

# Hydrogen Salt Storage Assessment (HYSS)

## SEAI National Energy Research, Development & Demonstration Funding Programme

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## Abstract

This research assesses the potential for co-location of hydrogen storage and wind farms, utilizing salt caverns for storing green hydrogen offshore in Ireland. Offshore energy storage will have the dual benefit of reducing dispatch down while enabling green hydrogen for domestic use or export. This will be critical in meeting Irish and European climate action targets. Hydrogen has been stored in geological salt formations since 1972 (Teeside in the UK) and there are over 2,000 salt stores in the United States and over 300 in Germany (Panifilov, 2016). Caglayan et. al. (2019) assessed the potential for hydrogen storage in geological salt formations across Europe. The overall technical storage potential was estimated at 84.8 PWhH<sub>2</sub>, though there is no assessment for Ireland. This research addresses this data gap and integrates existing technology concepts to identify the best offshore sites for combining electricity generation from wind, green hydrogen production from electrolysis, and energy storage in underlying/adjacent salt caverns.

## Research Outcomes

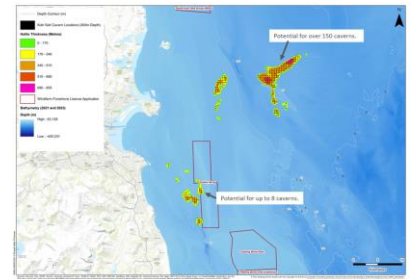
The project has identified locations with salt of suitable thickness and depth for the development of salt cavern storage projects. In the case study of the Kish Basin offshore Dublin there is the potential for up to 271 salt caverns. An area directly below the proposed the Dublin Array wind farm could support 8 caverns, equivalent to 1 Twh of Hydrogen. A review of surface constraints and geohazards show mitigation measures have been successfully employed by historic oil & gas activity.

## Recommendations

- Provide a clear policy for how an Offshore Green Hydrogen Production Facility or an Offshore Salt Cavern Storage Facility will be

regulated under the new Maritime Area Regulatory Authority (MARA).

- The maps of European salt storage potential need to be updated to reflect the results of this project ([H2 Infrastructure Map Europe \(h2inframap.eu\)](https://h2inframap.eu)).
- Propose the development of hydrogen storage infrastructure in salt caverns offshore Dublin as a Project of Common/Mutual Interest under the Trans-European Network for Energy (TEN-E).



- Investigate the role of public private partnerships in the development of hydrogen storage infrastructure offshore Dublin.
- Support the development of a regional hydrogen cluster or hub in the greater Dublin Area.
- Acquire additional high quality geophysical and geotechnical information to high grade areas for infrastructure development e.g., repeat bathymetric surveys, UHRS shallow seismic, 3D conventional seismic data, CPT, core and well data.
- Develop a detailed costing for the development of offshore salt cavern hydrogen storage and transportation infrastructure to inform commercial decisions of offshore wind developers – AACE Class 4 cost estimate for CAPEX with OPEX estimate.
- Liaise with relevant government bodies, IPP/Developers and other stakeholders to develop a roadmap to ensure the creation of a viable hydrogen economy that ensures long term energy security.
- Collaborate with other EU countries who are developing hydrogen storage for knowledge sharing, best practice adherence.