

Case Study

A Public Dialogue on Geoengineering

Vital statistics

Commissioning body:

Natural Environment Research Council (NERC), in partnership with the Royal Society and supported by the Living with Environmental Change programme (LWEC).

Duration of process: 14 months:
February 2010 – March 2011

Number of public participants:
85

Number of experts/stakeholders involved: Experts/stakeholder = 74
Steering Group = 15
Management team = 8

Cost of dialogue project:

£182,000
Sciencewise-ERC funding = £85,000

Geoengineering technologies (or climate engineering) involve the deliberate and large-scale manipulation of the Earth's climate to counteract the effects of climate change and global warming. There are two main types of geoengineering technologies: carbon dioxide reduction (CDR) techniques, which aim to reduce greenhouse gases in the atmosphere directly by removing CO₂ from the air, and solar radiation management (SRM) techniques, which seek to limit the sunlight reaching the planet by reflecting more of the sun's energy back into space.

There are now significant national and international policy initiatives to tackle global warming and climate change. To date, most climate change research and policy has focused on reducing greenhouse gas emissions. The development of geoengineering technologies has different moral, ethical and societal implications. For example, some commentators have suggested that geoengineering presents a moral hazard because it threatens to reduce the political and popular pressure for emissions reduction. Questions have also been asked about the preservation of what the public perceive to be 'natural systems', as well as the potential consequences of geoengineering.

Key messages from the public

Key issues raised by public participants in the dialogue include:

- Public participants were not against geoengineering as a matter of principle, but there were questions about governance and ethics as well as concerns with specific technologies
- Overall, CDR techniques were favoured over SRM. Some technologies were considered more acceptable than others:
 - Afforestation and biochar were preferred because they were seen as 'natural' approaches
 - Support for ocean-based methods such as iron fertilisation and liming was low, though at the reconvened event (see page 3) participants were more prepared to consider these
 - Support for air capture increased as the dialogue progressed. Participants liked the fact that it could be carried out locally without the need for international regulation, and may produce quicker results than afforestation
- There was less support for SRM technologies, as these were not seen to tackle the root cause of climate change (which participants considered to be greenhouse gases):
 - Cloud whitening and sulphate particles were the most positively received of the SRM technologies, but were not endorsed by a majority
 - Mirrors in space were seen as expensive and risky, and white roofs were viewed as likely to be ineffective and not feasible. Neither received much support
- Public attitudes towards government, science and institutions formed an important context for their views on climate issues
- Participants' views of the seriousness of climate change affected their views on geoengineering
- Participants found it difficult to envisage the scale of likely climate change impacts, and found it useful to have imagery that expressed these on a human scale
- Participants found it difficult to form firm views on the issues, not only because of perceived levels of uncertainty about climate change, but also because of uncertainty around the technologies, none of which has been developed for geoengineering on a large scale to date
- The concept of 'natural' processes evoked a strong emotional response. There was a widespread belief that 'natural systems' are balanced and self-contained, and should be respected
- Participants felt it was both ethically and practically important to link any new climate change solutions to



Background

NERC already supports a wide range of research relevant to geoengineering. Early in 2010, the Council was expected to start to take decisions on its priorities around geoengineering and come to informed investment decisions in this area. Taking account of the Royal Society's recommendations for public involvement¹, NERC wanted to understand public opinion on how, and to what degree, geoengineering-related research should go forward, and where priorities should lie.

A public dialogue was considered the most appropriate way to engage people on the topic. In Spring 2010, NERC and Sciencewise-ERC, together with LWECC, the Royal Society and the Engineering and Physical Sciences Research Council (EPSRC) came together to run a public dialogue.

continued mitigation. This contradicts the 'moral hazard' argument that geoengineering would undermine popular support for mitigation or adaptation

- The majority favoured the combination of several different international geoengineering approaches with international, national and individual mitigation efforts
- Participants did not see ethical issues as inherently separate from scientific and economic ones
- Participants drew a distinction between deliberately manipulating the climate (through geoengineering), which they saw as less acceptable, and manipulating the climate accidentally as a consequence of industrialisation, which was seen as regrettable, but more acceptable
- At the end of the dialogue, participants gave cautious support to research in geoengineering provided their principles and caveats were addressed in future decision-making, that further research was undertaken to understand the risks and that there was continued public engagement.

