NL-MARINERG-i

Dutch Marine Renewable Energy Infrastructure

The Dutch research & open water testing infrastructure (NL-MARINERG-i) is part of a larger European scientific collaboration (MARINERG-i) to accelerate the research development and deployment of wave, tidal, offshore wind and combined Offshore Renewable Energy (ORE) technologies. At its disposal will be the facilities, tools and e-infrastructure necessary to support research in ORE as a core activity within ocean and engineering science.

Aim

A key focus is to accelerate the deployment of efficient, reliable and cost-effective ORE technologies which will fuel the continued growth of this sector in Europe. Therefore, the organization and activities are designed in line with a defined research agenda established on the basis of inputs from ongoing EU coordination/roadmap initiatives (Ocean Energy Roadmap, SET plan/ TP Ocean/SI Ocean/Green Deal) and end-users requirements. A dedicated assessment strategy, based on the definition of specific Key Performance Indicators (KPIs) and involving relevant supervisory and advisory bodies, guarantees the quality of the offered services and its ability to anticipate and respond to changing end-user requirements.

Facilities

The NL-MARINERG-i encompasses five primary scientific focus groups: wave, tidal, offshore wind, electrical and grid connection and cross-cutting technologies/components. Research conducted within each of the NL-MARINERG-i focus groups requires access to different types of facilities. Infrastructures can thus be classified according to both the main domain of activity (focus group) and the scale or level of developments of the models or devices that can be tested in a given facility. This is important because facilities with different sizes and capabilities are necessary at different stages of development of an ORE converter (depending on its Technology Readiness Level (TRL)), from proof of concept at a small-scale in the controlled environment of a laboratory, to full-scale deployment for production in an open sea test site connected to the grid. NL-MARINERG-i provides the full range of facilities for all stages of device development.

Offer

Access to the participating facilities will be managed through a streamlined application process mediated by the single access portal, developed as part of the MARINERG-i e-Infrastructure (**www.marinerg-i.eu**). This platform will allow the integrated view of infrastructure availability, matching users' requirements, ensuring quick access and helping to alleviate oversubscription to well-known facilities by directing users to equally suitable facilities available within their time-frames. Support will be provided to users so as to help them determine the most appropriate testing facility according to:

- > technology type
- > Technology Readiness Level
- > test scope and objectives
- > developer's location, timeline and available funding mechanisms
- > availability of relevant testing facilities

For more information contact:
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Dutch test landscape

ROYAL NETHERLANDS INSTITUTE FOR SEA RESEARCH
TEXEL

- Fleet of research vessels
- Test facility for component- and supporting technology testing
- Laboratories for ecology, (micro-)biology, chemistry, geology and oceanography
- Stream flume
- Marine research equipment and sensors pool
- Test basin
- Pressure testing tank
- Open sea access port
- Netherlands Deep Sea Science & Technology Centre

DELFT UNIVERSITY OF TECHNOLOGY
DELFT

- Low speed, low turbulence tunnel
- Open Jet Facility
- Several small wind tunnels
- Structures and Material Laboratory
- Wave Basing, towin tank
- Wave Flume
- Stream Flume
- Stream Tank
- SAM|XL
- Delft Ocean Technology Centre (DOTC)

DUTCH MARINE ENERGY CENTRE
THE HAGUE

- Marine Energy Hub
- Open water test locations customised to users' needs

DELTARES
DELFT

- Atlantic Basin
- Scheldt flume
- Delta basin
- Delta Flume
- GeoCentrifuge
- Bioremediation Lab
- Geochemical characterisation laboratory
- Alphaloop
- IOS basins incl. header for pump (sump) research
- Ship Lock facility including fresh and salt water facilities
- Laboratory for microbial diversity
- Several smaller basins, flumes and geotechnical facilities

DNW – GERMAN-DUTCH WIND TUNNELS
MARKNESSE

- Medium (Low-speed wind tunnel LST) to large (Large low speed facility LLF) wind tunnels
- Equipment for acoustic and aerodynamic optimization of wind turbines, including their mutual interaction

NETHERLANDS AEROSPACE CENTRE
MARKNESSE

- Composites manufacturing facility with an industrial fibre placement machine
- Wide range of different static and dynamic testing machines
- Test facilities for noise
- Computational aero-elasticity tools running on an HPC cluster
- Safety assessments in aircraft operation areas

MARIN
WAGENINGEN

- Offshore basin
- Seakeeping and manoeuvring basin
- Depressurised wave basin
- Shallow water Basin
- Deep water basin
- Concept Basin
- Cavitation tunnel
- The atmosphere, multipurpose testing chamber
- Hydromechanical numerical simulations
- Offshore monitoring

WAGENINGEN UNIVERSITY & RESEARCH
WAGENINGEN

- Flume tank facilities
- Acoustic and telemetric monitoring techniques

HZ UNIVERSITY OF APPLIED SCIENCES
VLISSINGEN

- Fleet of research vessels
- Stream Flume suitable for scale model testing
- Smart Maintenance for offshore wind farms by robotica

TNO
DELFT

- R&D and prototype wind turbine test facility North Netherlands (EWTW)
- Prototype wind turbine test site South Netherlands
- North Sea meteorology measurement infrastructure network
- Offshore LiDAR test and validation facilities
- Floating Solar Energy facilities
- Renewable Energy Ecology field lab
- High pressure, large scale presses for piles (upto 400T)
- Seaweed production and processing lab
- Delft Ocean Technology Centre (DOTC)
- Hydrogen and materials laboratory
- Large scale air/water flow laboratory
- Rotary expansion test facility (large scale mechanical testing of linear and torsional forces)
- Structural Dynamics laboratory
- Tribology, corrosion and wear laboratory
- Automated test benches for battery cell, module, pack testing
- Radar test facilities
- Small scale air/water flow laboratory
- Oil/brine flow laboratory
- Dense gas flow set-up
- Foam testing set-up
- Engine climatic testing chamber (–45 to +55 °C)
- Engine emission monitoring facility GHG: NOx, NO, CO, THC, CO_2, O_2 (CH_4, EGR CO_2)
- Fuel Cell test and validation facility