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| Institution: Cardiff University | | |
| Unit of Assessment: Psychology, Psychiatry and Neuroscience (4) | | |
| Title of case study: Public engagement as a vital facilitator of policy change aligned to net zero carbon emissions | | |
| Period when the underpinning research was undertaken: 2013 - 2018 | | |
| Details of staff conducting the underpinning research from the submitting unit: | | |
| Name(s): | Role(s) (e.g. job title): | Period(s) employed by submitting HEI: |
| Nick Pidgeon Christina Demski | Professor Senior Lecturer | 01/02/2006 – present 01/07/2011 - present |
| Period when the claimed impact occurred: 2017 - 2020 | | |
| Is this case study continued from a case study submitted in 2014? No | | |
| 1. Summary of the impact (indicative maximum 100 words) | | |
| <p>Meeting the UK's legislated net-zero commitment to tackle climate change requires extensive changes, not only to energy infrastructure but also to people's behaviour. Cardiff-led research investigating public attitudes to future green energy systems, and everyday consumption, demonstrated that people strongly support renewable energy sources and a less wasteful economy, dispelling perceptions that the public would resist significant change. This changed UK policymakers' thinking and embedded public engagement within the Resources and Waste Strategy for England and the Scottish Energy Strategy. Cardiff's research also gained international reach through inclusion in the UN's climate change communications guidance.</p> | | |
| 2. Underpinning research (indicative maximum 500 words) | | |
| <p>The UK government's target of net zero carbon emissions by 2050 is unlikely to be met without a public mandate or 'social contract' for any new approaches that need to be adopted. Cardiff's Understanding Risk Research Group led two major projects to systematically investigate public attitudes to whole energy system change: the transformation of energy production and consumption required to meet the net-zero emissions target.</p> | | |
| 2.1 Transforming the UK energy system: public values, attitudes and acceptability (UKERC) project | | |
| <p>The Cardiff team led a UK Energy Research Centre (UKERC) funded project [G3.1] to elicit greater understanding of public perceptions of changes to the whole energy system. UKERC is an independent research centre funded by the UK Research and Innovation (UKRI) Energy Programme, which carries out research into sustainable energy. The Cardiff project was the first research study to consider public acceptance of the overall transformations required to decarbonise the UK energy system across all elements of supply, demand, infrastructure and human behaviour.</p> | | |
| <p>The Cardiff team developed a detailed empirical understanding of how the UK public views future energy system changes [3.1, 3.2]. They used interviews with stakeholders, six one-day qualitative public workshops in England, Scotland and Wales, and a UK representative quantitative survey (n=2,441). The research found that most of the British public are overwhelmingly committed to moving away from fossil fuels towards a new energy system that is affordable but modern and safe [3.3, 3.4].</p> | | |
| 2.2 Centre for Industrial Energy, Materials and Products (CIE-MAP) project | | |
| <p>CIE-MAP is funded by UKRI's Energy Programme to identify opportunities in the product supply chain that could deliver a reduction in industrial energy use. The Cardiff team led a CIE-MAP project [G3.2], which extended the UKERC project methodology using interviews and four two-day qualitative workshops; it also ran a nationally representative survey</p> | | |

(n=1,093) to investigate public beliefs about scenarios for reducing the energy used in the production and manufacture of consumer products (known as consumption carbon emissions). Using consumption-based emissions modelling alongside the attitudes data, the project confirmed the findings of the UKERC project and found significant public support for a range of resource efficiency strategies. If combined, they could reduce the UK's carbon footprint by up to 29 MtCO₂e (a 39% emissions reduction from household products such as cars, clothing, electronics, appliances and furniture) [3.5, 3.6].

2.3 Overall research findings

For the first time, the projects strongly evidenced public willingness to move away from using finite polluting energy sources [3.4] and wasteful modes of energy consumption [3.4, 3.5]. The Cardiff team also codified a set of fundamental values that would need to be met for energy system transformation and greener consumption to be acceptable, a "social contract for change" [3.1, 3.4]. In combination, the three most important values were:

- being more efficient (e.g., better product design);
- minimising waste and overall energy usage (e.g. changing how products are used);
- using renewable energy.

