

Enhanced whole-life anchoring systems for floating wind, wave and tidal energy devices

Dr Katherine Kwa

@KatherineKwa

Offshore Renewable Energy

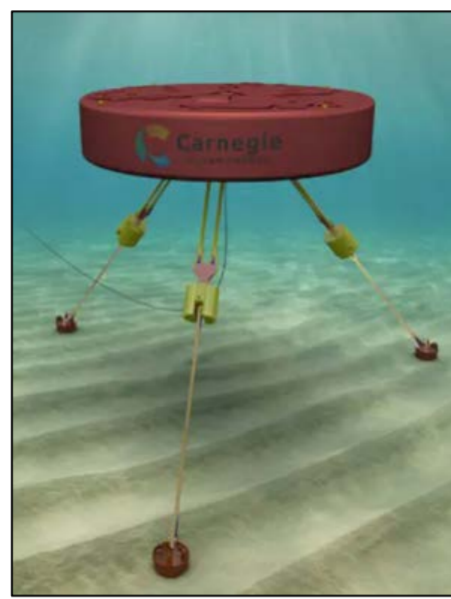
Sources of offshore renewable energy

Wind



Ørsted.com

Wave



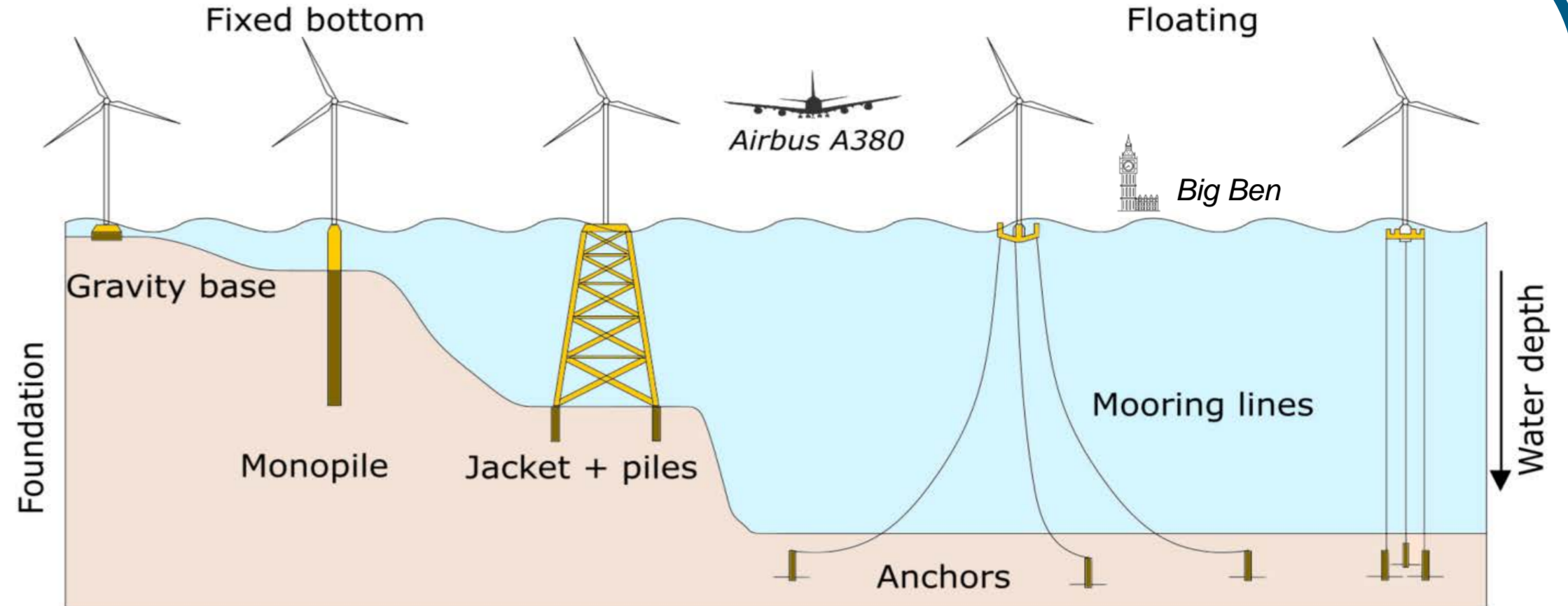
carnegiece.com

Tidal



sustainablemarine.com

Supporting foundations and anchoring systems



