensus. Journal of Risk Research 14, 147-174.

Knox-Hayes J., Brown, M.A., Sovacool, B.K.,Wang, Y. 2013. Understanding Attitudes toward Energy Security: Results of a Cross-National Survey. Global Environmental Change 23(3), 609-622.

Leiserowitz, A., 2006. Climate change risk perception and policy preferences: The role of affect, imagery, and values. Climatic Change 77, 45-72.

Loftus, P., Cohen, A., Long, J., Jenkins, J., 2015. A critical review of global decarbonization scenarios: What do they tell us about feasibility? WIREs Climate Change 6, 93-112.

Lorenzoni, I., Nicholson-Cole, S., Whitmarsh, L., 2007. Barriers perceived to engaging with climate change among the UK public and their policy implications. Global Environmental Change 17, 445-459.

Mitchell, C., Woodman, B., 2010. Towards trust in regulation—moving to a public value regulation. Energy Policy 38, 2644-2651.

Moscovici, S., 1988. Notes towards a description of social representations. European Journal of Social Psychology 18, 211-250.

Mumford, J., Gray, D., 2010. Consumer engagement in alternative energy—Can the regulators and suppliers be trusted? Energy Policy 38, 2664-2671.

National Grid, 2015. UK Future Energy Scenarios: UK gas and electricity transmission. Available at: http://fes.nationalgrid.com/fes-document/.

Pidgeon, N.F., 2012. Public understanding of, and attitudes to, climate change: UK and international perspectives and policy. Climate Policy 12 (Sup01), S85-S106.

Pye, S., Sabio, N., Strachan, N., 2014. UKERC Energy Strategy Under Uncertainties: An Integrated Systematic Analysis of Uncertainties in UK Energy Transition Pathways. UK Energy Research Centre. Available at: http://www.ukerc.ac.uk/publications/ukerc-energy-strategy-under-uncertainties-an-integrated-systematic-analysis-of-uncertainties-in-uk-energy-transition-pathways.html.

Rayner, S., 2010. Trust and the transformation of energy systems. Energy Policy 38, 2617-2623.

Ricci, M., Bellaby, P., Flynn, R., 2010. Engaging the public on the paths to sustainable energy: Who has to trust whom? Energy Policy 38, 2633-2640.

Sovacool, B.K., 2016. Differing cultures of energy security: An international comparison of public perceptions. Renewable and Sustainable Energy Reviews 55, 811-822.

Sovacool, B.K., Valentine, S.V., Bambawale, M.J., Brown, M.A., Cardoso, T.D.F, Nurbek, S., Suleimenova, G., Jinke, L., Yang, X., Jain, A., Alhajji, A.F., Zubiri, A. 2012. Exploring Propositions about Perceptions of Energy Security: An International Survey. Environmental Science & Policy 16(1), 44-64.

Steentjes, K., Pidgeon, N., Poortinga, W., Corner, A., Arnold, A., Böhm, G., Mays, C., Poumadère, M., Ruddat, M., Scheer, D., Sonnberger, M., Tvinnereim, E., 2017. European Perceptions of Climate Change: Topline findings of a survey conducted in four European countries in 2016. Cardiff: Cardiff University

Strbac, G. et al., 2012. Understanding the Balancing Challenge, Imperial College London.

Available at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48553/5767
-understanding-the-balancing-challenge.pdf.

Terwel, B., Harinck, F., Ellemers, N., Daamen, D., 2009. Competence-based and integrity-
based trust as predictors of acceptance or carbon dioxide capture and storage (CCS).
Risk Analysis 29, 1129-1140.

United Nations Framework Convention on Climate Change, 2015. Adoption of the Paris
Agreement. FCCC/CP/2015/L.9. Available at:
unfccc.int/resource/docs/2015/cop21/eng/l09.pdf.

Ürge-Vorsatz, D., Herrero, S., 2012. Building synergies between climate change mitigation
and energy poverty alleviation. Energy Policy 49, 83-90.

Vaze, P., Hewett, C., 2012. Who Pays? Consumer attitudes to the growth of levies to fund
environmental and social energy policy objectives. Consumer Focus. Available at:
http://socialwelfare.bl.uk/subject-areas/government-issues/social-
policy/consumerfocus/whopays12.aspx.

Whitfield, S., Rosa, E., Dan, A., Dietz, T., 2009. The future of nuclear power: Value
orientations and risk perception. Risk Analysis 29, 425-437.

Whitmarsh, L., Seyfang, G., O'Neill, S., 2011. Public engagement with carbon and climate
change: To what extent is the public 'carbon capable'? Global Environmental Change
21, 56-65.

YouGov Cambridge Programme, 2014. Energy, Politics and the Consumer: YouGov-

Cambridge Spring Event, April 2014. Available at:

https://yougov.co.uk/events/cambridge/2014/04/03/energy-politics-consumer/.