

Designutfordringer – Offshore Wind



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Petroleumstilsynet

Christophe Bekhouche | Marine Operations Engineer
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A WORLD ELECTRIFIED
BY RENEWABLE ENERGY

Aker group positioned to invest along global megatrends



Mainstream Renewable Power Offshore Wind



Aker Offshore Wind and Mainstream Renewable Power

combine to create global offshore wind frontrunner

4.9 GW in active
development:

- ✓ South Korea
- ✓ Scotland
- ✓ Vietnam

Upcoming
opportunities globally

Ownership of
Principle Power.
*Proven Floating Wind
technology*



Intro – Offshore Wind

Some facts about offshore wind:

- > Constant growth of wind turbine size
- > Increasing loads on substructures
- > Volume of equipment & supply chain constraints
- > Installation complexity
- > Race toward fast costs reduction

Technical aspects:

- > **Newest WTG designs** ~15-18 MW
- > **Hub heights** ~150m
- > **Rotor diameters** 236-260m
- > **Blade tip height** ~270m



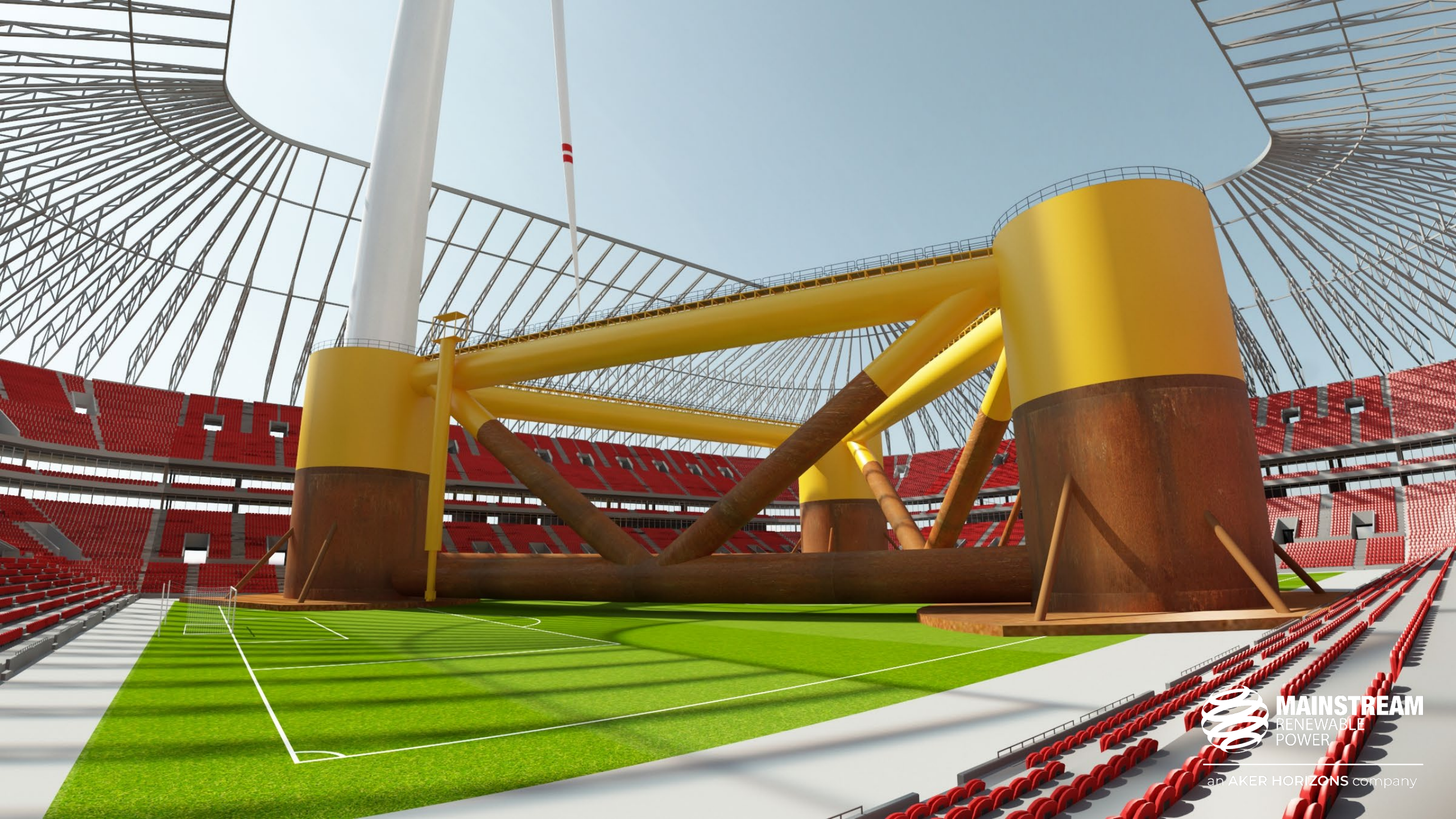
15MW – Vestas V236

Floating Wind farm

- > 1.5 GW
- > 100x WTGs
- > 2-3 Floating Substations



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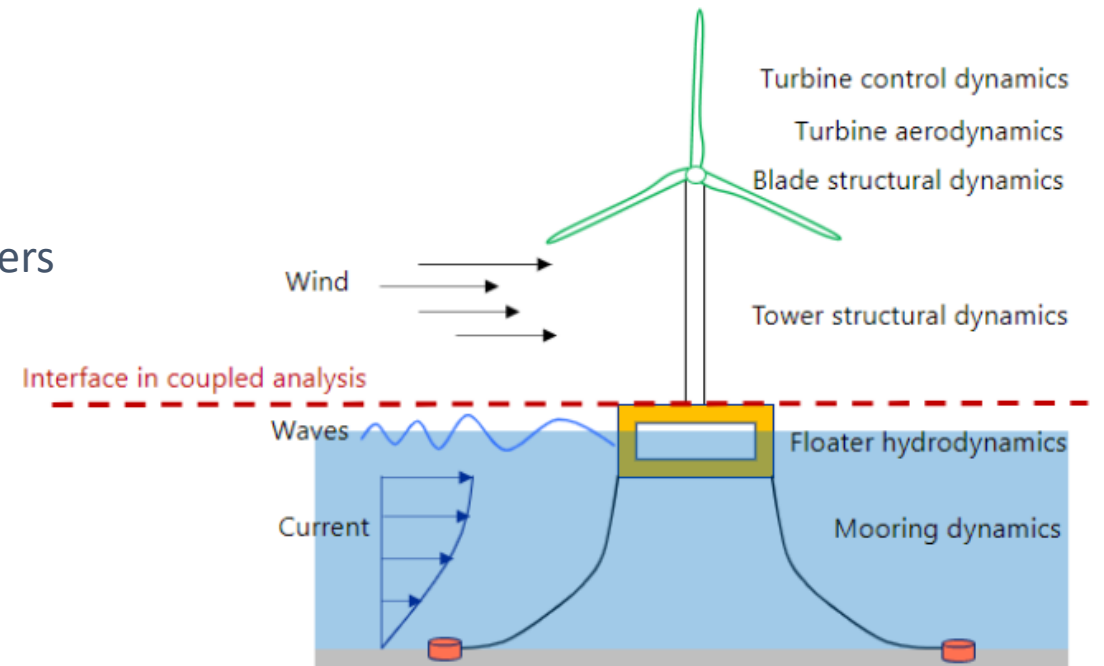


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Design - Integrated Load Analysis