14 GW

Offshore wind installed in the UK

4.5 million

Equivalent homes powered by offshore wind

£2.6 bn/y

Exports by 2030 for offshore wind

20%

UK's electricity needs that could be covered by wave and tidal

125 GW

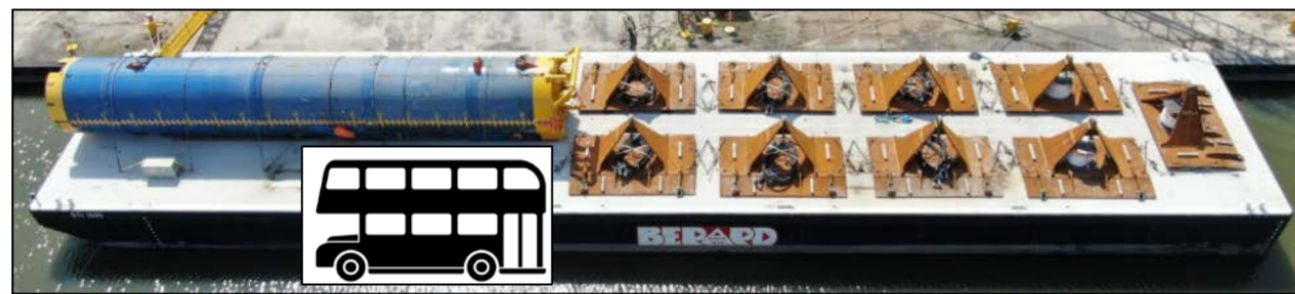
2050 net zero target for offshore wind

Challenges & Objectives

What are the challenges for anchoring offshore wind?