Policy influence

- The results of the dialogue gave NERC the confidence to proceed with research in this area within specific principles
- The dialogue results fed into an EPSRC-led 'sandpit'² on priorities for future funding of geoengineering research. The first day of the sandpit discussed moral and ethical issues that had been raised in the dialogue
- The sandpit agreed that the two projects it recommended for research council funding should both have public dialogue components as this dialogue had proved so valuable; one of

the projects has reflected on this dialogue and is using this as a starting point for its own investigations.

The dialogue activities

The aim of the dialogue was to identify and understand public views on geoengineering, including its moral, ethical and societal implications, to help inform the future planning, conduct and communication of geoengineering research by NERC and other funding bodies.

It was also hoped that the dialogue may be of value to science users, such as industry and policy makers, who may play a role in further research and deployment of geoengineering, as well as to science communicators.

The specific objectives of the project were:

- To better understand the public's perceptions and opinions of geoengineering research
- To inform the development of geoengineering research in NERC's strategy, based on the widest range of views and opinions
- To identify areas of particular public concern about geoengineering, and ensure new research takes account of the needs and concerns of society on this topic
- To increase public awareness of geoengineering and its potential implications through dissemination of the results
- To inform policy makers (e.g. in the Department for Energy and Climate Change (DECC)) of the outcomes, to help inform policy-making in this area, as well as potential business users

¹ The Royal Society report *Geoengineering the Climate: Science, Governance and Uncertainty* recommended research investment of £10 million per year for the next 10 years. <http://royalsociety.org/Geoengineering-the-climate/>

² A sandpit is a residential interactive workshop over 5 days involving 20-30 participants, the director, a team of expert mentors and a number of independent stakeholders. This sandpit was run by the Engineering and Physical Sciences Research Council (EPSRC).

- To identify particular requirements for further dissemination from the research.

A Steering Group of scientists and science communicators, and representatives from government, business and non-governmental organisations (NGOs) was established to oversee the project and to contribute to the development of stimulus materials for the dialogue workshops.

The dialogue events involved three groups of up to 30 people (85 in total, selected by professional recruiters to give a representative sample of the local population) who met in Cardiff, Birmingham and St Austell (Cornwall). Each group met for a full day (Event 1), and was then reconvened for a second full day (Event 2) a week later. At Event 1 the public met with scientists and learned about climate change and geoengineering approaches. At Event 2 the public discussed values, principles and ethics, and received contributions from science ethicists. Around one third of the public participants from each of the three areas (31 in total) then attended a final workshop event that took place at NERC's National Oceanography Centre at the University of Southampton. Here, public participants met with NERC staff, scientists and other stakeholders to discuss their thoughts and findings from the earlier workshops.

The public dialogue focused on nine geoengineering technologies. These broadly reflected those discussed in the Royal Society's earlier report. More detailed public views on all these technologies are in the final dialogue report.

The core public dialogue events were supplemented by additional engagement streams:

- Three open access events were held in Cardiff, Birmingham and Oxford in partnership with the British Science Association
- Targeted discussion groups held with specific sections of the general public. Discussions were held in Cardiff with a group of ten residents living in an area considered to be at risk of flooding and in Birmingham with ten young people, aged 16 to 18, to capture a sample of views from the next generation. Both discussions were shorter versions of Event 1 (lasting three hours) and covered all nine technologies
- The Royal Society hosted a meeting with NGOs to discuss the issues around the dialogue and invite their views and input. (They, along with other stakeholders who had expressed interest, were continually consulted around the materials used for the dialogue)
- A qualitative online survey was conducted, with responses received from 65 people and organisations.

Summary of good practice and innovation

- Public participants appreciated the effort that had been made in the workshops to convey complex ideas in simple terms and valued the presence of scientists as participants discussing issues with them
- The overall delivery of the dialogue workshops by the contractors' team was highly professional and well organised, and ensured that participants could focus on exploring issues
- Involving the management team and the steering group in clarifying the process, and resolving differences about the stimulus materials in advance of the dialogue workshops, was very effective
- The timing of the dialogue process was important, in that it was linked into the NERC research development process as well as the EPSRC sandpit on geoengineering research. This, together with the active involvement of key personnel from NERC, provided good conditions for the dialogue process to have influence.

