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The Regulation of Geoengineering - Science and Technology Committee [Contents](#)

1 Introduction

1. There were two spurs to this Report. First, in what we believe was a first for scrutiny by a legislature we examined geoengineering as one of the case studies in our Report, *Engineering: turning ideas into reality*.^[1] We wished to follow-up that earlier work. Second, during our visit to the USA in April 2009 we met the Chairman of the House of Representatives Science and Technology Committee, Representative Bart Gordon, who suggested that the committees might find it beneficial to coordinate their scrutiny on a subject. Later in the year we agreed that geoengineering was an area where we could pool our efforts and complement each other's work, particularly as it has a significant internal dimension—a large geoengineering test could have global repercussions, deployment certainly would.

Previous scrutiny of geoengineering

2. In our earlier Report, *Engineering: turning ideas into reality*, we carried out a wide examination of geoengineering. The Report provided us with an opportunity to consider the implications of a new engineering discipline for UK policy-making. The broad definition of geoengineering that we used in the earlier Report holds good: we use the term "geoengineering" to describe activities specifically and deliberately designed to effect a change in the global climate with the aim of minimising or reversing anthropogenic (that is, human made) climate change.^[2] A more succinct definition was provided by one of the witnesses to the current inquiry, Professor Keith:

the intentional large-scale manipulation of the environment.^[3]

3. To set the scene for this inquiry it is worth recalling some of our earlier findings, conclusions and recommendations from the earlier inquiry which informed our approach to this inquiry.

- We noted that unlike mitigation and adaptation to climate change, the UK had not developed any policies relating to geoengineering research or its potential role in mitigating against climate change.^[4]
- We did not consider a narrow definition of geoengineering technologies to be helpful and took the view that technologies to reduce solar insolation^[5] and to sequester carbon should both be considered as geoengineering options.^[6]
- We were of the view that the Government should give the full range of policy options for managing climate change due consideration and that geoengineering technologies should be evaluated as part of a portfolio of responses to climate change, alongside mitigation and adaptation efforts.^[7]
- The decision not to consider any initiative other than "Plan A"—mitigation— could be considered negligent, particularly since uncertainties in success of "Plan A—for example, climate sensitivity—could be greater than expected. Geoengineering should be considered "Plan B".^[8]
- In order to identify those geoengineering options it might be feasible to deploy safely in the future, it was essential that a detailed assessment of individual technologies was conducted. This assessment had to consider the costs and benefits of geoengineering options, including their full life-cycle environmental impact and whether they were reversible. We welcomed the efforts of the Royal Society to review the geoengineering sector.^[9]
- We considered that support for detailed modelling studies would be essential for the development of future geoengineering options, and to the construction of a credible cost-benefit analysis of technological feasibility. We urged the UK Research Councils to support research in this area.^[10]
- We recommended that the Government engage with organisations including the Tyndall Centre, Hadley Centre, Research Councils UK and the Carbon Trust to develop a publicly-funded programme of geoengineering research.^[11]
- Before deploying any technology with the capacity to geo-engineer the climate, we considered that it was essential that a rational debate on the ethics of geoengineering was conducted. We urged the Department for Energy and Climate Change (DECC) to lead this debate, and to consult on the full range of geoengineering options.^[12]
- We were of the view that it was essential that the Government support socio-economic research with regard to geoengineering technologies, in order that the UK could engage in informed, international discussions to develop a framework for any future legislation relating to technological deployment by nation states or industry.^[13]

4. The Committee's Report was published in March 2009 and the Government replied in June 2009.^[14] The main points relevant to this inquiry that the Government made were as follows.

- Geoengineering options currently did not represent viable alternatives to reducing greenhouse-gas emission. However, it recognised that it was important to keep such options under review as some might ultimately have a role to play in helping to ameliorate climate change, if emissions reductions were not achieved quickly enough. The Government therefore saw a need for some research on the potential of geoengineering technologies, to determine whether any of them could be used as an additional (Plan B) policy option for managing climate change, to complement the conventional mitigation and adaptation approaches.^[15]

- The Government agreed that a detailed (and independent) assessment of geoengineering options was needed and welcomed the study that the Royal Society had been undertaking into climate engineering. It said that it would consider carefully the findings of this study and use it to inform its policy development on geoengineering.[\[16\]](#)
- The Government agreed with the Committee's view that support for detailed modelling studies would be essential, to help evaluate the feasibility and suitability of different geoengineering options. As indicated in the Committee's report, the nature of geoengineering research meant that much of it would need to be done on a "virtual" basis and the use of climate models would also enable a risk assessment of individual options.[\[17\]](#)
- Geoengineering technologies raised a number of very significant and difficult socio-economic issues and the Government agreed that some publicly-funded research on this aspect would also be needed, to inform and underpin its policy position in any future international negotiations that might take place on the possible deployment of individual geoengineering options.[\[18\]](#)

