
CO₂ geological storage potential and capacity in New Brunswick

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Sedimentary rocks have the potential to store waste-captured carbon dioxide (CO₂) in its supercritical fluid or dissolved state, typically at depths below ~800 m. Storage can take place at such depths in either microfractures or the pores between mineral grains. Three types of underground sedimentary units can therefore be considered, namely, (1) coal seams (CO₂ being locked by adsorption onto the coal); (2) depleted petroleum reservoirs (injecting CO₂ under pressure can help retain high pressures in the reservoir); (3) deep saline formations (permeable rocks filled with connate (saline/alkaline) water). In New Brunswick, there are potentially four sedimentary basins in which such units may exist: (1) Matapedia Basin, (2) New Brunswick Platform, (3) the Moncton (and Sackville) Basins, and (4) the Fundy Basin. A preliminary overview nearing completion identifies coal seams in basins 2 and 3, although depth and seam thickness are an issue. Only basin 3 has known petroleum reservoirs but, where these are at sufficient depth, the reservoirs are a long way from being depleted, and permeability is an issue. Saline reservoirs may be present in all basins. In basin 3, the lack of highly permeable rock is again the major issue. In basins 1 and 2, there is minimal information from the appropriate depths and, what little is available again indicates a lack of permeable rock. However, in the Fundy Basin, the Cape Spencer #1 well, located less than 6 km offshore of Saint John (and less than 20 km from several major emitters) indicates the presence of ~450 m section containing highly porous and permeable intervals. These intervals, believed to be of aeolian-dune origin (Blomidon or Wolfville Formation equivalent), lie below a potentially ideal seal in the form of the North Mountain Basalt. The major drawback in this instance is the lack of additional data that indicates the volumetric extent of the permeable interval.