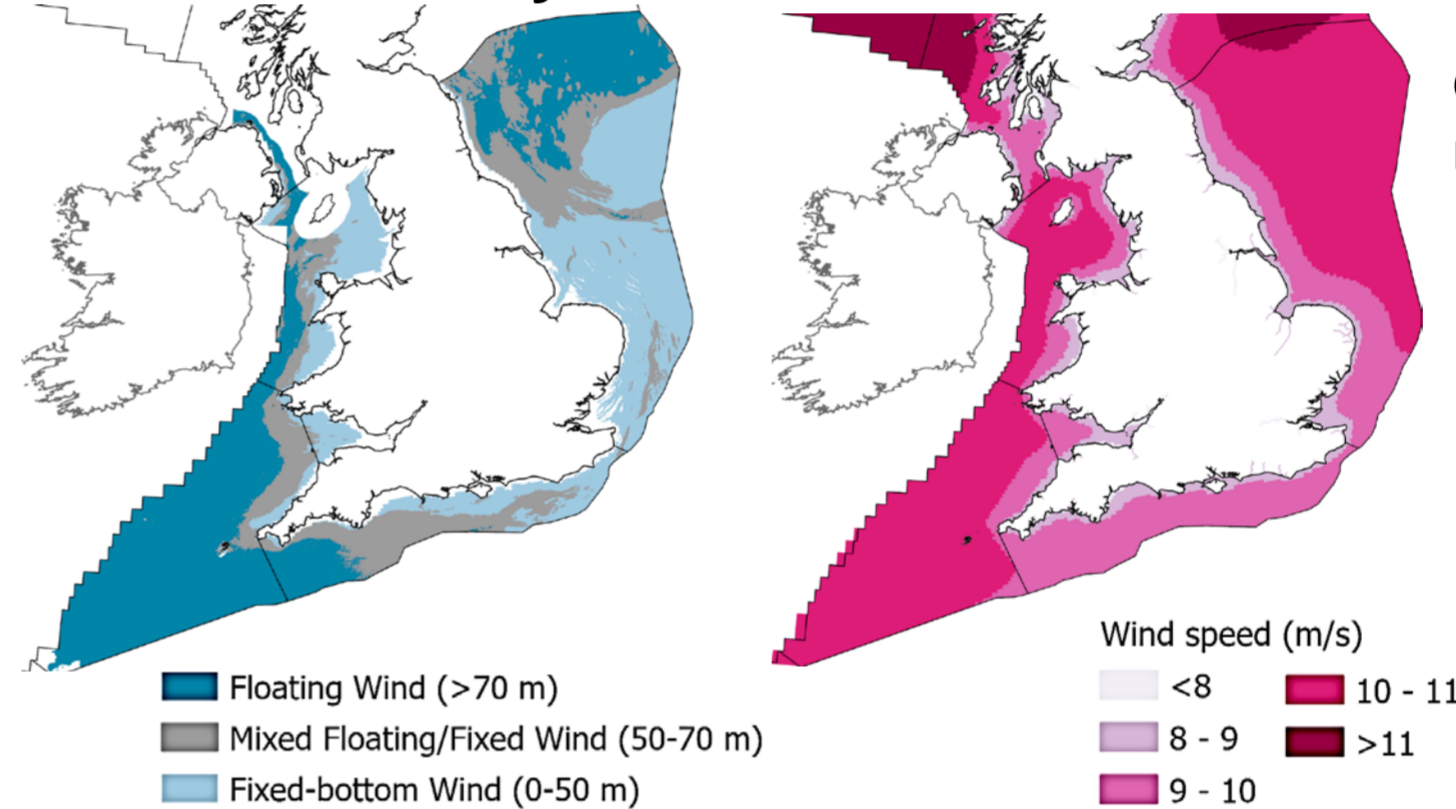
1. Deep water conditions: available and most energetic locations are far from shore.
2. Cost-efficiency in upscaling: Anchoring systems are expensive

How can we reduce anchor costs and improve their efficiency and reliability?



