

Research Project: Climate Change and Carbon Reduction: Technologies, Governance, Regulation and Risk.

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Background: Tackling climate change raises a number of questions relating to risk and governance and how particular proposed solutions may be implemented. Although many climate change initiatives involve responses within households, individual business and particular production and consumption systems, other solutions are being proposed that may need to be implemented on a global scale and with the potential for risks and impacts of an unprecedented global nature. This project examined issues of climate change governance relating to particular technologies, perceptions of risks and approaches to accounting for climate change impacts.

Aims & objectives:

- To understand how the risks of proposed geoengineering solutions to climate change are perceived and the implications this has in terms of their development and governance;
- To explore the legal and policy implications of the proposed use of carbon capture & storage technologies to allow the future exploitation of coal reserves with reduced carbon emissions;
- To find ways to better account for emissions production in which the consumption of goods and services and the production of emissions may occur across different regions and nations.

About the research: This project involved several specific elements:

- Integrated assessment of geoengineering proposals: Geoengineering solution to the climate change challenge represent some of the most significant risk and governance issues ever to face policy makers and technologists. Funded through a joint initiative with EPSRC and NERC this work aimed to provide evidence and tools which will enable society to explore and evaluate the feasibility of geoengineering proposals. BRASS researchers were involved in eliciting and examining public perceptions of geoengineering using one-day deliberative workshops conducted with members of the UK public (using the approach developed for the nanotechnology workshops see A13) which build on BRASS Research expertise on understandings of climate change (see A48);
- Carbon Capture and Storage (CCS): Growing interest in ‘clean coal’ technologies in the UK and internationally in countries such as Australia is generating increased interest in CCS technologies, and in the case of the UK, the storage of CO₂ in the sub seabed of the North Sea Continental Shelf. This work sought to analyse the rapid changes being made at International, EU and UK level to shape a legal framework to govern CCS implementation and its linkage to regimes on climate change and marine protection. It also considered the development of policy support for CCS in Australia, a country attracted to CCS as a means of reducing emissions, avoiding costly closure and replacement of an existing coal-fired power plant infrastructure, and of securing the long-term viability of Australia’s coal and natural gas industry.
- Regional accountability for emissions: Policymakers have been slow to enact targets based on limiting emissions under full consumption accounting measures (such as carbon footprints), and one reason for this may be that policymakers in one jurisdiction cannot control production technologies in other jurisdictions. This work explored the use of a regional input-output framework and data derived on carbon dioxide emissions by industry (and households) to examine regional accountability for emissions generation.

Results and outputs: The deliberative workshops looking at public perceptions of geoengineering revealed that the relationship between public perceptions of geoengineering and nature are complex, and that there is a danger that public concerns are simply dismissed as being irrational or anti-science. In practice workshop participants conceptualised and debated the relationship between geoengineering and nature in a wide variety of ways which collectively represented a sophisticated

and nuanced critique of the potential implications of geoengineering technologies for both our planet's ecosystem services and human societies. For specific technologies such as stratospheric aerosols although people felt that trialling them was worthwhile, there were strong reservations about impacting nature through full-scale implementation. The work on CCS and it concludes that the viability of the technology may ultimately be dependent on one element of the regulatory structure in the EU, the EU Emissions Trading Scheme since the price of carbon will ultimately determine levels of investment in the technology. The work on carbon capture and storage technology revealed that although European regulatory frameworks relating to them were rapidly adapting, the key determinant of success was likely to be the price of carbon as determined by the EU Emissions Trading Scheme. This has practical implications for both policy makers and those investing in the technology. The work on regional accountability for emissions explored two accounting methods that permit greater accountability of regional private household and public consumption as the main driver of regional emissions generation, while retaining a focus on the local production technologies and consumption decisions that fall under the jurisdiction of regional policymakers. These methods permit an attribution of emissions generation that is likely to be of more use to regional policymakers than a full global emissions footprint analysis.

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Impacts achieved/potential for impact: The findings from the Geoengineering research were fed into a responsible innovation process for the *Stratospheric Particle Injection for Climate Engineering* project initiated by RCUK. Prof Nick Pidgeon is a member of DECC's Science Advisory Group. BRASS was involved with a partnership with the University of Strathclyde and the Regional Research Institute at West Virginia University on an ESRC/ Climate Change Leadership Fellowship project "*Investigating the pollution content of trade flows and the importance of environmental trade balances*". Three BRASS Researchers collaborated with the *Lean Enterprise Research Centre* to develop the report *Best Practice Tools and Techniques for Carbon Reduction & Climate Change* for Climate Action Yorkshire, as part of efforts to provide businesses with carbon reduction tools.