Nominal power is key for competitivness

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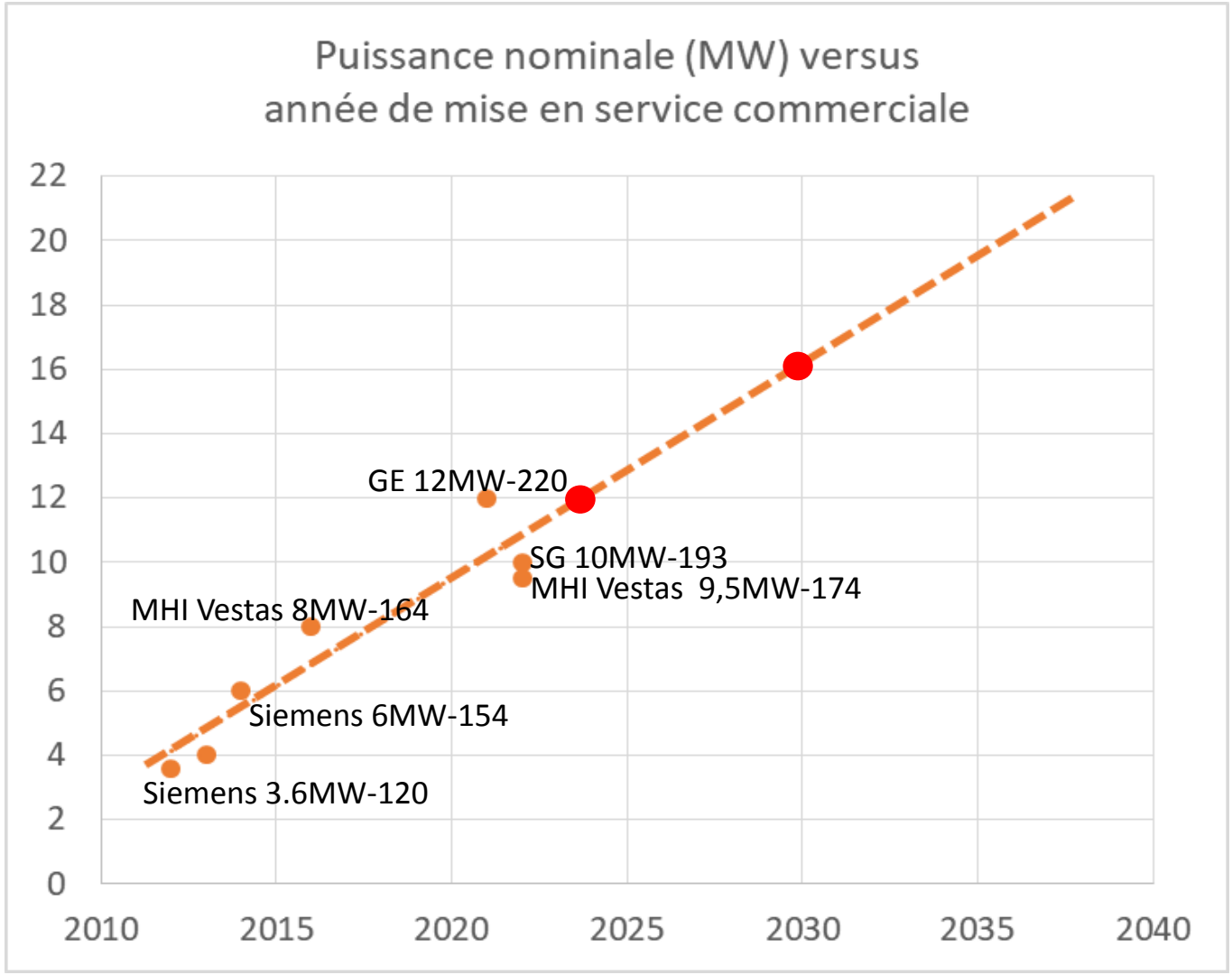
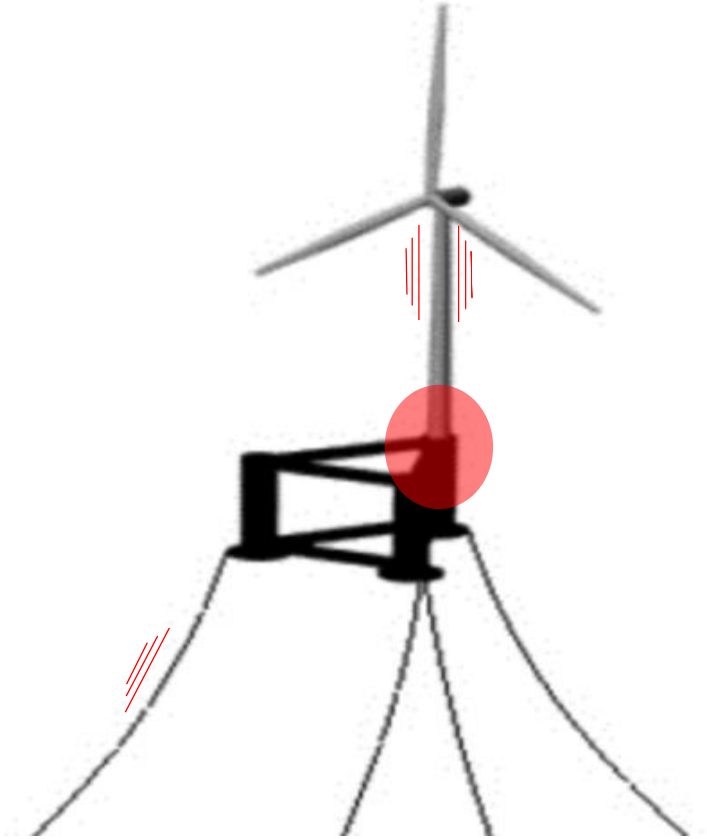
Cost-effective Floating Wind Parks





