

Biodiversity & Environmental Impact Management

Focus on Underwater Noise

Why is biodiversity important to Ørsted?

- The world needs to accelerate the transition to green energy
- Scaling up renewable energy at the pace required will have increased local environmental impacts
- We must continue to find ways to build in balance with nature
- As Ørsted accelerates the build-out of green energy, we will work with a greater number and more diverse set of ecosystems



Our biodiversity ambition

As part of Ørsted's new 2030 strategy, the company has set **the ambition to deliver net-positive biodiversity impact in all renewable energy projects it commissions from 2030**, strengthening the green energy build-out in balance with nature



The challenges in achieving our ambition



Understanding our current biodiversity footprint and to measure it



Delivering net positive in dynamic marine ecosystems



Increase in initial investment



Managing stakeholder expectations and views in multiple market

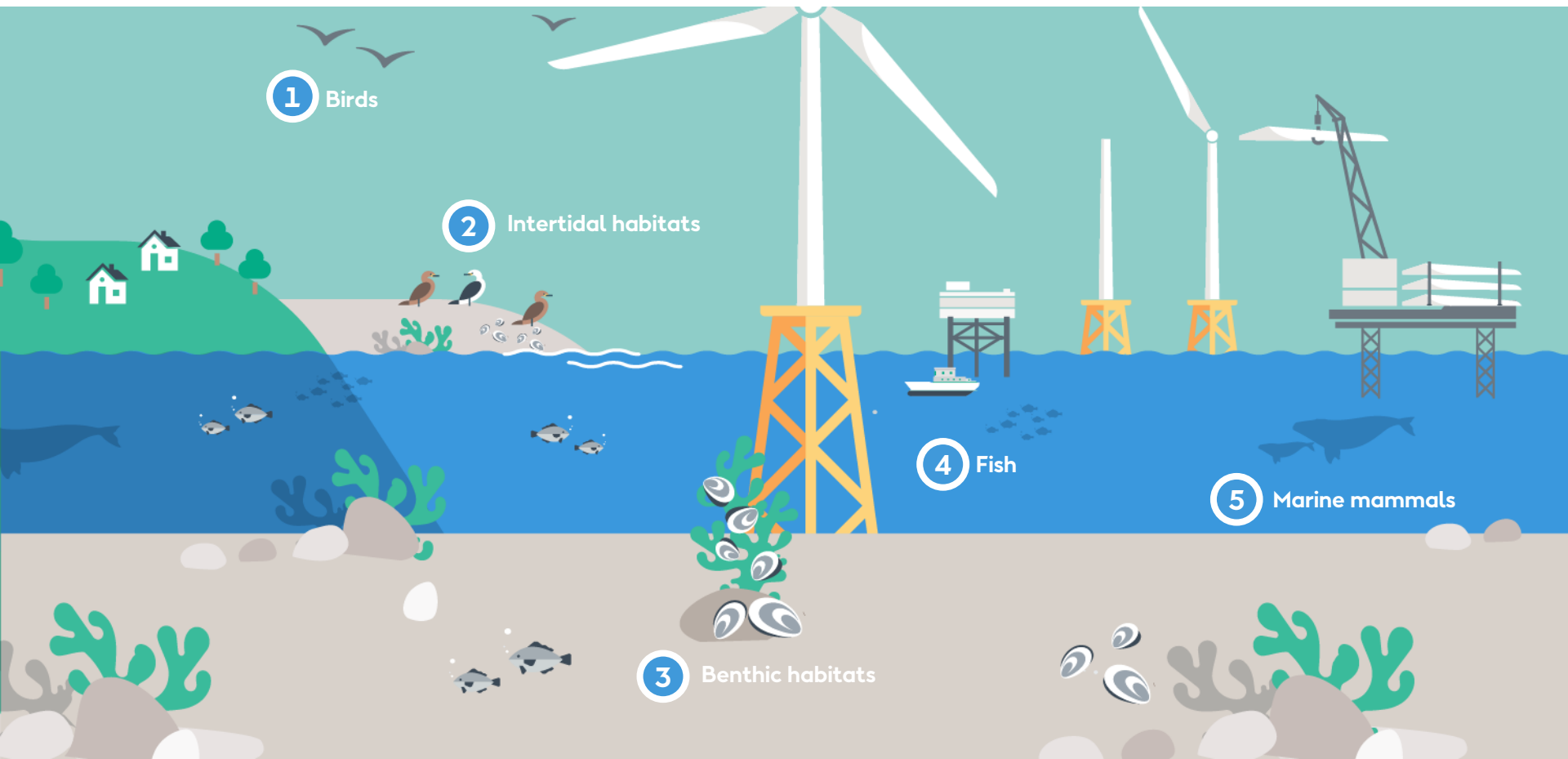


Adapting to the changing policy landscape

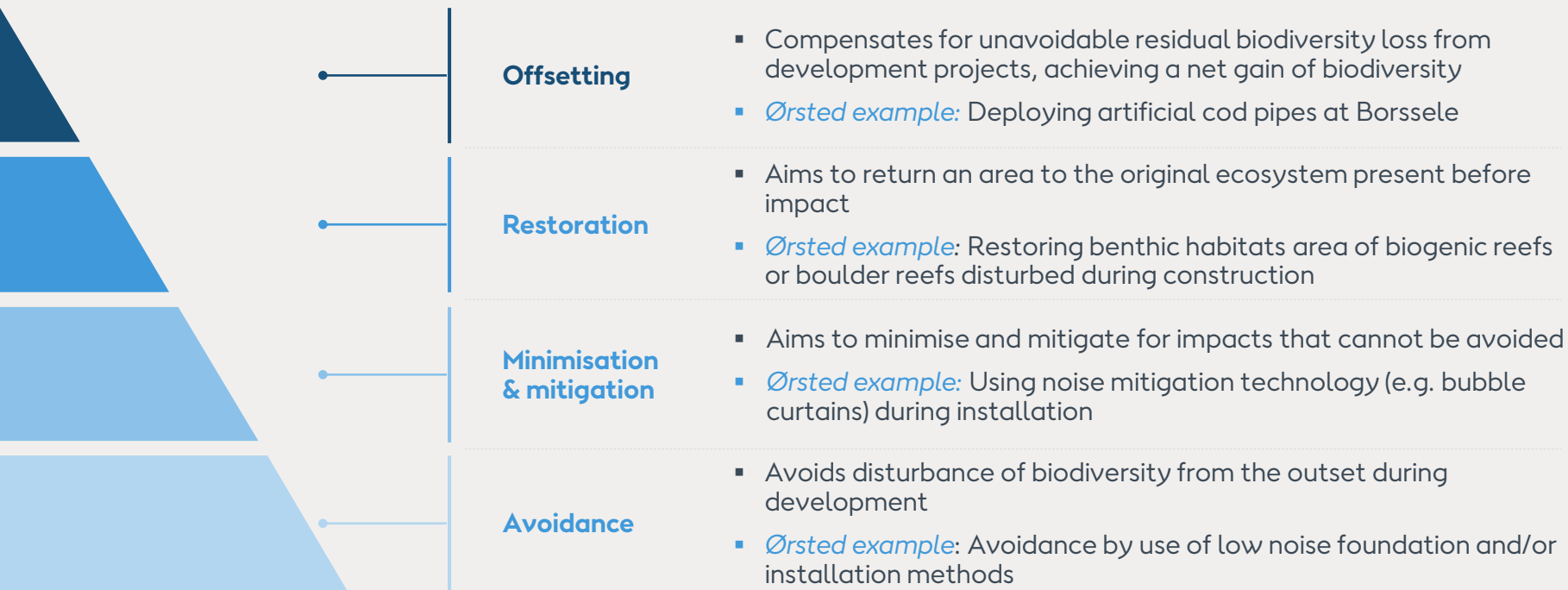


Potential conflict with other sea users

Our impacts on offshore biodiversity can largely be grouped into five key biodiversity features

