

THE FUTURE IN PRACTICE

THE STATE OF SUSTAINABILITY LEADERSHIP



Perspectives on carbon capture and storage

Dr David Reiner

In 2005, architect Peter Clegg and visual artist Antony Gormley collaborated on temporary sculptures, *Three Made Places*, whilst on a Cape Farewell expedition to the High Arctic.



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Dr David Reiner's research follows international negotiations on climate change, the consequent development of national climate change and energy policies, and public perception and communications regarding energy and climate policies. Much of his research focuses on regulatory design in energy and environmental policy, such as in setting goals in regulation and on wider public attitudes towards energy – for example, the upcoming rollout of smart meters and its likely impact on consumer demand.

A particular interest for Dr Reiner is carbon dioxide capture and storage (CCS) – a technology which could play a significant role in addressing the CO₂ problem, but which also has become a source of controversy. He has led several research projects exploring how CCS is perceived among different environmental activists, and how the energy industry, environmental activists, and the lay public communicate about CCS. Two recent studies were sponsored by the Global CCS Institute through the Australian Commonwealth Scientific and Research Organisation (CSIRO) and completed in June 2011.

Dr David Reiner is a University Senior Lecturer in Technology Policy at the Judge Business School. He is also Director of the MPhil in Technology Policy, Assistant Director of the Electricity Policy Research Group, and a member of the Coordination Group of the UK CCS Research Centre with responsibility for social sciences and public communications. Interview by Wayne Visser and Francesca Raphaely.

Why CCS?

Carbon dioxide capture and storage is one of the only technologies capable of reducing the amount of CO₂ in the atmosphere, rather than just slowing accumulation; yet it has generated disagreements both within the environmental movement and at the local community level. Reiner neither supports nor opposes CCS. Rather, he says, "All scientists look for gaps in knowledge", and when he began his research in 2002, public understanding of CCS was so limited it offered the possibility of establishing a 'baseline' against which he could measure any changes. In addition, he believes that CCS provides an interesting case for insight into the wider climate debate.

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The first public controversy over CCS dates back to the earliest projects, initiated in the late 1990s. The first of these, an initiative planned by the US, Japan, Norway and Canada to store carbon dioxide in waters off the coast of Hawaii, the so-called Ocean Sequestration Field Experiment, focused purely on technical challenges. It failed to account for local interests concerned with protecting the marine environment as a tourist attraction, and it also neglected sensitive political considerations. Most basically, time and resources had not been built in to engage with public concerns.

As a result, the initiative became mired in objections and bureaucratic red tape. A relocation to Norwegian waters was planned, but this became a campaign target for Greenpeace and the project was ultimately cancelled. Since then, there have been no further efforts at storing CO₂ in the oceans and since 2000, storage projects have only focused on geological formations, either deep onshore (many hundreds of metres below the surface) or offshore (under the seabed in the North Sea, for example).

"That series of unfortunate, or badly managed, events ended up taking all of ocean CO₂ storage off the table, without really thinking, without public debate, without considering the consequences," says Reiner. It is a case in point of how technical solutions cannot be judged solely on technical merit, and will only succeed with buy-in from decision-makers and the general public.

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Debates around CCS also highlight some challenges around the wider climate debate, as Reiner's research into the views of environmental activists demonstrates.

Radical environmentalists and CCS

After international climate negotiations in Copenhagen in 2009 failed to establish new binding emissions reduction targets, Reiner set out to explore whether this perceived breakdown would lead to greater activism or even radicalism. He and his collaborator Olaf Corry explored the attitudes of radical environmental activists to CCS, by attending 'Climate Camps' in several countries. These events were coordinated by a loose coalition of smaller environmental NGOs and grassroots movements, and were designed partly to educate and prepare activists for direct action.

Reiner's main finding was that CCS is not judged primarily on technical grounds among this group. Instead, environmentalists based their evaluations on what role they believed CCS would play in society. More specifically, the main concerns and questions about CCS related to:

- **Perceived opportunity costs** – Will it divert resources away from renewable energy and prolong our reliance on fossil fuels, thereby perpetuating existing industrial structures?
- **Implementation** – Will it happen, and will it happen fast enough to make a difference in combating climate change?
- **Monitoring** – Can we trust those charged with CCS to do it properly?

Although more than half of the activists surveyed thought CCS could reduce CO₂ emissions, it was given extremely low priority compared to other options to address climate change, such as renewable energy and reductions in energy demand.



The voidshelter of *Three Made Places*, illuminated at night.

Among 'Climate Campers', Reiner's team found that questions about CCS had an interesting effect. "If you talk to most environmentalists about nuclear, or renewables, or coal, it's easy. Then you ask them about CCS and it starts to get harder, because it starts to raise the issue of what the real problem is. Is your real concern global climate change, or is it centralised power generation? Or is it the way our industrial civilisation is structured?"

The radical environmental movement offers a loose umbrella for campaigners from a variety of positions, Reiner found. "Carbon dioxide emissions motivated a number of the people there, but others saw this as a reflection of a much broader social debate."

