

SCALEWIND JIP

MARIN and NREL take the initiative to start a cooperative JIP to develop a widely accepted floating wind turbine design assessment methodology that leads to efficient design convergence and reduced operational uncertainties for large scale floating wind.

The Floating wind market is rapidly developing. Wind turbines with power ratings of 15MW to more than 20MW are being proposed. These designs are assessed with numerical tools, model tests and medium scale pilot tests in the ocean. With larger turbines the mass of the floater and mooring system become lighter relative to the installed power. While this leads to a reduced cost per unit of produced energy, these larger wind turbines on small floaters also have a tendency to show flexible response of the integrated system of blades, tower, floater and mooring.

Fatigue and survivability of the whole system has to be analysed and validated step by step in an integrated manner for the flexible system. This is important especially when large series of the same design will be produced. The risk of operational cost later in the design life needs to be balanced against the aim for lower LCOE. This can be done by evolving validated numerical models during design and continued learning through monitoring during the operational life.

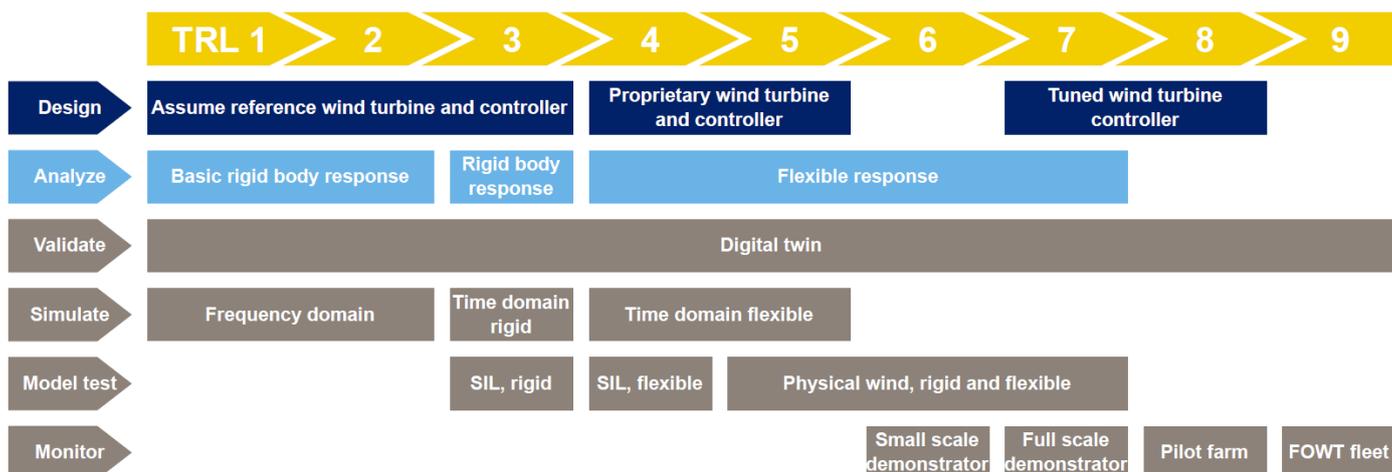


Project Outcomes:

- Step by step design and analysis approach across TRL
- Step by step validation method for integrated flexible response of tower, blades, blade pitch controller, floater and mooring
- Dataset with results for a generic floater and tower design.

Objective

The goal is to establish validated procedures, models and datasets for the numerical and experimental modelling of the integrated FOWT response. Main points of attention are structural flexibility and the turbine controller. Parameters of interest are the platform motions and accelerations, ultimate and fatigue loads in the tower, floater and mooring system, and the electrical power output. These procedures in turn allow for safe and efficient designs of large-scale FOWT platforms. An overview of the expected outcome is visualised below.



Work packages

- WP1 Evaluation of current design practices and standards. Identification of knowledge gaps, challenges and risks in the design process for larger scale industrial FOWT.
- WP2 Definition of 22MW reference platform(s), turbine, tower and mooring.
- WP3 Numerical model development using reference FOWT design(s)
- WP4 Stepwise validation of WP3 results, based on model testing and possibly full-scale data.
- WP5 Improved methodology development.

MARIN project management:

- Gijs Bouman
- Maarten van der Leij

MARIN project support:

- Arjan Voogt
- Erik-Jan de Ridder
- Olaf Waals



For more information contact MARIN:

Gijs Bouman
 T +31 317 49 36 47
 E g.j.bouman@marin.nl

JIP partner involvement

We encourage JIP partners to actively participate in this JIP. The aim is to discuss a methodology and apply this method to generic floater design, thereby avoiding specific FOWT design details. NREL and DTU are working on a 22MW reference wind turbine design for which MARIN is defining a generic floater. The focus is on an industry wide design methodology that helps platform designers, end-users and certification bodies to assess large scale floating wind turbines in a pragmatic manner.

Schedule

The project is aimed to start in Q4 2023 for a duration of 2 years.

Budget

The project aims for a 1.2 MEuro budget with 60 kEuro contribution for each partner. A maximum of 30 kEuro in-kind participation is possible and encouraged. The project will also apply for funding in US, EU and the Netherlands.

Interested?

If you are interested to participate or if you want to discuss this proposal, please contact us! Scan the QR code to visit the Scalewind JIP page for more information.

An open meeting will be organised during the FER Forum, June 26-30 2023, Paris, France.