

# Floating Offshore Wind TLP



***Building on over 45 years of experience in designing permanently moored systems, Bluewater has developed a Tension Leg Platform (TLP) to support offshore wind turbines. The TLP foundation is lightweight and is designed based on a scalability approach to support the upcoming ultra large wind turbines at site.***

With the support of Bluewater's Transport and Installation Frame (TIF) the WTG and TLP are being integrated in sheltered waters and towed-out to the offshore location. Stability on the system during tow-out is secured by the temporary buoyancy offered by the TIF, while the system stability offshore is maintained by tension in the mooring lines provided by the buoyancy force of the floater. The mooring lines are tensioned straight between the floater and the anchor points, avoiding contact with the seabed. The legs of the floater are situated under the wave zone so that the wave induced mooring loads are minimized. The system has minimal movements, resulting in substantial advantages for both the lifetime and performances of the wind turbine and the power cable.

## System Characteristics

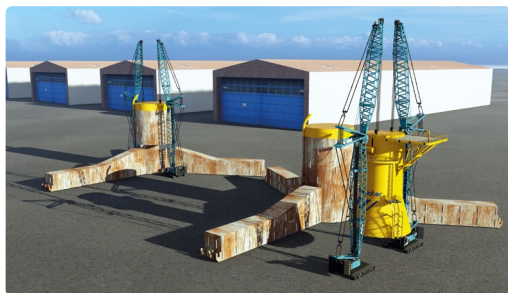
- Lightest structure for floating wind
- Modular sections
- Minimized nacelle motions
- Redundant mooring system
- Mooring lines free from seabed

## Wide Application

- For deployment in harsh environments & deep waters
- Minimal floater induced movements on the WTG
- Deep-draft floater, out of wave influenced zone
- Fully dynamic power cable not required
- No active ballast systems

## Supply Chain Approach

The Floating Offshore Wind Tension Leg Platform (TLP) concept focusses on efficient supply chains and minimized project execution risk. Learnings from floating projects are taken and a novel installation method is proposed based on Bluewater's Transport & Installation Frame (TIF), where the wind turbine is integrated on the TLP foundation in bottom-fixed conditions nearshore. The complete system is towed safely to the site and hooked-up to its mooring system. Reducing critical offshore operations improves the installation weather windows, enabling sound and timely project delivery.



Local assembly of TLP sections



Assembly with Bluewater's TIF (Transport and Installation Frame)



Tow-out with Bluewater's TIF



Easy access for maintenance

## Minimized Project Risks

- Efficient and simple TLP fabrication and straight forward
- Predictable and reliable fixed-to-fixed WTG integration in sheltered locations
- local assembly
- Improved weather uptime for installation and MCR
- Predictable project execution schedules
- Straightforward IAC routing

### TLP Construction

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*Design optimized for efficient mass construction*

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*Suitable for existing ship building capabilities*

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*Optimized for automated welding and steel handling*

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*Modular sections for efficient transport*

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### TLP Assembly and Logistics

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*Efficient (wet) storage of TLPs, minimal quay space requirements*

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*Straightforward final assembly*

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*Multiple marshalling locations, shorter installation periods*

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### WTG Integration Nearshore

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*Grounding TIF to stabilize TLP for fixed-to-fixed WTG integration*

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*Nearshore WTG integration on TLP avoiding port congestions*

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*Installation in sheltered location, less weather dependent*

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*Green shore-power is used for integration operations*

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### Installation Offshore

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*Tow-out of fully integrated foundation/WTG system*

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*TIF supports the complete transport and offshore installation operation*

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*No dependency on large vessels*

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### Operation and Maintenance

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*TIF provides stable platform with no relative motions for MCR operations*

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*Strongpoints for platform mounted crane for MCR*

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*Maintenance-free foundation, no active ballast*

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*Easy access similar to bottom-fixed*

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