

Potential for Hydrogen Storage in Salt Caverns in the Kish Bank Basin



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OBJECTIVE

To assess the potential for excess wind energy to be stored as Hydrogen gas in manmade subsurface salt caverns directly below or adjacent to offshore wind farm locations in the Dublin Bay area. Existing oil & gas industry datasets were examined to delineate the extent, thickness, and depth of burial of geological salt formations adjacent to proposed offshore wind farms.

METHODOLOGY

A detailed literature review of published and non-published reports on the presence of salt offshore Ireland and latest research in salt cavern storage was undertaken. All available oil & gas industry seismic and well datasets for the Kish Bank Basin were accessed from the Department of the Environment, Climate and Communications (DECC). This data was loaded onto a Kingdom software platform ensuring correct spatial positioning and QC of the datasets. The salt intervals in wells were evaluated and their signature on seismic data confirmed. The top and base of salt formations were interpreted, including depth conversion and assessment of salt thickness and extent. Finally, an engineering study was carried out to assess the maximum theoretical hydrogen storage potential using salt cavern storage methodologies suitable for the geological conditions.

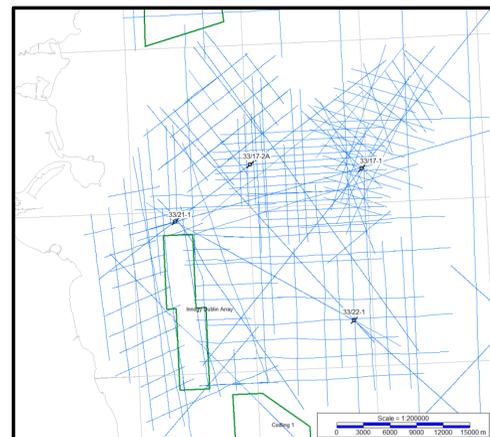


Fig 1. Available seismic and well data

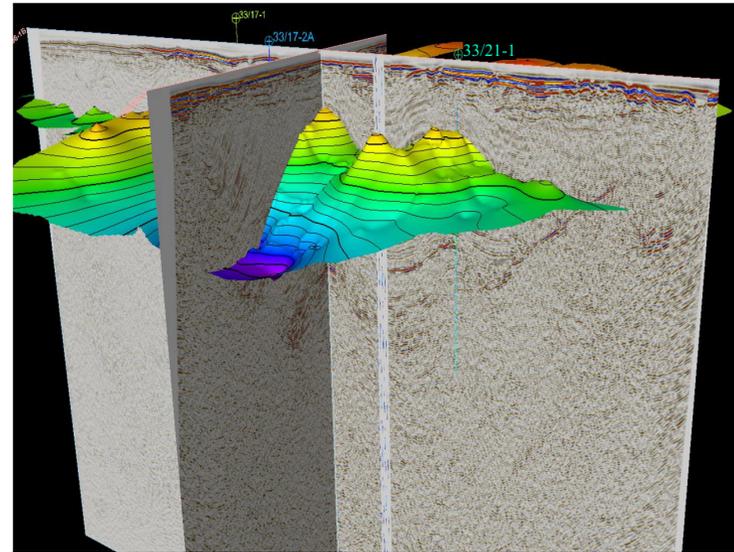


Fig 2. 3D Visualisation of 2D seismic and salt interpretation

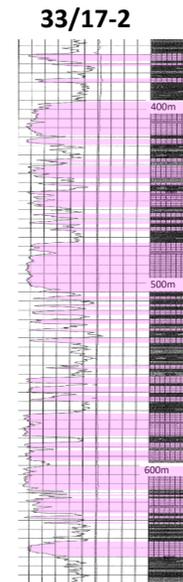


Fig 3. 33/17-2 well log with Rossall Halite highlighted.

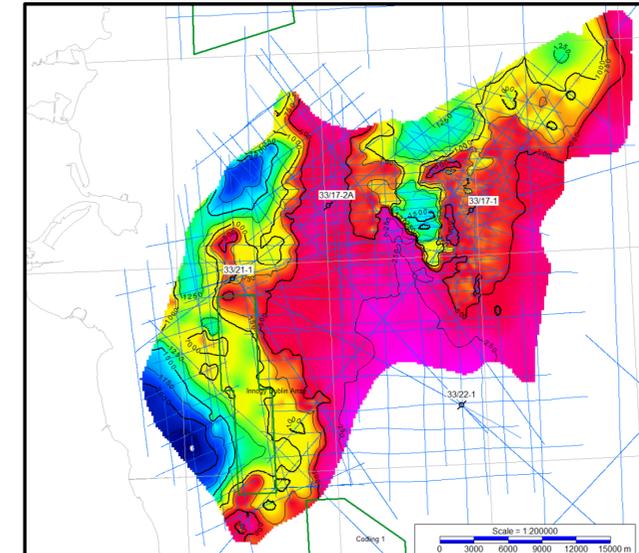


Fig 4. Interpreted extent and depth of the Rossall Halite, 1 of 4 salt intervals in the Kish Bank Basin.

