

OCEAN-H2W™

An innovative decision-support tool for assessing and optimising the production and distribution of electricity and hydrogen from a wind farm

Context

To achieve carbon neutrality and gradually reduce our dependence on fossil fuels, there is growing interest in clean and sustainable fuel solutions such as renewable hydrogen. However, integrating hydrogen production into a wind farm raises several challenges, particularly regarding its economic viability and the need to adapt the wind farm's configuration to account for production intermittency and associated costs.

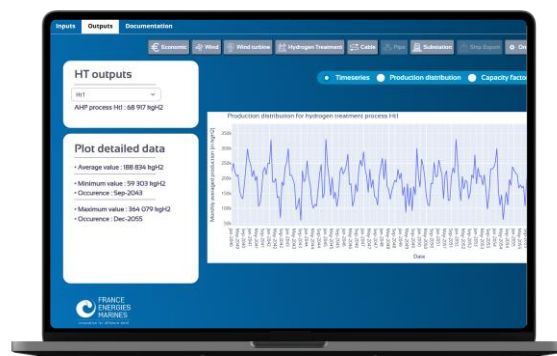
Designed as a decision-support and assessment tool for energy yield and associated costs, OCEAN-H2W™ provides an innovative solution for rapidly addressing the design challenges of offshore wind systems integrated with hydrogen production. Through an intuitive graphical interface, the tool enables users to design wind farm architectures and incorporate hydrogen production to estimate energy yield and key techno-economic indicators.

Key Features

OCEAN-H2W™ enables the design of offshore wind farm architectures by integrating key elements related to electricity generation (offshore substations, cables) and hydrogen production (electrolysers, pipelines, transport vessels).

Through a simplified graphical interface and a database developed from the latest scientific publications, the tool allows users to estimate electricity and/or hydrogen yield over one or several years, with a selectable time step (hourly, daily or monthly).

OCEAN-H2W™ also provides initial estimates of key economic indicators such as LCOE and LCOH, enabling the comparison of different system architectures.



- ✓ Rapid and simplified design of a wind farm architecture
- ✓ Realistic estimation of energy yield (electricity and/or hydrogen)

- ✓ Initial estimates of economic indicators
- ✓ Ability to set production priorities (electricity or hydrogen)

Case Studies



Conceptual design phases

Enables a rapid and simplified comparison of different wind farm architectures, thereby providing decision support for the initial design of the wind farm and electrolysis capacity.



Grid integration

Provides a realistic estimate of a wind farm's electricity and hydrogen production, enabling anticipation of how their injection into the grid should be managed.

- ⊕ OCEAN-H2W™ is a tool designed to be simple and quick to use, enabling initial estimates of energy yield as well as associated economic indicators. It offers the possibility to explore a wide range of hydrogen production scenarios, whether onshore or offshore, under a centralised configuration (production at the offshore substation) or a decentralised configuration (electrolysers installed at the base of each turbine).

The tool also accounts for different hydrogen import and export pathways, including pipeline or vessel export to port facilities, the integration of refuelling services for hydrogen-powered vessels, and hydrogen import from other vessels.

Our Associated Services

France Energies Marines supports you at every stage of your project through a tailored service offering based on the use of the OCEAN-H2W™ tool. Evaluate and compare different offshore hydrogen production scenarios to guide your design and development choices. Our support covers the full range of your needs, from feasibility, optimisation and sensitivity studies through to hands-on training in the tool, including coupling with other simulation models and results analysis.

Benefit from a tailor-made offering

Complete assessment of a wind farm site

- Generation and comparison of hydrogen production architectures tailored to your objectives and constraints;
- Detailed evaluation of energy yield and key techno-economic indicators for each case study;
- Preparation of a comprehensive study report and delivery of results in formats adapted to your needs (CSV, text, etc.)

Training and hands-on support for the tool

- Full presentation of OCEAN-H2W™ features and installation support;
- Guidance through initial case studies to facilitate tool familiarisation;
- Provision of detailed technical documentation.

Technical support and expert assistance

- In-depth analysis and interpretation sessions of results;
- Support in the generation of case studies;
- Possibility to couple OCEAN-H2W™ with other simulation models to address specific analytical needs.



Rapid generation of hydrogen production scenarios



Realistic estimation of electricity/hydrogen energy yield



Calculation of relevant economic indicators



20-year simulation with hourly time steps in under three minutes

Why Choose Us?

For over five years, France Energies Marines has been conducting research projects dedicated to hydrogen production associated with offshore wind turbines. This expertise enables the definition of realistic scenarios that incorporate the technological developments of a rapidly evolving sector.

Clients Benefits

- **Definition of a relevant initial design** for a wind farm architecture integrating hydrogen production;
- **Realistic estimation of energy yield** through simulations based on several years of data;
- **Generation of robust statistical indicators** to assess the performance of the scenarios studied;
- **Calculation of techno-economic indicators** enabling the comparison of design options.

Our Expertise to Support You

With over five years of studies, France Energies Marines has developed recognised expertise in **coupled architectures for electricity and hydrogen production from offshore wind**.

This expertise, combined with in-depth sector knowledge, enables us to **support our clients at every stage of their projects**, from defining the most relevant scenarios through to interpreting the results.

The Advantages of Our Solution

Through its intuitive and user-friendly graphical interface, the OCEAN-H2W™ tool enables the **rapid configuration and generation of a wide range of scenarios tailored to different offshore hydrogen production strategies**. Its reduced computation time facilitates the exploration and comparison of multiple configurations and enables multi-year simulations, ensuring the generation of reliable statistical indicators to support decision-making.

