



Carbon reduction scenarios for 2050: An explorative analysis of public preferences



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HIGHLIGHTS

- Examination of > 10,000 initial responses to UK government 'My 2050' simulation.
- A number of patterns were identified in the responses.
- Participants preferred renewable energy options to other low carbon supply options.
- The alignment of public preferences with government scenarios was assessed.
- The value of scenario simulations for public engagement was demonstrated with caveats.

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ABSTRACT

This paper presents an analysis of public preferences for a low carbon future UK and compares them with three future scenarios proposed by the UK government based on data from 10,983 self-selected participants who engaged in the UK Department of Energy and Climate Change 'My2050' online simulation. Participants expressed a stronger preference for demand-side options than for supply-side ones. They also chose fuel switching (to electricity) and technical energy efficiency measures above more behaviour focused options. Renewable energy options (wind, solar, marine and hydro) were preferred to other low carbon supply options (nuclear power, carbon capture and storage), with offshore wind power more popular than onshore. Nuclear power was the least popular generation option. Acceptability of the government's three proposed scenarios was tested by comparing these scenarios with the research findings. Greatest support was suggested for the two scenarios emphasising business greenness, home energy efficiency, electrification of home heating and travel behaviour. The lowest level of support was demonstrated for the scenario based on significant growth in nuclear power with minimal increases in energy efficiency. Despite issues regarding the representivity of the sampled respondents, the work demonstrates the possibility of using outputs from the tool to assess publically preferred pathways.

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1. Introduction

The Climate Change Act provides a legally binding requirement for the United Kingdom (UK) to reduce greenhouse gas emissions by 80% by 2050 (HM Government, 2008a). The government has published three preferred scenarios to achieve this target within the national Carbon Plan (DECC, 2011a). Alongside this, the Department of Energy and Climate Change (DECC) has developed public engagement tools to promote understanding of the challenges in developing carbon reduction scenarios, and encourage debate about energy futures (DECC, 2011b). Any significant effort to move towards decarbonisation of the energy supply, or reduction in energy demand or fuel switching by the public, will require significant public support due to the scale of change required (Whitmarsh et al., 2011).

One of DECC's public participation tools, the 'My2050' online simulation (DECC, 2011c), attracted over 10,000 responses between its launch in early March and the end of June 2011 (the first four months after it was launched). This paper reports on an analysis undertaken of this first tranche of responses. This is an exploratory study that has been carried out in order to test the possibilities for summarising data generated by the simulation, and to highlight where, for various reasons, caution will need to be taken in future use of the tool, or interpretation of its outputs.

Policy analysts have considerable interest in understanding to what extent the options being pursued by DECC's three scenarios align with public preferences, and would welcome information about where options clash with public acceptance or willingness to act.¹ This research investigated the outcomes of the first wave of public engagement using the 'My2050' web-tool developed by DECC, by

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¹ Kiso (2011) Department of Energy and Climate Change. Personal communication, 11 April.

scrutinising the data for preference patterns and comparing these with DECC's proposed scenarios as set out in the Carbon Plan (DECC, 2011a). The comparison with DECC's three preferred scenarios can provide some indications about how feasible each of these scenarios might be if implemented, if the self-selected respondents are sufficiently representative of the wider population. In addition to questioning the representivity of respondents, the paper also discusses whether self-reporting in this format can be reliably considered to represent actual support for policy implementation, particularly where there is a lack of clarity over who would be required to make the necessary changes. As planning for long-term carbon reduction grows as a policy area, recommendations for improvements to the 'My2050' simulation are sought to ensure public engagement aligns with good practice.² There is also growing interest in adapting the UK's 2050 carbon reduction public participation tools in other countries, including China.³ However, this type of approach would require much more rigorous evaluation and re-design to become more than a very limited test of opinion. Within the paper we also draw attention to some issues regarding the design and layout of the tool that might inadvertently skew participants' responses and, considering the current popularity of 'behavioural sciences' within UK government (Chatterton and Wilson, 2013), might merit significant further testing.

2. Background to DECC's 2050 calculator and online simulation

Following the IPCC and Stern reports, in 2008 the UK became the first country to pass legislation for long-term greenhouse gas emissions reductions (HM Government, 2008a). The Climate Change Act 2008 requires an 80% reduction in greenhouse gas emissions by 2050 (against a 1990 baseline for carbon dioxide, nitrous oxide and methane, and a 1995 baseline for other greenhouse gases). This target was determined as a result of recommendations by the Committee on Climate Change (2008), however some scientists argue that even this is not ambitious enough to mitigate serious impacts (Hansen et al., 2008).