UPSIZING MAIN DESIGN ISSUES

1. Structure fatigue damage
2. Structure resonance due to rotor excitation
3. Blade design

Floating enables to rethink architecture

1. Structure fatigue damage : the patented pyramidal structure provides a better stress distribution
   -30% steel @ iso-turbine/iso-floater/iso-lifetime

Bottom-fixed with nacelle yaw

Floating foundation without electric yaw

Floating enables to rethink architecture

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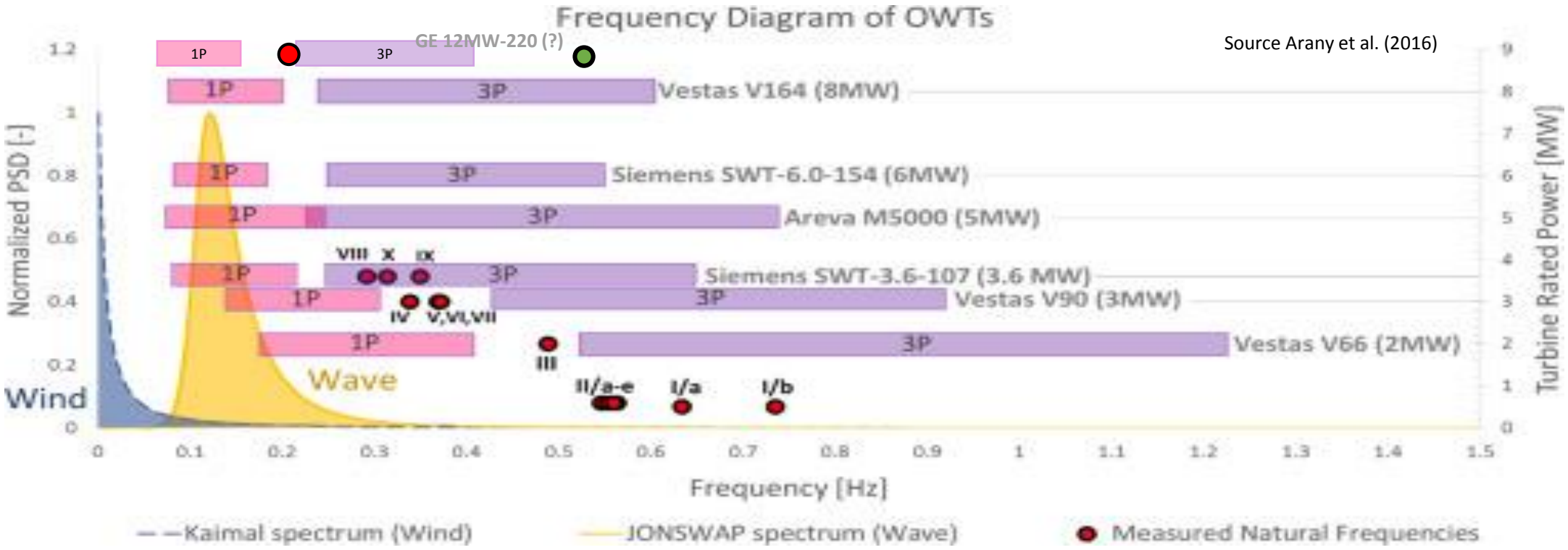
1. Lower structure fatigue damage

2. No more resonance issue thanks to the 1st structural eigen freq. shifted to 0.6Hz



3. Blade design

Floating enables to rethink architecture

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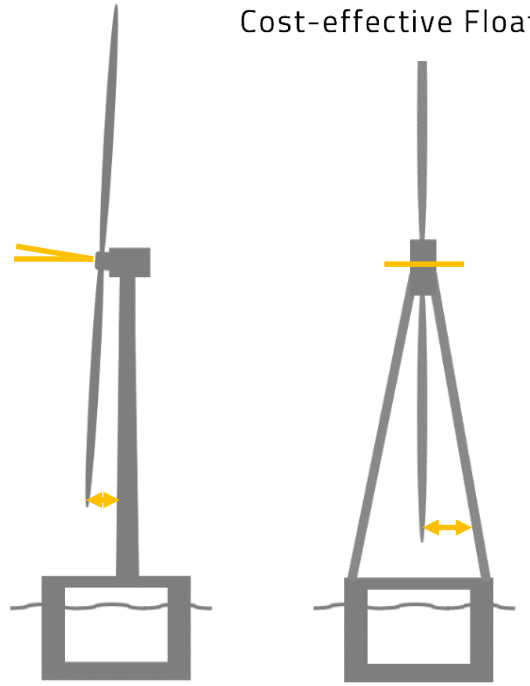
1. Lower structure fatigue damage

