

Public and Social Acceptability of Geological Disposal of Carbon Dioxide and Radioactive Waste: Similarities and Differences

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Geological storage of carbon dioxide storage and disposal of radioactive waste have enormous differences in both physical scale and level of experience. As a sensitive political matter in many countries, nuclear power has been tied closely to major issues such as non-proliferation, international relations, and the origins of the environmental movement. By contrast, carbon dioxide capture and storage (CCS) technologies are largely unheard of and what familiarity lay people have with carbon dioxide is largely benign. For a large power plant, radioactive wastes generated are in the hundreds of tons whereas a coal plant of similar size will produce almost 10 million tons of carbon dioxide, but radioactive wastes are highly toxic and CO₂ is only dangerous in high concentrations.

Radioactive waste has become the Achilles' Heel of nuclear power such that progress cannot be made on nuclear power expansion in many countries unless and until issues associated with radioactive waste are addressed. As such, radioactive waste takes on an importance far beyond the narrow issues of waste and the associated hazards. Arguably, waste has become a proxy battle for wider questions over nuclear energy, electricity systems and associated infrastructures and, in extremis, the very nature of industrial and post-industrial society.

By contrast, CCS is often put forward as the saviour of fossil-fired generation, and especially in preserving coal as an element in the fuel mix of a carbon-constrained world. One might consider, though, whether a situation might eventually develop by which CCS might take on the status of Achilles' Heel for the fossil fuel industry. To some extent the recent insistence that no new coal plants be built without CCS requires the same resolution as for radioactive wastes and nuclear power. Experience from the radioactive waste

debate might imply that success for those opposed to fossil fuels might be achieved by merely preventing any resolution of questions concerning CCS deployment.

Similar to technical research, there has been decades of public opinion research on nuclear power and radioactive wastes. These studies have shown that women in particular are hostile towards nuclear issues whereas there is no clear gender gap on most other energy technologies including CCS. Nuclear issues also occupy a unique role in popular culture in terms of level of dread originally because of the link to nuclear weapons. Over time, the inter-relationship between matters nuclear and pop-culture extended beyond nuclear weapons to include aspects of civil nuclear power such as radioactive waste.

The political debates over both nuclear waste and CCS have been shaped by many leading environmental NGOs, almost all of which are strongly anti-nuclear. This anti-nuclear disposition on the part of most NGOs has remained steadfast in the face of growing concerns over climate change. Indeed, opposition to nuclear power, in part, explains the willingness of NGOs to remain neutral or even to be slightly favourably disposed towards CCS.

Siting nuclear waste facilities has proven exceedingly difficult around the world. Efforts at siting often face concerns on the grounds of equity and process as much as on risk and technical considerations and get wrapped in debates over compensation and NIMBYism.

The future of fossil-fired generation is wrapped up in questions both of the fuels themselves but also of the ultimate fate of carbon dioxide underground. Whereas nuclear power and nuclear waste have never been perceived as “ordinary” and although CO₂ storage is still unfamiliar to the vast majority of the public, the familiarity with carbon dioxide itself and its comparatively benign nature may allow carbon dioxide storage to proceed even though individual CO₂ storage projects may well be halted for a variety of NIMBY or other local considerations much as would be the case for many other types of waste facilities.

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