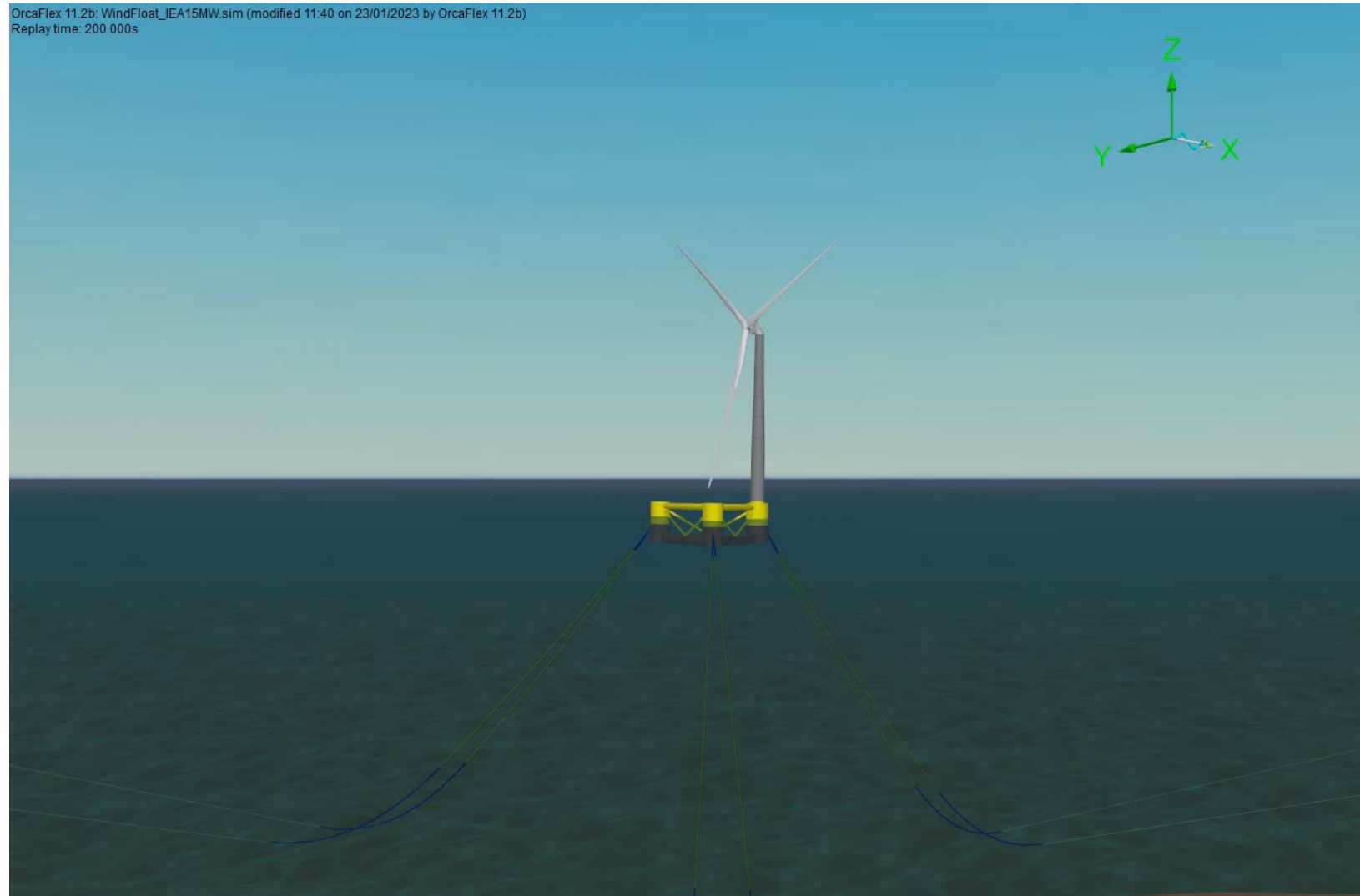
- > Highly complex system with many coupling effects
- > Joint effort involving WTG OEM, Floater & Mooring designers
- > Multiple iteration loops
- > Potentially on project critical path



Design - Integrated Load Analysis



OrcaFlex 11.2b: WindFloat_JEA15MW.sim (modified 11:40 on 23/01/2023 by OrcaFlex 11.2b)
Replay time: 200.000s



Orcaflex model

- > WTG - 15MW
- > Hs 10m

Supply chain challenges

- > Industry in exponential growth
- > Design adjustments to accommodate local fabrication capabilities



- > Cost reduction through standardization of designs and supply chain investments



Flat panel container ship building – credit Maersk



Jacket fabrication, Aker yard in Verdal (Norway)

Transport & Installation

- > Large volumes of heavy equipment
- > Need for industrialized methods
- > Minimize manual handling
- > Aging fleets and need for new-built vessels



Operation & Maintenance

- > Large number of offshore personnel transfer
- > Need for fast intervention, in high weather criteria
- > Multiple transfers per day, all year round
- > Wind farms being built further from shore, in rougher weather area
- > Assets availability and Safety are key

