Perception Spillover

The impact of fracking on public perceptions of other technologies

Key findings

- Perception spillover from fracking could lead to widespread negative perceptions of deep geothermal energy and potentially other technologies involving drilling or pumping underground
- In contrast, perception spillover could result in more positive attitudes towards green hydrogen because it is perceived as dissimilar to fracking
- The research provides insights into the conditions for acceptance that deep geothermal would be expected to meet
- Perception spillover is multi-dimensional, manifesting as 'spontaneous', 'prompted' or 'primed'

Transforming energy supplies in order to reach 'net zero' emissions requires the development and large-scale deployment of novel energy technologies. Public support or opposition toward such technologies can be decisive in whether they are deployed successfully, as illustrated by the case of hydraulic fracturing ('fracking') for unconventional oil and gas. Public concerns over fracking have included: water supply impacts; carbon emissions; local pollution and disruption; induced seismicity (earth tremors); and concerns over procedures for decision-making.

For this study, we wanted to understand the impacts of the fracking controversy on *other* technologies, particularly those which could play a role in the UK's low-carbon energy transition. Work on energy systems has shown that we need to take a whole-systems approach to understanding the energy transition. Therefore, it is valuable to understand whether public opposition and controversy in one area may have knock-on impacts to other parts of the system.

This study used a nationally-representative survey in the UK and two focus groups in South Wales, to understand the impact of the fracking controversy on public perceptions of two novel low-carbon technologies:

- Green hydrogen from electrolysis (without underground storage)
- Deep or 'enhanced' geothermal systems.

We chose deep geothermal as a 'similar' technology to fracking due to its use of deep underground drilling, and green hydrogen as a more dissimilar technology. We also generated findings regarding public perceptions of green hydrogen (Cox & Westlake, 2021). Survey participants were randomly assigned to answer questions about either green hydrogen or deep geothermal, before and after receiving information on fracking. Two focus groups were conducted online, using the same information provided in the survey.

Results

Our study finds that negative perceptions of fracking are an important factor in people's perceptions of deep geothermal. We term this 'negative spillover'. We found that some people make **spontaneous** connections between the two technologies – in fact, participants mentioned fracking within the first few minutes when discussing deep geothermal. In these cases, the fracking controversy is salient enough to act as the main 'risk association' that informs people's opinions of the novel energy technology. When other participants were then **prompted** to think about fracking, thus triggering latent associations, the proportion of negative spillover increased noticeably to nearly half the sample in our survey. When participants were then **primed** with detailed information about fracking, additional negative spillover occurred, but also some positive spillover because deep geothermal was considered somewhat preferable to fracking.

For green hydrogen on the other hand, we found no evidence of spontaneous associations with fracking. However, after being prompted to think about fracking, many participants in the survey and focus groups felt more positive about green hydrogen because they perceived it as different from fracking. Similarly, when primed with detailed information about fracking, the proportion of positive spillover was much greater than that for negative spillover.

Taken alongside previous work on Carbon Capture and Storage (CCS), we suggest that techniques with an underground drilling/injection component are most vulnerable to perception spillover effects from fracking. Our participants perceived the deep underground as unknowable, containing an intrinsic threat, and a place where changes are potentially irreversible. Perception spillover from fracking could therefore impact many other techniques not included in this study, including CO_2 injection, compressed air energy storage, and hydrogen storage.

That said, it is notable that participants mostly expressed *conditional* acceptance for deep geothermal, even in the presence of strong negative spillover effects. Participants reflected on whether deep geothermal's status as a renewable energy source should justify pursuing it despite worries about drilling and induced seismicity. Therefore, negative perception spillover doesn't necessarily lead to complete rejection of a technique – instead, it shows us some important conditions for acceptance. Where perception spillover from fracking occurs, however, such conditions might be very stringent, and relate directly to the conditions that fracking was perceived to have failed to meet.

The study also demonstrates that perception spillover is multifaceted and arises in different ways, depending on people's knowledge, perspectives, and how they obtain and process information. We present these forms of spillover as: spontaneous, prompted, and primed. While a minority of people may spontaneously make connections between a familiar and an unfamiliar technology, a greater proportion are likely to see the connections once prompted by the mentioning of the familiar technology, even if any similarity between the two is not explicitly stated. A remainder may make connections only when primed with further information. All of these forms of spillover have the potential to occur when new technologies are proposed, planned, and introduced.

Recommendations

This research is highly policy relevant, due to the need to develop new energy technologies (including but not limited to green hydrogen and deep geothermal), and some ongoing

controversy about the role of fracking in the UK energy mix. From the outcomes of the research, we propose the following recommendations for regional, devolved and UK national policy:

1. Take the lessons from the fracking controversy seriously. There is much to be learnt from the public response to fracking. In particular, attention should be paid to the following conditions that many people and communities perceived fracking had failed to meet:

- Procedural justice (including people in decision processes on issues that affect them)
- Place-technology fit (using the right technology in the right place, paying attention to social and landscape context)
- Distributional aspects (aiming for a fair distribution of risks and benefits. Note that community benefit payments are often not sufficient, and in the case of fracking were widely perceived as bribes)

2. Do not attempt to downplay similarities between technologies. The latent and spontaneous associations we identified between deep geothermal and fracking mean that attempting to ignore or downplay similarities may backfire if people feel they are being misinformed.

3. Get the conditions right. We did not find evidence that deep geothermal will encounter significant public opposition in the same way as fracking, *provided* some necessary conditions are met. Key acceptance conditions we identified for deep geothermal include:

- The perception of shifting away from fossil fuels. In our study, this was a key issue which differentiated deep geothermal (conditionally accepted) from fracking (widely disliked)
- Transparency of decision-making
- Solid mechanisms for public participation
- Well-understood and well-regulated monitoring and control systems

4. Commit to coherent policy narratives. Rather than trying to avoid or 'communicate around' perception spillover, a more beneficial approach may be to openly acknowledge and attempt to move past it, for instance by supporting climate policy narratives which commit to the phase out of fossil fuels. This would help to avoid perceptions that deep geothermal is a 'non-transition'.

This Policy Brief is based on:

Westlake, S., John, C.H.D. & Cox, E. (2023) Perception spillover from fracking onto public perceptions of novel energy technologies. *Nature Energy.* https://doi.org/10.1038/s41560-022-01178-4

Cox, E. & Westlake, S. (2022) Public perceptions of low-carbon hydrogen. *UK Energy Research Centre.* https://ukerc.ac.uk/news/public-perceptions-of-low-carbon-hydrogen/

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