CCS highlights the divergences in these positions, because it is how it would be used that would determine its impact. Many point out that CCS could preserve the 'status quo' of fossil fuel reliance, offering an easy way for the energy industry to maintain harmful extractive practices while using CCS as a 'fig

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leaf'. On the other hand, others appreciate that, if implemented alongside biomass generation, CCS could actually enable energy production with negative overall emissions, thereby offering deeper CO₂ cuts than renewables alone.

In fact, says Reiner, differences of opinion among radical environmental activists have now led the Climate Camps to be disbanded, as organisers could not reach a consensus on how to work towards their quite disparate goals. The responses to CCS lead Reiner to comment that some issues in the climate debate, such as renewable energy, are 'overdetermined': people have numerous reasons for supporting a solution, which allows those with often antithetical views to come together to support emissions reductions. Moving beyond easily agreed solutions to more nuanced issues such as CCS reveals fissures within the movement, exposing the fundamental differences – for example, between those who believe that the chief problem of our time is climate change, and those who believe it is capitalism.

CCS and Green Party activists

To "get the other side of the equation", Reiner then conducted similar research among Green Party activists – campaigners involved in the mainstream political process – at party conferences in Edinburgh and Cardiff.

He found that this group was more positive than 'Climate Campers' about the potential for CCS. While 84 per cent of 'Climate Campers' had said they would 'probably not' or 'definitely not' use CCS alongside coal-fired energy generation, only 40 per cent of 'Greens' took the same position. (In each group a similar proportion – roughly two-thirds – were in favour of using CCS alongside biomass, since that would result in net negative emissions.)

"The people who are willing to be involved in the political process, I think, are the ones who are more willing to accept constraints that we all operate under," Reiner comments. "They are playing by the rules; the nature of politics is trade-offs. You might still have a very strong opinion, but you accept those trade-offs."

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This highlights the contrast between the way environmental issues are debated among NGOs, which are relatively divided in their positions, and among political players, who are keen to achieve action and consensus. Yet strikingly, Reiner found that politicians are among the least trusted sources of climate change information, for both Green Party members and 'Climate Campers'. Corporate scientists and the energy industry were also highly mistrusted, with the greatest hostility among 'Climate Campers' directed towards large corporations.

In contrast, NGOs are among the most trusted sources of information among environmental campaigners of both types, but they have generally remained neutral on CCS, ranging from moderately sceptical to largely positive. Non-industry scientists were also perceived as trustworthy sources of information, but, naturally enough, few of these are concerned with the wider context of how CCS is implemented, focusing more on technical issues.

Although well disposed towards scientists because of the contribution of peer-reviewed science in raising awareness of climate change, both 'Climate Campers' and Green Party members focused on social and systemic issues rather than technical ones. In Reiner's surveys, few believed that technology would play a 'leading' role in dealing with the worst effects of climate change. System-wide problems such as climate change and resource depletion were seen as more important than traditional 'local' environmental issues such as air and water pollution, or protecting endangered species – showing how the environmental debate has moved on to a wider critique of existing norms.

Communicating CCS

This lack of engagement by the most trusted sources – NGOs and independent scientists – with the questions that most concerned activists led Reiner to look more closely at the way CCS is discussed in the public sphere. He conducted two pieces of desk-based research in 2008 and 2011, and found that the CCS ambitions of governments and other leading institutions have grown steadily in the interim, as have funding commitments. But existing communications remain far from adequate, given the level of governmental and business interest in the technology.

Reiner found that CCS communication was more extensive by 2011, was better co-ordinated and made greater use of a variety of media. However, it remains in need of greater interactivity and attention to the needs of end users, including more diversity in language and approach.

CCS communication also tends to be heavily oriented towards explaining the technological and engineering processes involved. Socio-economic questions about costs, burdens, policy alternatives and wider implications – all concerns raised by activists – receive much less coverage. To communicate more effectively with a wider audience, more attention is needed to explain how developing CCS would affect other long-term problems apart from climate change, and how CCS compares to other options.

Reiner found that a mix of government, industry, NGO and research institutions now communicate CCS as an integrated technology, looking at the wider issues of how it would be implemented alongside other energy-generation technologies. More information sources are appearing, but websites which describe CCS, especially from NGOs and research organisations, can stagnate or disappear. Different target audiences need