5. In September 2009, the Royal Society published its report, *Geoengineering the climate: science, governance and uncertainty*.[\[19\]](#) The report aimed "to provide an authoritative and balanced assessment of the main geoengineering options" but made the point that "far more detailed study would be needed before any method could even be seriously considered for deployment on the requisite international scale".[\[20\]](#) The report emphasised that geoengineering was not an alternative to greenhouse gas emission reductions and that, although geoengineering might hold longer-term potential and merited more research, it offered "no quick and easy solutions that should distract policy-makers from working toward a reduction of at least 50 percent in global carbon dioxide [...] emissions by 2050".[\[21\]](#)

6. We welcomed both the Government's response to our Report—albeit we consider some parts to be too cautious—and the Royal Society's report. Both are constructive and show that further work needs to be done. We considered therefore what part we could play in moving geoengineering policy on in the limited time left in this Parliament. One of the recommendations in the Royal Society's report was that:

The governance challenges posed by geoengineering should be explored in more detail, and policy processes established to resolve them.[\[22\]](#)

The report explained:

A review of existing international and regional mechanisms relevant to the activities and impacts of [geoengineering] methods proposed to date would be helpful for identifying where mechanisms already exist that could be used to regulate geoengineering (either directly or with some modification), and where there are gaps.
[\[23\]](#)

We considered that the national and international regulation of geoengineering was an issue we could examine in more detail by means of a short inquiry.

Coordinated working with US House of Representatives Science and Technology Committee

7. When the Innovation, Universities, Science and Skills Committee, as we were until October 2009, visited the USA in April 2009 we met Representative Bart Gordon, Chairman of the House Science and Technology Committee. Representative Gordon suggested that the two Committees might wish to identify a subject on which they could work together. The Commons Committee (now the Science and Technology Committee) discussed the proposal after its return from the USA and explored possible topics and arrangements for coordinating work. During the summer geoengineering emerged as an attractive subject, particularly as geoengineering has a large international dimension. In addition, the two Committees were at different stages in examination of the subject with the Commons Committee having, as we have noted, already produced a report and the House Committee about to embark on its first examination of the subject. This meant that each could cover different ground and complement each other's work.

8. In October 2009 the Committees agreed a timetable and working arrangements within the procedural rules of their respective legislatures. The text of a joint statement agreed between the Committees is the Annex to this Report.

9. The House Committee began its examination of geoengineering with a hearing in Washington DC on 5 November 2009, in which testimony was provided by a panel of expert witnesses that included Professor John Shepherd, who chaired the working group that produced the Royal Society's report, and leading US climate scientist Professor Ken Caldeira, Carnegie Institution, from whom we took evidence in our earlier inquiry. That session assessed the implications of large-scale climate intervention. On 4 February 2010 the House Committee took evidence on the scientific basis and engineering challenges from Professor Klaus Lackner, Columbia University, from whom we took evidence for our earlier inquiry, and from Professor David Keith, who gave evidence to this inquiry. The third hearing is planned for 18 March 2010 and will cover issues of governance.^[24] It is planned that our Chairman will give testimony to that session. Ultimately, the hearings may lead to the formation of legislation authorising US government agencies to undertake certain geoengineering research activities and establish intergovernmental research agreements with other nations.

10. It is our intention that this report will assist members of the House Committee in their deliberations on the regulation of geoengineering. We also see our work on geoengineering as a pilot for future collaborative scrutiny between select committees of the House of Commons and the committees of other national legislatures, which is an issue we examine further in this Report.

The inquiry

11. In our call for evidence on 5 November 2009 we stated that the inquiry would focus on the regulation of geoengineering, particularly international regulation and regulation within the UK. The following were the terms of reference of our inquiry.

- Is there a need for international regulation of geoengineering and geoengineering research and if so, what international regulatory mechanisms need to be developed?
- How should international regulations be developed collaboratively?
- What UK regulatory mechanisms apply to geoengineering and geoengineering research and what changes will need to be made for the purpose of regulating geoengineering?^[25]

12. We received 13 written submissions (excluding supplementary memoranda) in response to our call for submissions, which we accepted as evidence to the inquiry and which are appended to this Report. We are grateful to all those who submitted written memoranda. We are especially pleased that with the international dimension to this Report we received submissions from across the world.