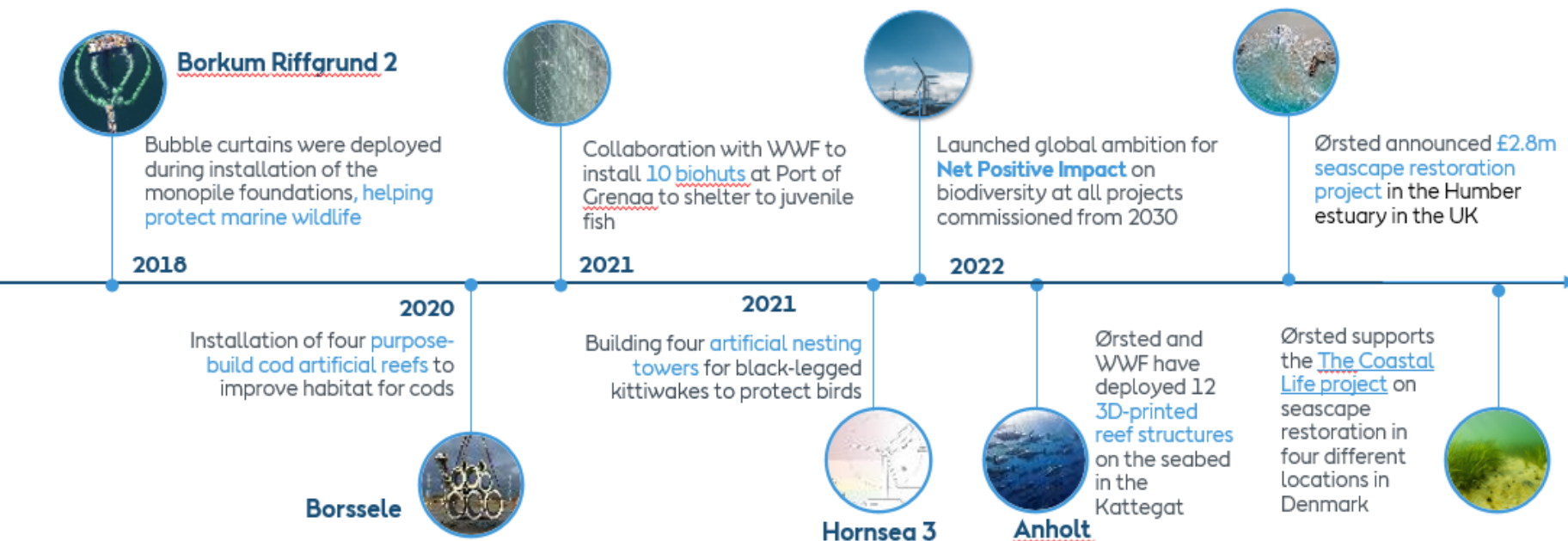


The mitigation hierarchy

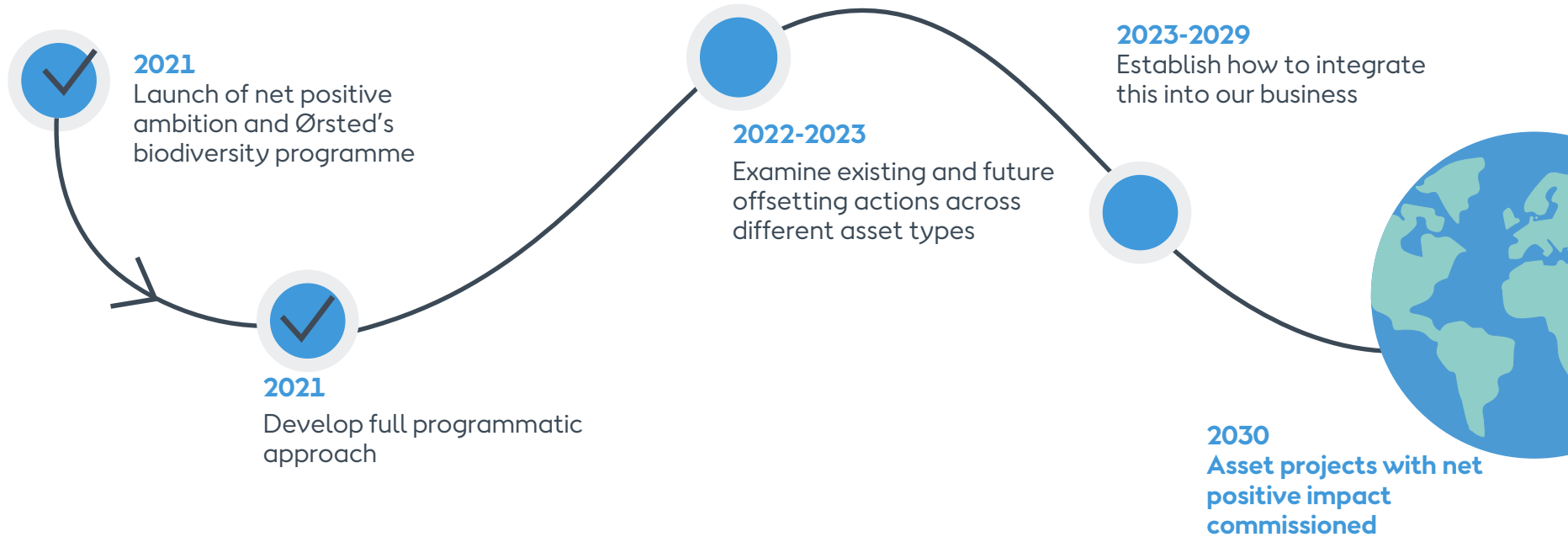


Source: International Union for Conservation of Nature; OECD; The Biodiversity Consultancy