intermoor.com

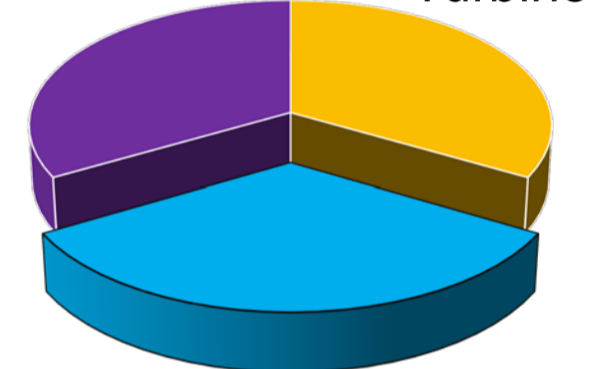
Key resource areas



Putuhena et al., 2022

Component costs

Operations and maintenance Turbine

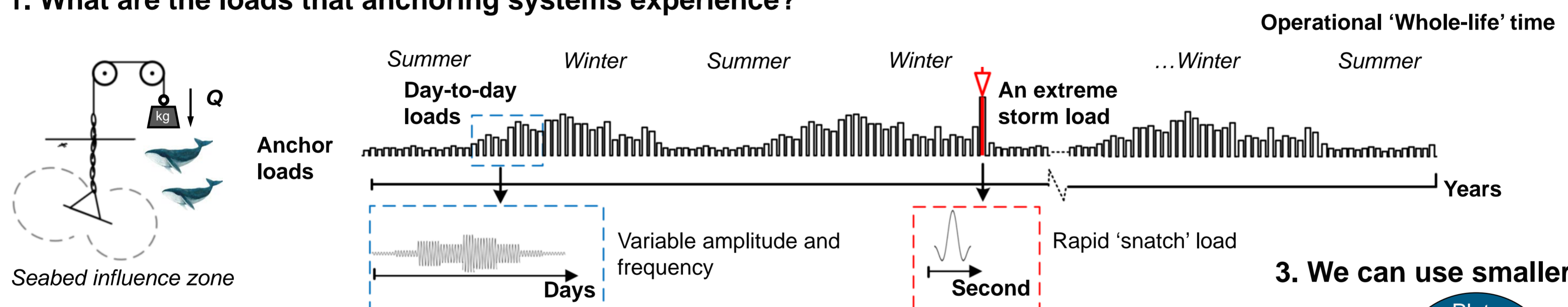


Anchoring systems

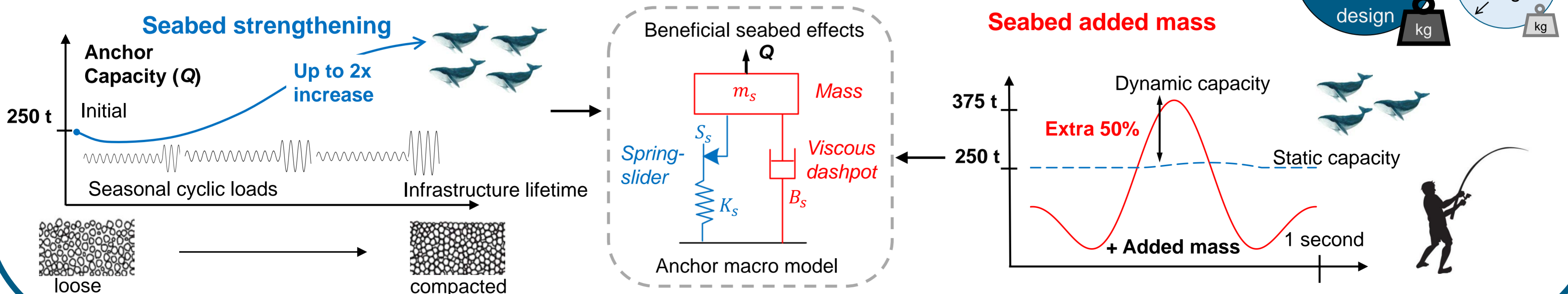
ore.catapult.org.uk

Research Methodology & Results

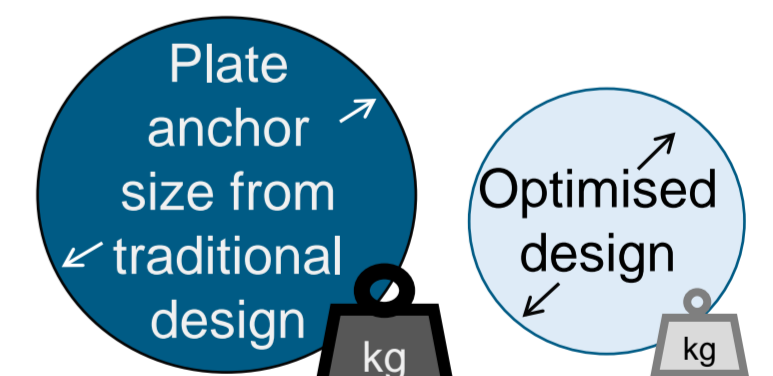
1. What are the loads that anchoring systems experience?



2. Where do anchor capacity enhancements come from?



3. We can use smaller anchors



Conclusions

Harnessing beneficial seabed effects means that we can make anchors smaller.

Smaller anchors are:

- Cheaper to manufacture and transport
- Easier and safer to install

Impact

Unlock cost reductions required for UK commercial scale floating offshore renewable energy.

Working with industry partners to implement our findings in practice.