A Critical Review of Assessments of Geological CO2 Storage Resources in Pennsylvania and the Surrounding Region

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Abstract : A critical review of assessments of geological carbon dioxide (CO2) storage resources in Pennsylvania and the surrounding region was completed with a focus on the studies of Midwest Regional Carbon Sequestration Partnership (MRCSP), United States Department of Energy (US-DOE), and United States Geological Survey (USGS). Pennsylvania Geological Survey participated in the MRCSP Phase I research to characterize potential storage formations in Pennsylvania. The MRCSP's volumetric method estimated ~89 gigatonnes (Gt) of total CO2 storage resources in deep saline formations, depleted oil and gas reservoirs, coals, and shales in Pennsylvania. Meanwhile, the US-DOE calculated storage efficiency factors using log-odds normal distribution and Monte Carlo sampling, revealing contingent storage resources of ~18 Gt to ~20 Gt in deep saline formations, depleted oil and gas reservoirs, and coals in Pennsylvania. Additionally, the USGS employed Beta-PERT distribution and Monte Carlo sampling to determine buoyant and residual storage efficiency factors, resulting in 20 Gt of contingent storage resources across four storage assessment units in Appalachian Basin. However, few studies have explored CO2 storage resources in shales in the region, yielding inconclusive findings. This article provides a critical and most up to date review and analysis of geological CO2 storage resources in Pennsylvania and the region.

Keywords : carbon capture and storage, geological CO2 storage, pennsylvania, appalachian basin
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