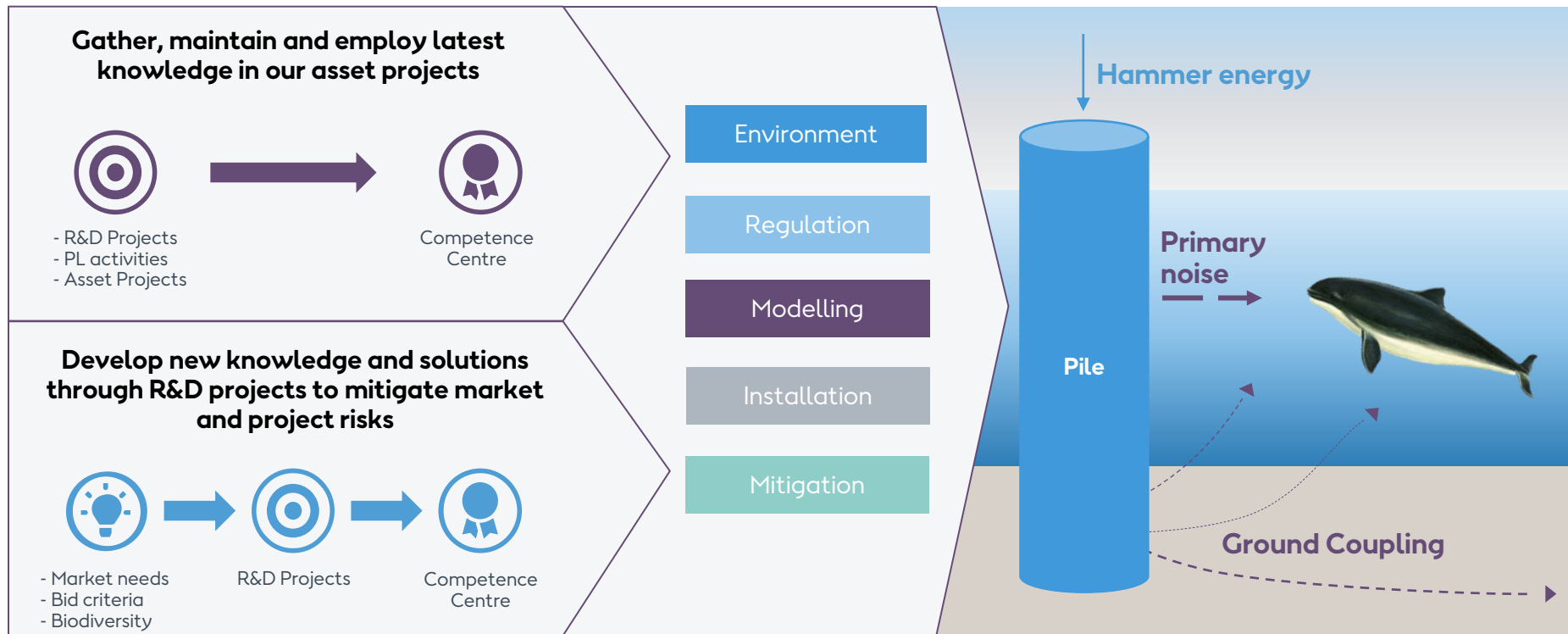
2030 Ambition, we've already started



How we'll go about meeting our net positive ambition by 2030



UnNo-X – An Underwater Noise Competence Centre



UnNo-X: Some Previous / Current Activities

Environmental studies



GESCHA I & II: Effects of offshore pile driving on harbour porpoise abundance in the German Bight including during pile driving.



DEPONS: Disturbance effects on the harbour Porpoise population in the North Sea. Project Partner.



ORJIP ADD: Use of ADDs & Improvements to standard mitigation measures during piling

Underwater acoustics



BORA: improved knowledge of underwater acoustics



COMPILE II: A real-life benchmark scenario for pile driving noise estimations



ORJIP ReCon: Study to investigate modelling and reduce conservatism in noise impact assessments for a more realistic assessment. On Project Expert Panel



ORJIP RaDIN: Study on the range-dependent nature of impulsive noise - analysis of existing data and development of method for incorporation into noise impact assessments. On Project Expert Panel.