There is a growing body of literature emerging from business, industry, academia and the NGO sector setting out road maps and exploring options for how to achieve the targets in the Climate Change Act (Centre for Alternative Technology, 2010; Ekins et al., 2011; Jamasb and Pollitt, 2011; Nicholson, 2011; Skea et al., 2011; Williams et al., 2012; WWF, IPPR and RSPB, 2007). Systematic assessments for long-term policy analysis are challenging due to the complexity of planning across timeframes where many factors remain unknown (Lempert et al., 2003). Most scenario studies examine the impact of different policy measures on technological uptake, although emerging research highlights the significant role institutional and behavioural change will also have to play in achieving a low carbon energy future. This suggests that scenario building would be strengthened if it integrates qualitative and quantitative methods (Söderholm et al., 2011). Policy decisions will need to be made in the near future about preferred low carbon scenarios for energy and transport supply and demand options, particularly for infrastructure investment, if the targets in the Climate Change Act are to be achieved (Skea et al., 2011).

Prior to becoming Chief Scientific Adviser at DECC, MacKay published several possible scenarios with associated emissions reduction calculations (MacKay, 2009). DECC subsequently published six illustrative 'pathways' outlining possible whole energy system change scenarios (HM Government, 2010). DECC has encouraged

public engagement and debate by developing tools which enable the creation of new scenarios, facilitated by online and offline versions of a '2050 Pathways Calculator' (DECC, 2010), a simplified web-based simulation called 'My2050' (DECC, 2011c) designed for wider public engagement (and which has provided the data in this study), an online debate initiated by a panel of experts, and a toolkit to enable local community participation (DECC, 2011d).

Fulfilling legal requirements for the Climate Change Act, DECC subsequently published The Carbon Plan (DECC, 2011a), which described three possible scenarios for achieving the 2050 carbon reduction targets, and illustrated them using the DECC calculator. These scenarios show possible pathways, but they are not yet actual policy choices or recommendations by DECC, since the political decision-making process to select a preferred pathway is ongoing. At the same time, DECC also published a detailed spreadsheet setting out cost ranges, land use implications and other technical data associated with choices available in the 2050 calculator (DECC, 2011b).

Public participation in development of carbon reduction policies offers the possibility of more effective policy decision-making (Castell, 2010), although the challenges in adapting the political system to enable greater democratic involvement in responding to climate change should not be underestimated (Lidskog and Elander, 2010). Public acceptance of new technologies will influence their uptake and speed of adoption, while public preparedness to adapt behaviour or comply with new legislation will test the viability of low carbon policy measures (Spence and Pidgeon, 2009). The implementation of low carbon technology changes (such as the proposed shift towards low emission vehicles) and societal change towards lower carbon behaviours (such as the increased use of public transport and car-sharing) will only be realised if they are socially acceptable (Christmas et al., 2009), yet research to understand the likelihood of extensive behaviour change towards low carbon demand-side policy options is still in its infancy (Darnton, 2008). Given the scale of societal change that is predicted to be required to reduce emissions, an understanding of public preferences for different low carbon energy and transport policies is essential (Spence et al., 2012). More recent work is indicating that increased public participation is crucial as public preferences are potentially based on complex, and far from transparent, sets of underlying values (Parkhill et al., 2013). The 'My2050' simulation is proving to be a useful tool in aiding public engagement, by providing a clear focus for discussion around a hugely complex set of issues.

This paper introduces and describes the 'My2050' tool before going on to examine an initial set of results collected over the first four months of its availability. The study evaluates the representativeness of the self-selected sample of participants, explores patterns in the data by looking at most popular choices (across the whole sample and within sub-groups), and finally attempts to compare these to the three existing DECC scenarios published in the Carbon Plan.

3. Methodology

This research explored whether there were consistent patterns within people's responses to the 'My2050' simulator that could be seen as demonstrating any clear public preferences for how significant carbon reduction can be achieved by 2050. It also tested to what extent these voluntary responses aligned with the options currently being explored by government. The research reported here involved a quasi-experimental evaluation, with a quantitative research strategy. Wider research also involved undertaking semi-structured interviews with six experts from academia and policy development (with backgrounds in the physical sciences, psychology, politics and social research). These informed the interpretation of preliminary findings, but are not analysed in this paper.

² Counsell (2011) Department of Energy and Climate Change. Personal communication, 23 March.

³ Kiso (2012) Department of Energy and Climate Change. Personal communication, 27 January, and see <http://2050pathway-en.chinaenergyoutlook.org>.

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