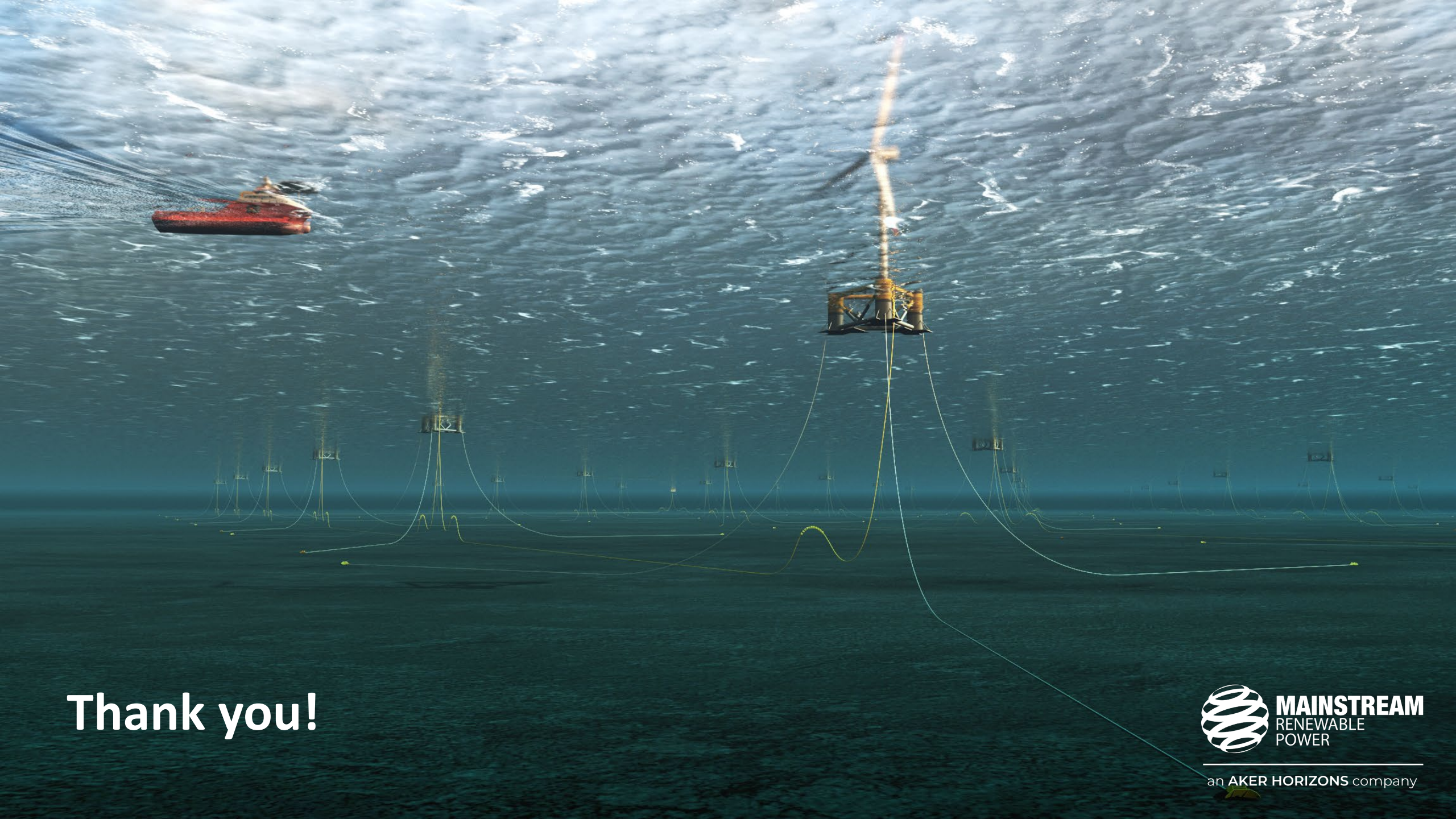


Main take-aways

- > Increasing size of turbines
- > Complex integrated designs
- > Volume and supply chain developments
- > Industrialized installation methods
- > Availability & safety during operation



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Thank you!



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