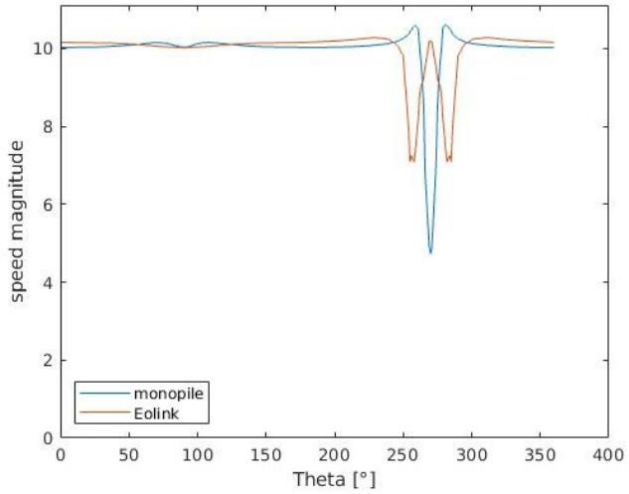
2. No more structure resonance

3. Blade design

   - The tower clearance constraint disapears. Thus, blades stiffness and weight can be reduced → Cost and fatigue damage due to cyclic inertia loadings are reduced.

   - Less aeodynamic disturbances between the legs reduces tower shadow effect → Fatigue damage due to flapwise moments is reduced.





Others benefits

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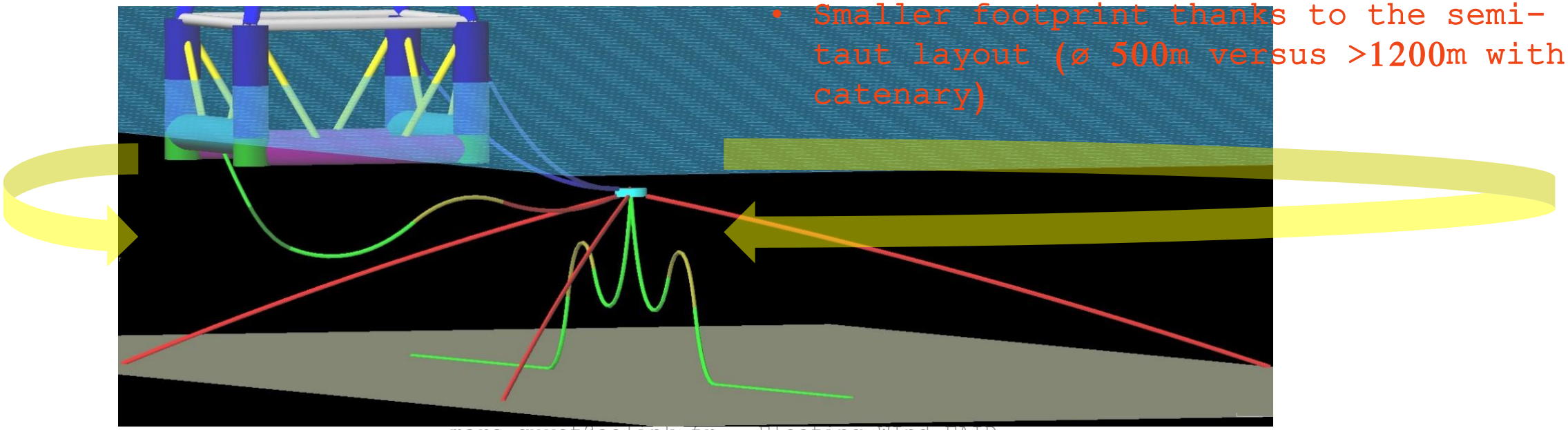
4. Smaller foundations (66m for 12MW): lower requirements in hydrostatic stability thanks to the hawsers which counteract wind overturning moment

5. Turbine erection doesn't require any XL cranes as the structure is by itself a gantry crane.

6. Mooring and electric layout
- Independant installation of the mooring lines, the power cables and the FOWT
- Lower mooring loads thanks to the damping proivded by the hawsers
- Nearly zero offset at the inter-array cables connexion
- Smaller footprint thanks to the semi-taut layout (ø 500m versus >1200m with catenary)



Demonstration

- One of the 7 companies to have successfully performed offshore test (cf Joint Industry Project Carbon Trust)
- Biggest $\frac{\text{rotor diameter}}{\text{hull's length}}$ ever tested
- Grid-connected in April 2018
- 12MW à 1/10th (Froude scaling)
- Max gusts equivalent to 75m/s at full scale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Cost-effectivness