Other values that people wished to be considered in future energy systems were [3.1]:

- protection of the environment and nature through minimising destructive processes;
- ensuring security of energy supply to all citizens through reliability, affordability, availability and safety, while being mindful of national and personal autonomy;
- developing energy systems in ways that are transparent, fair and attentive to how people can lead healthy lives;
- ensuring that changes that occur represent genuine (technological and social) improvements.

Cardiff's research showed that public acceptability of any element of a green energy system transformation will depend upon how well it aligns to the aforementioned values. These values provided a basis for the robust inclusion of public and social perspectives in framing effective and transformational policies and options for energy futures. The Cardiff research further provided a foundation for anticipating and understanding likely public responses (resistances and enthusiasm), alongside consideration of technical and economic assessments of energy systems. It highlighted how, given the right resources and opportunity, citizens will engage systematically and intelligently with energy system change, hence offering a novel methodology for policy makers and academics to use in the future [3.3].

3. References to the research (indicative maximum of six references)

[3.1] Demski, C.C., Butler, C. Parkhill, K.A., Spence, A. and Pidgeon, N.F. (2015) Public values for energy system change. *Global Environmental Change*, 34, 59-69. DOI: 10.1016/j.gloenvcha.2015.06.014

[3.2] Demski, C.C., Spence, A. and Pidgeon, N.F. (2017) Effects of exemplar scenarios on public preferences for energy futures using the my2050 scenario-building tool. *Nature Energy*, 2, article 17027. DOI: 10.1038/nenergy.2017.27

[3.3] Pidgeon, N.F., Demski, C.C, Butler, C., Parkhill, K.A. and Spence, A. (2014) Creating a national citizen engagement process for energy policy. *Proceedings of the National Academy of Sciences of the USA*, 111 (Sup4), 13606-13613. DOI: 10.1073/pnas.1317512111

[3.4] UKERC (2013) *Transforming the UK energy system: public values, attitudes and acceptability - synthesis report* (authors Parkhill, K., Demski, C.C., Butler, C., Spence, A. and Pidgeon, N.F.). London: UK Energy Research Centre. DOI: 10.1038/s41558-018-0298-3

[3.5] Cherry, C.E., Scott, K., Barrett, J. and Pidgeon, N.F. (2018) Public acceptance of resource efficiency strategies to mitigate climate change. *Nature Climate Change*, 8, 11, 1007-1012. DOI: 10.1038/s41558-018-0298-3

[3.6] CIE-MAP/Cardiff University (2018) *By Popular Demand. What people want from a resource efficient economy.* (authors Peake, L., Cherry, C.C, Steentjes, K., Scott, K. and **Pidgeon, N.F.**). London, Green Alliance
www.green-alliance.org.uk/resources/By_popular_demand.pdf

Selected grants:

[G3.1] Pidgeon N.F. (PI), 'Transforming the UK energy system: public values, attitudes and acceptability: UK Energy Research Centre (UKERC)' NERC grant NE/G007748/1, £585,000, 2011-2013.

[G3.2] Pidgeon N.F. (PI) Centre for Industrial Energy, Materials and Products (CIE-MAP) project, EPSRC grant EP/M008053/1, £748,480, 2015-2019.

4. Details of the impact (indicative maximum 750 words)

Four types of impact arose from Cardiff's research including changes to: 1) UK environmental regulation; 2) UK policy thinking; 3) processes for engaging citizens in energy system change; and 4) international climate change communication practice.

4.1 Changes to UK environmental regulation

In November 2018, the Cardiff team and Green Alliance published '*By popular demand: what people want from a resource efficient economy*' **[3.6]**. Pidgeon was subsequently invited to present his research findings at a private meeting between himself and the Prime Minister's environment special advisor Lord Randall in December 2018 **[5.1]**. The report's recommendation, that the UK government should extend producer responsibility for the end use of its products as both a publicly acceptable and highly resource efficient strategy, was implemented by the UK government in its '*Resources and Waste Strategy for England*' **[5.2]**. This sets out how the government will double resource productivity and eliminate waste by 2050: "Extended Producer Responsibility' (EPR) is a powerful environmental policy approach through which a producer's responsibility for a product is extended to the post-use stage. This incentivises producers to design products to make it easier for them to be reused, dismantled and/or recycled at end of life" **[5.2a, p31]**.

