SCALEWIND JIP

MARIN, TNO, Bureau Veritas and NREL are taking 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 rations 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. These procedures in turn allow for safe and efficient designs of large-scale FOWT platforms.

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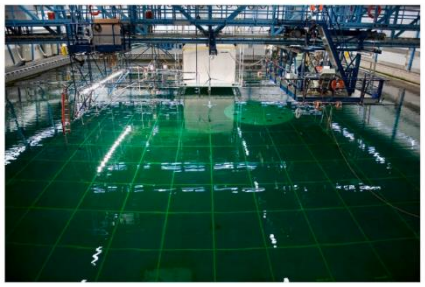

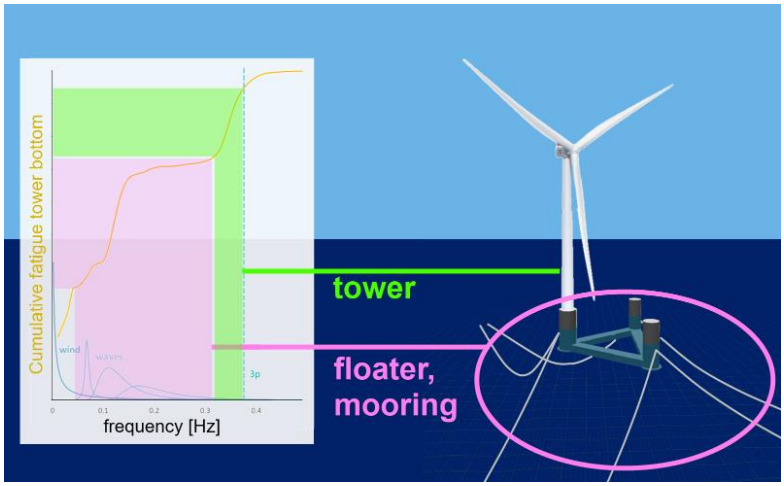

Image adapted from: Engebretsen, E. and Stampultzoglou, A. and Borgen, E. and Schafhirt, S. "Design Challenges and Novel Solutions for Tower Designs of Next Generation Floating Wind Turbines", DeepWind conference, 19 January 2023, Trondheim

Workpackages

WP1	Identification of knowledge gaps, challenges and risks for large scale industrial FOWT systems
WP2	Definition of reference platform(s), turbine, tower and mooring.
WP3	Numerical model development using reference FOWT design(s)
WP4	Stepwise validation of WP3 results with high-fidelity model test.
WP5	Guidance for experimental and numerical modelling.

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

It is aimed to start the project in Q4 2024 for a duration of 2.5 years.

Budget

The project aims for a 1.1 MEuro budget with 50 kEuro contribution for each partner. A maximum of 25 kEuro in-kind participation is possible and encouraged. For small companies a reduced fee of 30K Euro apply' s (with a maximum of 15k euro in-kind). 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! Use the QR code on the left to visit the JIP page on MARIN's website. Here you can find more information and contact details.

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