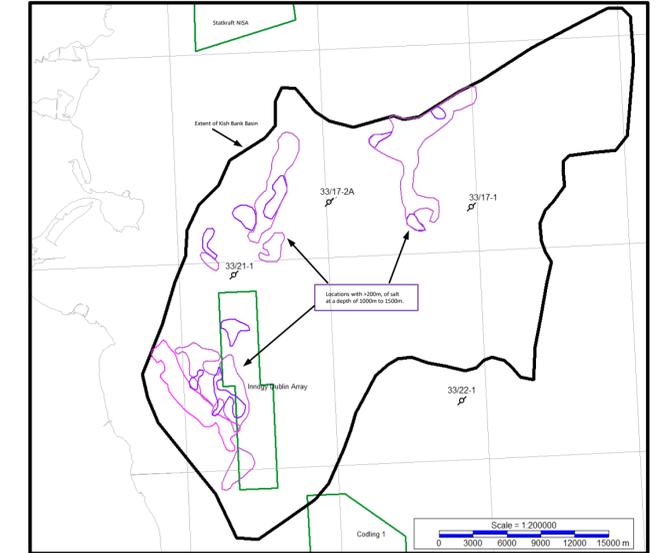


Fig 5. Map showing extent of salt > 200m thick at depth between 1,000m and 1,500m in purple/pink with exploration wells and location of proposed offshore wind developments in green.

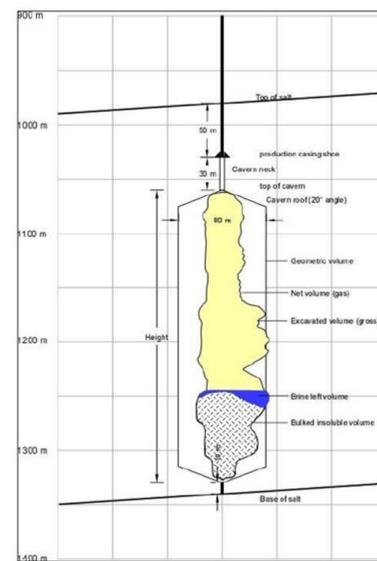


Fig 6. Cavern Geometry. Source: Histories

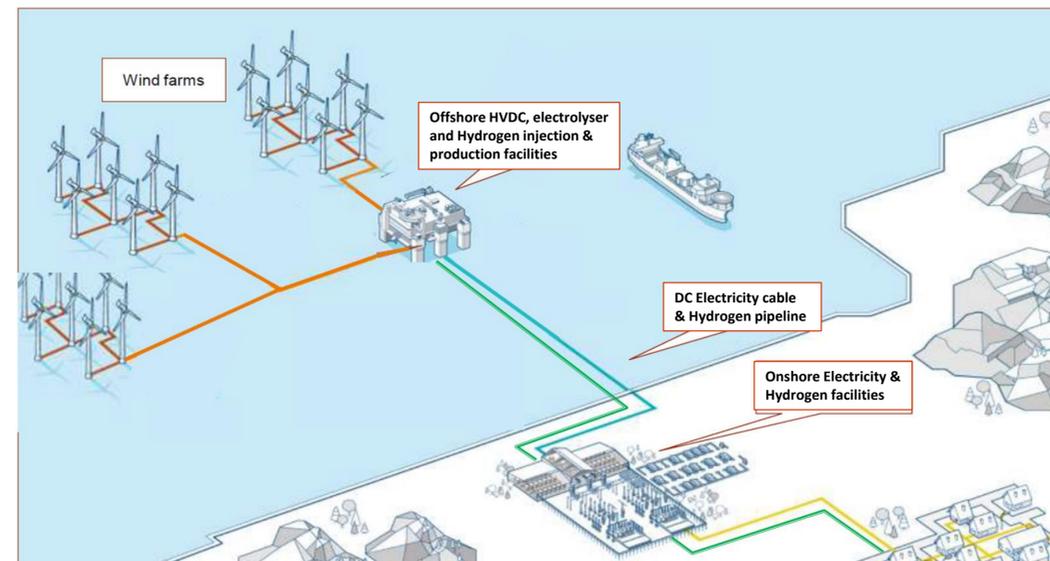


Fig 7. Offshore Hydrogen Storage Project Description - Courtesy: ABB Power Systems, Nov 2016; Modified

PRELIMINARY RESULTS

The extent and thickness of salt formations in the Kish Basin have been mapped. The thickest salt development is in the west of the basin. The key components for an offshore green hydrogen production facility in the Kish Basin have been defined including the optimum salt cavern size and offsets.

NEXT STEPS

The maximum theoretical hydrogen storage potential for the Kish Bank Basin will be calculated based on the extent of salt deposits greater than 200m thick at depths of greater than 1,000m below sea level and the optimum salt cavern size and offset.

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