

## **Trade-Offs for Injecting Carbon Dioxide**

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A critical factor in shaping the final design of a carbon capture and storage process is a rigorous understanding of how the costs of transport and injection behave. Frequently, the supply of nearby good quality storage formations is limited, and the CCS project might therefore involve using low quality local reservoirs, with low net pay, low permeabilities, low fracture pressures, or high initial reservoir pressures. In contrast, good quality formations would have high mobility and pressure gradients with high contact areas for wells. However, they might be remote from the source. Ultimately, therefore analysing the relative economic merits of the different storage options should help us to decide which site is preferred. In this paper we analyse the effects of sites with contrasting conditions — a nearby, poor quality sink and a very distant, high quality sink. The analysis involves a combination of numerical reservoir simulation and economic modelling. A commercial compositional simulator is used for reservoir simulations and the economics are assessed using an internally developed techno-economic model. We investigate the sensitivity of the reservoir behaviour and the economics of CCS to such parameters as – the distance between the source and the sink, the pressure difference between the fracture and formation pressures, the formation thickness, the economic effect of fracturing the formation to increase injectivity and the risks of fracturing.