Lessons for future practice include:

- Value and cultivate the benefits of bringing the public and scientists together in scientific discussions. All those involved indicated they found the process valuable
- Ask members of the public to use their own knowledge and expertise, without them needing to become scientists. Some participants expressed concern about how their views might be used, emphasising that they were not 'experts' and that they had not been given the necessary information to be able to make decisions
- Be clear about the scope of the project and make sure this is clear throughout, particularly about what the public can and cannot influence
- Scientist participants indicated, during and after the dialogue workshops, that they realised the value of discussing science with the public and were ready to promote this to their organisations. However, this change in attitude was not communicated to the public participants, who would value clearer evidence of how their input has been used and what impact it has had
- It is worth investing time and resources in making partnerships between stakeholders work. The partnership working involved was highly valued by those taking part, but significant time was required for project management to make these relationships work
- Public dialogue and market research have different purposes. Dialogue (such as in this project) involves deeper engagement and can encourage the co-production of outcomes, deliberation and social learning; market research asks people for information on their attitudes and concerns. They are different, but each approach has value depending on the purpose of the engagement. Here, there was some lack of understanding among scientists about the nature of the process and, therefore, the status of the findings that resulted
- The design of the events was very good, but the amount of information provision in Events 1 and 3 limited time for longer discussions between participants. This was regrettable, but perhaps inevitable given the complex nature of the topic.

Impacts

Policy impacts are covered on the second page of this summary. This section examines the impacts on all the participants in the process.

Impacts on policy makers and policy organisations:

- The findings had a direct impact on funding policy for the research councils in geoengineering as it showed a clear impact on the projects funded through the sandpit and also influenced research council strategies in this area
- It was felt that the findings would help policy makers – not just research councils funding policy, but also government policy makers, by providing a clearer picture of public opinion, priorities and values, and contributing to how the scientists and others involved plan public communications in future. DECC was represented on the steering committee and both DECC and the Department for Environment, Food and Rural Affairs (Defra) (particularly their Chief Scientific Advisers) took a keen interest in the dialogue and its outputs.

Impacts on public participants:

- Initially, participants tended not to relate climate change impacts to their own personal lives. Their view changed once they accepted the size and scope of the challenge
- Participants said that they had enjoyed the events and many said they would like to be involved in similar activities in the future

“ The main value is that it demonstrates that government is listening to the public. It’s taking account of what the public thinks. ”

Expert participant

“ Yes, I do, I think the results were helpful to NERC in its decision-making on geoengineering. I don’t know exactly how NERC operates, but I think there’s enough in there to say the things that people are really worried about are this, this and this, so if you’re going to go ahead and develop these things or you are going to discuss them politically, then here’s what you need to worry about and here are some recommendations about how that’s communicated. ”

Stakeholder

- Participants enjoyed listening to the scientists; everyone felt that their views were being listened to and appreciated
- The dialogue was successful in increasing participants’ knowledge and understanding of geoengineering. At the start of the process 54 (out of 85) participants said that they either knew nothing or had never heard of geoengineering; seven believed they knew a great or a fair amount. By the end of Event 2, 64 people considered that they knew a great deal or a fair amount about the subject and only one still felt they knew almost nothing.

Impacts on scientists/experts and other stakeholders:

- The scientists enjoyed hearing the views of members of the public and felt that this experience has significant value in a society where people are losing the experience of engaging in conversations about important subjects with people unfamiliar to or unlike themselves
- Many of the scientists commented on the useful messages coming out of the dialogue on how best to communicate geoengineering science
- Some of the scientists involved expressed the need to learn from the process for dialogues in future; NERC and its science leaders are continuing to explore other opportunities and need for dialogue in the different areas of science it supports, and some further activity is planned.

Overall impacts

In addition to the impacts already given, this work is influencing wider thinking and has been cited in international studies. For instance, it was cited by the US House of Representatives Committee on Science and Technology report *Engineering the Climate: Research Needs and Strategies for International Collaboration*, which acknowledged the importance of public engagement. It was also cited by the Solar Radiation Management Governance Initiative (SRMGI) report on *Solar radiation management: the governance of research*, which highlights the importance of public engagement as options are considered and developed.

“ I felt good to be part of something that probably would be quite significant, when you think about the scheme of things, especially if it’s going to help to advise Government policy. ”

Public participant

“ We can say it did have an impact straightaway on some things that were funded (as a result of the sandpit) because that’s what people will forever ask. There’s been a heck of a lot of dialogues in the past where it is quite hard to pinpoint actual tangible things that have come out. ”

Stakeholder

Contacts and links

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Reports

Full project and evaluation reports available from Sciencewise-ERC on <http://www.sciencewise-erc.org.uk/cms/geoengineering/>