The evidence Annex underpinning the UK's Resources and Waste Strategy references the findings of Cardiff's CIE-MAP project, specifically: "CIE-MAP and Green Alliance (2018) found most people see the need to shift towards a society that uses resources more efficiently. The study also found 60% were supportive of a 'drastic shift' towards a resource efficient society even if that changed the way they live. People tended to favour approaches that were carried out by others (e.g. redesigning packaging) or were not too restrictive (e.g. a collaborative economy)" **[5.2b, p10]**.

The UK Environment Bill 2019-2021, which sets out a new framework for the UK's environmental law post-Brexit, also incorporates a recommendation from Cardiff's CIE-MAP report, specifically to extend the requirement for "*ecodesign principles to apply to resource efficiency as well as energy efficiency*" **[5.1]**. The intended consequence of this recommendation is to drive reductions in consumption carbon emissions. In December 2020, the Bill was partway through legislative passage (at report stage in the House of Commons, where MPs have the opportunity to consider further amendments to the Bill).

4.2 Changes to UK policy thinking

Cardiff research also changed views within the UK climate and energy sector about public willingness to accept and engage with the transition to sustainable practices. Cardiff's UKERC project findings gained extensive media coverage when launched and have been used by government, industry and NGOs. For example:

a. UK Parliament via Government Chief Scientist

In July 2013, Pidgeon was invited by Claire Craig, Director of the UK Government Office for Science (GOScience), to conduct a one-to-one briefing with the Government Chief Scientist Sir Mark Walport on the findings of the UKERC project. Craig describes the impact of the briefing: "*Sir Mark's thinking, and the thinking within GOScience, were influenced by this*

meeting and Professor Pidgeon's research...Sir Mark used a slide with a summary of the findings from the UKERC energy systems project as part of his standard presentation on UK climate change and/or energy policy for some period afterwards." [5.3] The UKERC report also had an impact on the approach taken to major public policy issues by Walport as it led to him "*considering the importance of public attitudes*", which was "*much less common amongst scientific advisors at the time than it is now*" [5.3]. Craig also affirms that while it is difficult to directly link research impact to policy framing, due to the fluid ways in which policies evolve, "*this is one of the rare cases where the link between specific pieces of research and subsequent policy framing and communication is about as robust as it is possible to be*" [5.3].

b. Energy Research Partnership

The Energy Research Partnership (ERP) was set up by the Chancellor in 2005 to provide guidance and leadership to government on UK energy research and innovation. In 2014, the ERP's report '*Engaging the Public in the Transformation of the Energy System*' recommended that a communications process known as a "Strategic Narrative" is used to engage the public at national, local and individual levels in the transition to a low-carbon energy system. The summary quotes Cardiff's UKERC research: "Crucially the Strategic Narrative must resonate with its audiences and address the issues that are important to them, so as to engender trust... Recent work by UKERC provides a valuable starting point" [5.4, p4].

c. Green Alliance

Green Alliance is a charity and think tank working with politicians and policy makers in the UK government. Libby Peake, Head of Resource Policy, describes Pidgeon's work and the CIE-MAP project as "*foundational*" to the Green Alliance's current thinking "*about the important role that public attitudes can play in shaping sustainable and socially acceptable environmental policies*" and states that it had "*demonstrable impact at the very highest level of the UK policy world*" [5.1]. Examples include:

- The '*By popular demand*' [3.6] report "*continue[s] to influence UK government policy*" [5.1]. The House of Commons Environmental Audit Committee (EAC)'s report on '*Electronic Waste and the circular economy*' published in November 2020 refers to the CIE-MAP findings on Extended Producer Responsibility and the Committee concluded that "*When products are designed, durability and repairability should be key considerations*" [5.1].
- A Green Alliance project examining how the UK tax system can be transformed to embed environmental considerations (e.g., replacing VAT with carbon or material taxes) was developed from the CIE-MAP research findings. The Green Alliance's initial report, '*Added value: improving the environmental and social impact of UK VAT*', "*drew heavily on CIE-MAP research*" [5.1].
- Another 2015 Green Alliance report '*Opening up infrastructure planning: the need for better public engagement*' referenced Cardiff's research to conclude that securing a public mandate for new infrastructure will be essential to successful delivery: "An extensive study [UKERC] found that the British public "wants and expects change with regard to how energy is supplied, used and governed" with the caveat that politicians are expected to deliver the energy transition in a way that aligns with public values" [5.5, p6]. This recommendation was taken up in a joint Department for Business, Energy and Industrial Strategy (BEIS)/Sciencewise public dialogue project exploring public attitudes towards carbon capture, usage and storage (CCUS). Pidgeon co-chaired the oversight board and the project outputs are a resource for future CCUS policy development [5.6].

