

INSPIRE: Innovative design and operation for rare earth material reduction and optimized lifetime for next generation offshore wind-based hydrogen production



Offshore wind turbines - Green hydrogen - Rare earth materials – Drivetrain and Generator

INSPIRE integrates wind farm together with the hydrogen production to optimize the design, to reduce rare earth element (REE) usage, and to enhance the system lifetime

Objectives:

1. Optimized green hydrogen system design methodology with minimum REEs
2. AI-based wind-hydrogen production optimization for optimized lifetime
3. Reference design of an optimized, open access, green hydrogen system
4. Establish a pathway towards implementation in policy and industrial standards

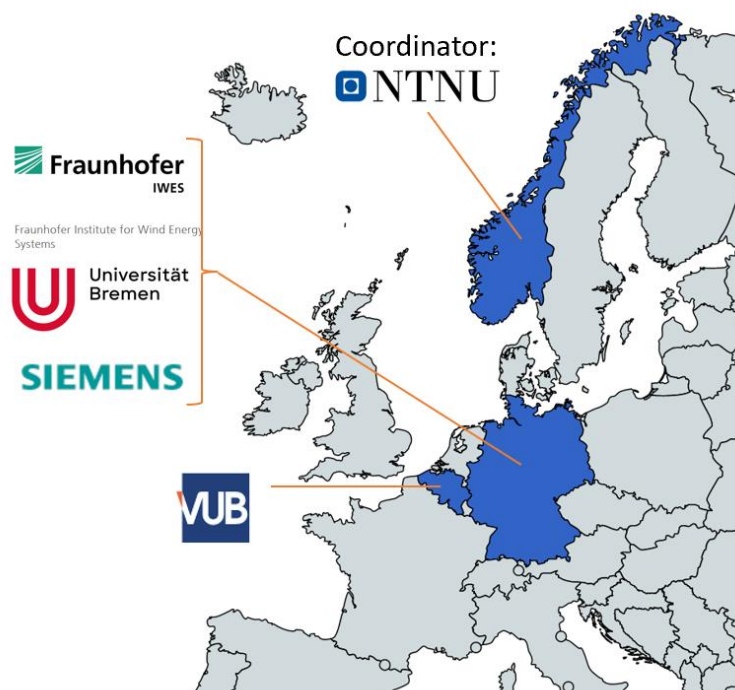
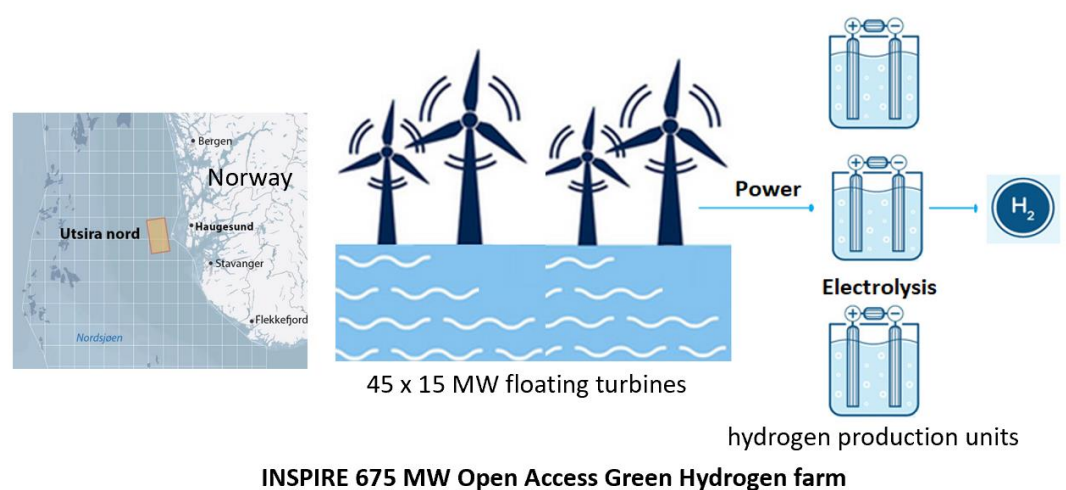
The INSPIRE novelties and position:

- new approach to REE reduction and optimized lifetime methodology and algorithm
- min 30% reduction of REEs
- open access integrated design as EU research infrastructure
- risk reduction of Europe's reliance on REEs and on the non-EU supply chain
- integrated transnational road maps for REE reduction and industrialization of innovations in wind-hydrogen for stakeholders and EU policy makers

INSPIRE core ambition:
to deliver innovative optimized design for REE reduction and AI-based optimized operation for an integrated hydrogen-wind system, as well as road maps for implementation for EU policy makers

Two Case studies with real world data aiming for TRL 4 -5:

1. INSPIRE 675 MW Green Hydrogen Farm
2. An on-grid hydrogen production system from a virtual wind farm calibrated on the Belgian offshore wind cluster



INSPIRE IMPACT

- ❖ Reduced REE and cost of renewable energy and renewable fuel and their value chains
- ❖ Enhanced sustainability of wind-hydrogen renewable energy and renewable fuels value chains (social, economic, environment)
- ❖ More effective market uptake of renewable energy and fuel technologies



Contact INSPIRE coordinator:

