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Developing the Next Generation 12+ MW Offshore Wind Turbine for Clean and Competitive Electricity

Alternative platform concept to address WTG integration in shallow water port facilities

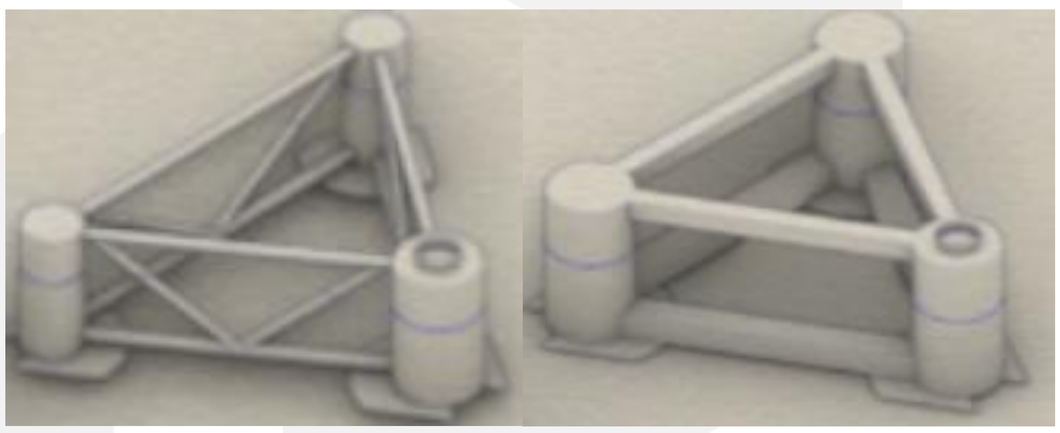
Lift bags at EFGL (Image: Rana Subsea)

Why develop an alternative hull design?

To eliminate the associated costs, logistical risks and time delays of temporary installation aids, an alternative hull design based on the WindFloat T was developed. This configuration replaces traditional braces with pontoons that provide integrated buoyancy and incorporate internal ballast tanks for precise control of draft and heel angle during the integration phase. For the hulls developed under the ReaLCOE project, this alternative design reduces the WTG integration draft from 12.1 m to 10.9 m. This reduction of 1.2 m significantly enhances operational flexibility and port accessibility, ensuring safe clearance in locations such as the Polder of Brest port, where the quay water depth is limited to 12 m at the lowest astronomical tide. Further improvements were made in the platform design where the more recent designs can achieve integration draft up to 5 m.

Impact of hull design on integration draft

As wind turbine generator (WTG) ratings increase, the draft and overall dimensions of floating platforms must also increase to support heavier components and higher thrust loads. This growth complicates the sensitive process of mounting the turbine onto the floating hull, known as the integration phase, which requires favorable environmental conditions and precise ballast management at every step. Furthermore, these deeper drafts restrict port and shipyard accessibility due to the increased risk of grounding in shallow waters during integration. During the integration phase in the ReaLCoE project, the Polder of Brest Port was considered, which has a water depth of up to 12 m. In order to comply with this shallow water depth, the WindFloat T design requires the use of temporary installation aids, such as lift bags, to provide additional buoyancy. These aids reduce the platform's draft effectively, maintaining an even keel throughout the integration process and enabling safe and stable construction in environments with depth constraints.



Baseline Hull (left) and Alternative Hull (right) structural designs

ReaLCoE's vision is to unleash the full potential of offshore wind energy
€35/MWh LCoE Goal, +12MW WEC Capacity, ~32 mio € Total Budget, 42 month project duration

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