4.3 Changes to processes for engaging citizens in energy system change

The UKERC project's novel methodology and template for public engagement with sustainable energy system change have been adopted at UK and Scottish Government levels:

a. Evidence underpinning the 2017 Scottish Energy Strategy

As a direct result of the UKERC research [3.1, 3.2], Demski and Pidgeon were commissioned by the Scottish Government to write an evidence review of the Scottish public's views on energy system change: '*Public Engagement with Energy System Change in Scotland*' [5.7].

This provided evidence for the 2017 Scottish Energy Strategy which maps out Scotland's transition to secure, affordable and clean energy until 2050. The Strategy refers to Cardiff's evidence review and states: "This kind of insight is essential to finding the best ways to reach and inform wider audiences [about the Energy Strategy in Scotland], and the best range of communication tools and channels to use" [5.7, p87].

b. 2019 UK Parliamentary Report 'Future of Gas' recommendations

A report launched in 2019 by the Minister for Climate Change, Lord Duncan, and backed by MPs called for an urgent Green Heat Roadmap by 2020 to scale low carbon heat and support the public in implementing greener heating choices. Pidgeon and Demski sat on the steering committee for the year-long enquiry and their research on a national citizen engagement process for energy policy [3.4] was cited: "...a broader approach to public engagement with energy is likely to be required to facilitate the profound societal changes necessary in a transition to a low carbon society. This type of engagement strategy is important firstly to ensure a more engaged public, and secondly to help policy-makers make better policy through improved understanding and integration of public attitudes and preferences" [5.8, p43].

4.4 Changes to international climate change communication practice

The UKERC research findings underpinned one of the principles in the UN's Intergovernmental Panel on Climate Change (IPCC) 2018 Climate Outreach Handbook, *'Means of Public Engagement on Energy and Climate Change'*. The IPCC is responsible for assessing the science related to climate change. The Handbook provides communication and public engagement guidance for all IPCC Authors globally. Principle 3 notes: "In an analysis of public perceptions of the changing energy system in the UK, researchers at Cardiff University identified the following values that underpinned people's views about a range of energy technologies, as well as 'demand side' changes to household energy use...it provides a useful starting point for conversations about tackling climate change" [5.9, p12].

In summary, Cardiff's research demonstrated the importance of public engagement as a vital part of the strategy to build a net zero society and economy. This work was fundamental to government policy change for the UK and Scottish Governments, as well as approaches and reports undertaken by NGOs including the Green Alliance and Intergovernmental Panel on Climate Change to directly engage citizens in energy system changes.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[5.1] Testimonial: Libby Peake, Green Alliance Head of resource policy

[5.2] a. 'Our Waste, Our Resources: A Strategy for England Report' b. 'Our Waste, Our Resources: A Strategy for England Evidence' Annex

[5.3] Testimonial: Dr Claire Craig, Director of Science at the Government Office of Science, (2013)

[5.4] 'Engaging the Public in the Transformation of the Energy System'. London, Energy Research Partnership, May 2014

[5.5] 'Opening up infrastructure planning: the need for better public engagement'. London, Green Alliance, 2015

[5.6] 'Public dialogue commences on Carbon Capture Usage and Storage'. BEIS/ Sciencewise CCUS public perceptions Oversight Group meeting online workshop materials and Sciencewise press release

[5.7] 'Public engagement with energy system change in Scotland.' A report for ClimateXChange and the Scottish Government and 'Scottish Energy Strategy; The Future of Energy in Scotland', 2017

[5.8] 'Uncomfortable Home Truths: Why Britain urgently needs a low carbon heat strategy', Future Gas Series, Part 3

[5.9] Climate Outreach (2018) 'Principles for Effective Communication and Public Engagement on Climate Change: A Handbook for IPCC Authors'. Oxford