13. On 13 January 2010 we took oral evidence from three panels consisting of:

a) Dr Jason J Blackstock, Centre for International Governance Innovation, Canada, Professor David Keith, Director, ISEEE Energy and Environmental Systems Group, University of Calgary, and John Virgoe, an expert in geoengineering governance based in Australia;

b) Sir David King, Director of the Smith School of Enterprise and the Environment and former Government Chief Scientific Adviser in the UK, and Dr Maarten van Aalst, Associate Director and Lead Climate Specialist at the Red Cross/Red Crescent Climate Centre, who gave evidence in a personal expert capacity;^[26] and

c) Joan Ruddock MP, Minister of State, DECC, Professor David MacKay, Chief Scientific Adviser, DECC, and Professor Nick Pidgeon, on behalf of Research Councils UK.

14. We are grateful to those who provided oral evidence. All three members on the first panel gave their evidence by video link from, respectively, the USA, Canada and Australia. The arrangements worked well and, other than a couple of blips, each witness was able to hear the others and to comment on their responses. There was almost no time delay in the transmissions which greatly facilitated the flow of the session. It would assist the operation of the facility if the visual quality was improved and all the witnesses could see each other as well as the Committee. We wrote to the Speaker and the Liaison Committee to commend the facility and its development and we were encouraged by the Speaker's response. He replied in February 2010 and said that some technical aspects have been improved and that the audio-visual facilities in all committee rooms were being reviewed. **We welcome the review that the House is carrying out of the audio-visual facilities in committee rooms to enable the taking of oral evidence in committee by video link.**

Structure of this Report

15. This report is in four parts. The second chapter examines categories of geoengineering, the third examines the need for regulation of geoengineering, the fourth considers the outline of future regulatory arrangements and the final chapter looks at collaborative working between committees in national legislatures.

1 Innovation, Universities, Science and Skills Committee, Fourth Report of Session 2008-09, *Engineering: turning ideas into reality*, HC 50-I, chapter 4 [Back](#)

2 HC (2008-09) 50-I, para 160 [Back](#)

3 DW Keith, "Geoengineering the climate: history and prospect", *Annual Review of Energy and the Environment*, (2000) 25: 245-284 [Back](#)

4 HC (2008-09) 50-I, para 159 [Back](#)

5 Insolation is the offsetting of greenhouse warming by reducing the incidence and absorption of incoming solar (short-wave) radiation. [Back](#)

6 HC (2008-09) 50-I, para 182 [Back](#)

7 HC (2008-09) 50-I, para 185 [Back](#)

8 HC (2008-09) 50-I, para 187 [Back](#)

9 HC (2008-09) 50-I, para 197 [Back](#)

10 HC (2008-09) 50-I, para 203 [Back](#)

11 HC (2008-09) 50-I, para 217 [Back](#)

12 HC (2008-09) 50-I, para 226 [Back](#)

13 HC (2008-09) 50-I, para 229 [Back](#)

14 Innovation, Universities, Science and Skills Committee, Fifth Special Report of Session 2008-09, *Engineering: turning ideas into reality: Government Response to the Committee's Fourth Report*, HC 759 [Back](#)

15 HC (2008-09) 759, pp 11-12 [Back](#)

16 HC (2008-09) 759, p 13 [Back](#)

17 HC (2008-09) 759, p 13; see also Ev 36 [British Geophysical Association], para 1. [Back](#)

18 HC (2008-09) 759, p 14 [Back](#)

19 The Royal Society, *Geoengineering the climate Science, governance and uncertainty*, September 2009 [Back](#)

20 The Royal Society, *Geoengineering the climate Science, governance and uncertainty*, September 2009, p v [Back](#)

21 Ev 51, para 2 [Back](#)

22 The Royal Society, *Geoengineering the climate Science, governance and uncertainty*, September 2009, rec 6.1 [Back](#)

23 The Royal Society, *Geoengineering the climate Science, governance and uncertainty*, September 2009, para 5.4 [Back](#)

24 "Subcommittee Examines Geoengineering Strategies and Hazards", US House of Representatives Science and Technology Committee, Press Release, 4 February 2010 [Back](#)

25 "The regulation of geoengineering", Science and Technology Committee press release 2008-09 no. 10, 5 November 2009 [Back](#)

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Prepared 18 March 2010

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