STATUS, CHALLENGES, AND POTENTIAL CAPACITY OF RELIABLE GEOLOGIC STORAGE OF CO_2

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CO_2 captured from point sources such as power generation and industrial facilities can be compressed, transported and injected into permeable geologic strata below and isolated from freshwater and the surface; this results in storage of the Co2 within the pore space in the subsurface. The transport, injection and storage processes are mature, with an experience of more than 40 years of injection and dozens of intensely characterized, monitored and modeled demonstration sites globally.

However some questions remain. For example what are the limitations on the storage capacity, in particular, how much injection is too much, or too fast, and what settings are too unknown or too risky? How much evidence is needed before stakeholder and regulator confidence is sufficiently established to cross project thresholds, such starting the project, continuing a mature project, and closing a completed project? What are the best practices to manage and mitigate should an unacceptable event occur?

Storage sites can be developed within depleted hydrocarbon reservoirs or developed in previously unused formations in which pores are filled with brine (called saline formations), and each can be in onshore or offshore settings. CO_2 can be used alone or in combination with other fluids to extract hydrocarbons, a process known as CO_2 enhanced oil recovery (EOR). EOR generates revenue for the capture and storage process and results in large volume effective storage at low risk. However the whole system carbon balance is impacted by oil production and operations. Each of these storage site types has a distinctive risk profile for the class, as well as a site specific risk of costs, Co2 loss, or other unacceptable events such as induced seismicity.