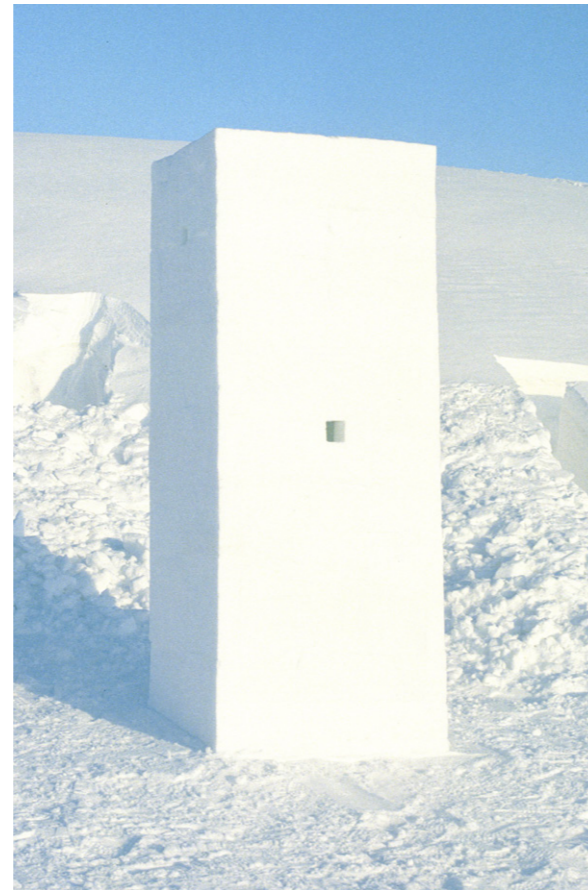
"Is your real concern global climate change, or is it centralised power generation? Or is it the way our industrial civilisation is structured?"

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different messages, types and levels of information, and these are currently not always available. Educational materials are being developed, but slowly.

In contrast to the patchy coverage from trusted NGOs and non-industry experts, the most prevalent communications come from less-trusted sources such as business and governments, which often are CCS advocates. The majority of this material is overtly positive, without addressing the challenges levelled against CCS. While more trusted NGOs and critical sources tend to focus on a wider set of issues – emphasising cost, burdens and social implications – communications by research institutions, which are also considered trustworthy, are usually narrowly technical, and fail to acknowledge the existence of wider concerns.

Challenges around the transport of CO₂, in particular, have been neglected. This is a key issue to the public, and, again, raises many different challenges depending on where and how CCS is implemented. In the UK, for example, the potential for CO₂ storage is offshore under the North Sea, which means pipelines would need to be constructed to transport CO₂ from the sources of energy generation to the coast. In terms of public responses, says Reiner, this means that “if your plant is right by the coast, your ‘footprint’ to deal with the public is really quite small; whereas if you’re by Doncaster and you need to get to the North Sea, it will require a hundred or so miles of pipes.” This means addressing similar issues to those around the construction of a gas pipeline: obtaining consent and right of way, dealing with concerns about the landscape, etc. In contrast, for CCS projects in continental Europe further from the coast, ‘onshore’ carbon storage near energy generation has raised its own fears among the public and a good deal



of so-called ‘not-under-my-back-yard-ism’. This has led to onshore projects in Germany and the Netherlands failing because of public opposition. It is this lack of attention to the public-relations ‘footprint’ that concerns Reiner.

While there is considerable coverage of CCS on the Internet, Reiner also notes that this is almost entirely one-way and top-down, with little opportunity for discussion or reaction. “The Web is used almost entirely as a loud-hailer – as a way of saying even louder what people would be saying otherwise. There’s no real discussion, no real sense of engagement.”

The future of CCS

Reiner’s exploration of public perceptions of CCS highlights schisms and impasses in the environmental movement; the limits of scientists’ and engineers’ ability to implement solutions once they have been formulated; and how distrust can reach such high levels in the climate debate that any sort of progress is precluded. He is also concerned that government policy and incentives to support the technology remain weak, leading to inadequate investment in CCS.

Given that most distrust around CCS is due to claims that it preserves the interests of the energy industry, says Reiner, it’s ironic that this sector has invested so little in engaging in debate. This lack of attention to addressing concerns around CCS is “striking, particularly for an industry that is in the business of siting infrastructure that’s difficult to site. I always find it almost amusing that I need to explain to large multi-nationals how to do this better.

“If CCS is essentially meant to perpetuate the existence of the energy industry, they really aren’t taking it seriously enough. They take the technical issues seriously, and you have wonderful people who are trying to improve the science. But there’s almost nothing on the ‘softer’ side of things.” Energy interests, comments Reiner, have technical expertise in implementing large infrastructure projects, combined with the experience and funding

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to run public campaigns on controversial issues and engage with local communities. In contrast, scientists, who are more trusted as a source of reliable information, have neither the experience nor the resources to participate in public dialogue on the subject.

“It is true that engagement and developing a discussion takes longer. Engaging with independent scientists and NGOs will take longer. But, by the same token, it’s not like we’re rushing into this either. Given that progress has been so slow, it’s almost unconscionable that this hasn’t happened.”

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On Cape Farewell’s third art and science voyage in 2005, with their boat locked into Arctic ice, architect Peter Clegg and artist Antony Gormley collaborated on the construction of *Three Made Places*. Carved into the vast white landscape, the configuration is at once monolith, shelter, and sarcophagus. According to Peter Clegg, “One kilo of CO₂ at atmospheric pressure occupies 0.54m³. That is the space – approximately – taken up by ourselves and the space immediately around us. It is roughly the volume of a coffin, which is perhaps an appropriate symbolic unit when we are talking about the destruction of the planet.” CPSL is proud to be collaborating with Cape Farewell, which works with artists and scientists on a cultural response to climate change. www.capefarewell.com