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Public engagement: Building Energy Futures

It is important to include the public in the processes by which decisions on societal trajectories are made. A study shows that interactive scenario-building tools can engage people in the holistic complexities of energy transitions, but these tools must be designed and used with care because elicited preferences can be influenced by contextual factors.

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There is little doubt within the scientific community that to avoid catastrophic climate change it will be necessary to significantly reduce greenhouse gas emissions over the next 35 years and beyond. The signing of the Paris Accord by 197 countries (and its ratification by 127) demonstrates that there is little doubt even among politicians. Now that we (as a global community) have, finally, agreed on the need for action, we have to decide how to achieve the massive emission reductions necessary. Although some may believe that it will be possible to achieve these reductions through technological means alone, it is more likely that we will have to change the way that we act. This could involve either behavioural modifications to adapt to new technologies (e.g. how we re-fuel our vehicles, re-timing washing to maximise the use of solar electricity), or, at the other end of the scale, significant changes to the way we organise and operate our societies and economies. Writing in *Nature Energy*, Christina Demski and colleagues from Cardiff University show that subtle changes in the way the public are engaged on these issues lead to differences in opinions and preferences, and that this has important implications for public discourse[1].

In the study, participants used an interactive scenario-building tool to explore possible pathways to achieving an 80% reduction in emissions by adjusting effort levels on seven supply-side (e.g., nuclear power, carbon capture and storage) and demand-side (e.g., home efficiency, how we travel) levers until the target was reached. Engagement with the tool generally strengthened existing preferences for renewable energy and intentions to take personal action. However, Demski and colleagues also found that patterns of energy preferences were affected by the initial settings of the levers: whether they were initially set to zero, or whether they were initially set to represent exemplar 'low-carbon living' or 'high technology future' scenarios. Specifically, energy choices were anchored by the presented exemplar scenarios, such that lever settings were closer to their original starting points. These results suggest that whilst scenario-building tools can engage the public, they must be designed, used and interpreted with caution.

The 2050 Calculator/my2050 tool (http://my2050.decc.gov.uk/) at the centre of the paper was the brainchild of the late David Mackay and developed during his time as Chief Scientific Adviser at the UK Department of Energy and Climate Change. This tool was designed to advance public engagement with ongoing energy transitions by providing numbers, grounded in physics, that could

be used to judge both public preferences and political policies in terms of whether they would actually meet the necessary carbon and energy targets. Furthermore, the my2050 tool reflects some of the complex interactions between parts of the energy system (e.g., the need to decarbonise the electricity supply to achieve emission reductions through electric vehicles),, which can be more informative than eliciting preferences for or evaluating individual components presented in isolation.

The concept of the 2050 calculator has been adopted in a range of other countries with UK support, including China, India, Colombia, South Africa and Mauritius. However, the reason for its apparent global transferability is one of its main areas of weakness: because it was developed from a physics perspective, focussing on 'the numbers', the 2050 tools have a strong bias towards the promulgation of technical solutions for reducing and decarbonising energy consumption. In doing so, they pay little heed to the changes in behaviour that are going to be necessary to adopt new technologies on the scale required, or those changes in behaviour that could circumvent the need for deploying new technologies (at least on the grand scales offered by the tools - the literature accompanying the 2050 tools does not shy away from describing the potential effort required to meet the targets using terms like "heroic" or "stellar"[2]). The tools give even less attention to how we might bring about decarbonisation through changes in the way societies and economies are structured and operate. Also, when considering societal futures, it is not just the energy system that we need to consider. To achieve public acceptance of some options, it is likely that we may need to ensure that changes also address non-energy issues such as the growing health inequalities in developed countries[3].

These criticisms do not prevent the tools as they stand from being of considerable use, particularly in the context of providing some fixed point for discussion in the complex world of public engagement and opinion. Also, as clearly demonstrated by Demski and colleagues, these tools also provide a useful way to explore the process of engagement, by examining the effects of different approaches, particularly around how problems (and solutions) are framed.

By showing how subtle differences in initial tool settings can have significant impacts on user preferences, Demski and co-authors demonstrate that public opinions with regard to energy futures are malleable. Although within the study they only examine the framing provided by initial lever settings, the work clearly highlights the risk that other, often subtle, framings will steer the preferences expressed by the public. These framings may occur within the tool itself (for example, in the options provided or the specific way those options are described), within the context in which the tool is being used (for example, deployed anonymously via the internet as in this case, or used within a workshop at an engagement event), or even through wider contemporary social influences. With respect to this last point, we may wish to consider the potential influence of current political dialogue and action on how people view their preferred future. There is good evidence to suggest that changes in government policies can have a measurable impact on people's values (as opposed to people's values driving the direction of public policy)[4], and there are concerns in both the UK and US that in recent years policy has maintained a 'climate silence' (see[5, 6]). Particularly in light of the more recent rise in 'populist' climate-sceptic or anti-environment politics in these and other countries, the work by Demski and colleagues demonstrates how important it will be to have high-profile and active engagement on energy and environmental issues if we are to maintain and increase public acceptance and support for a transition to a just and equitable low-carbon society.

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