Low-noise installation techniques and mitigation



Full-scale test of vibrodriving at Anholt OWF 2012



Participation in Carbon Trust VIBRO JIP with tests at Cuxhaven



Co-development of the IHC NMS



Small scale test of the AdBm system in Belgium with DEME offshore (Geosea)



Participation in Blue PILOT test through the Carbon Trust OWA programme



Part participation (only noise measurements) in the test of the AdBM noise abatement system at the Norther OWF.



SIMOX (Sustainable Installation of XXL Monopiles): aims to have innovative technologies for the installation of large wind turbines commercially available. Part of Steering Committee.

PROJECT FUNDAMENTALS

Site

Water Depth
Soil
Current

Foundations

Shallow Water Gravity
Suction Bucket Jacket
Piled Jacket
Monopile

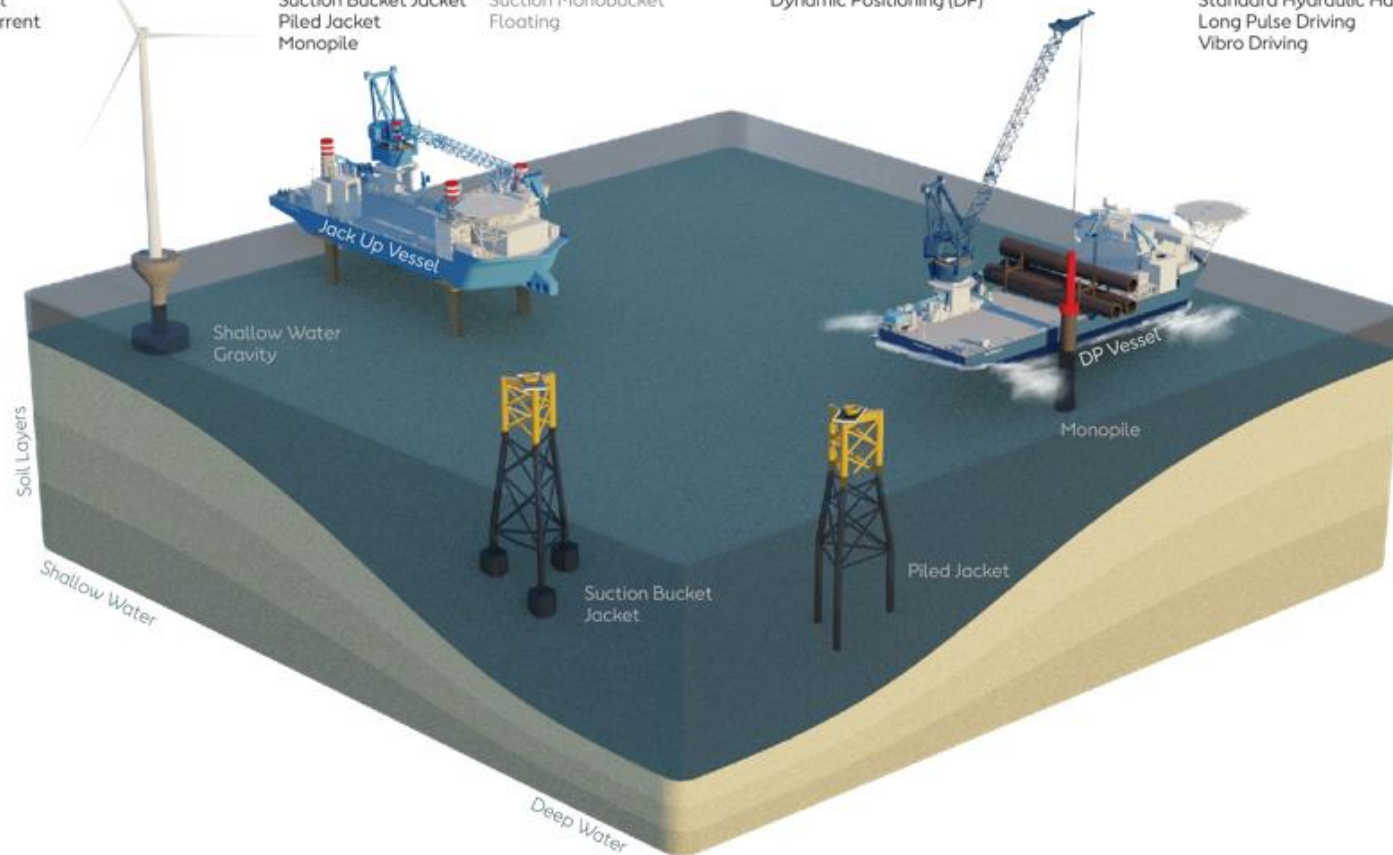
Deep Water Gravity
Suction Monobucket
Floating

Installation Vessels

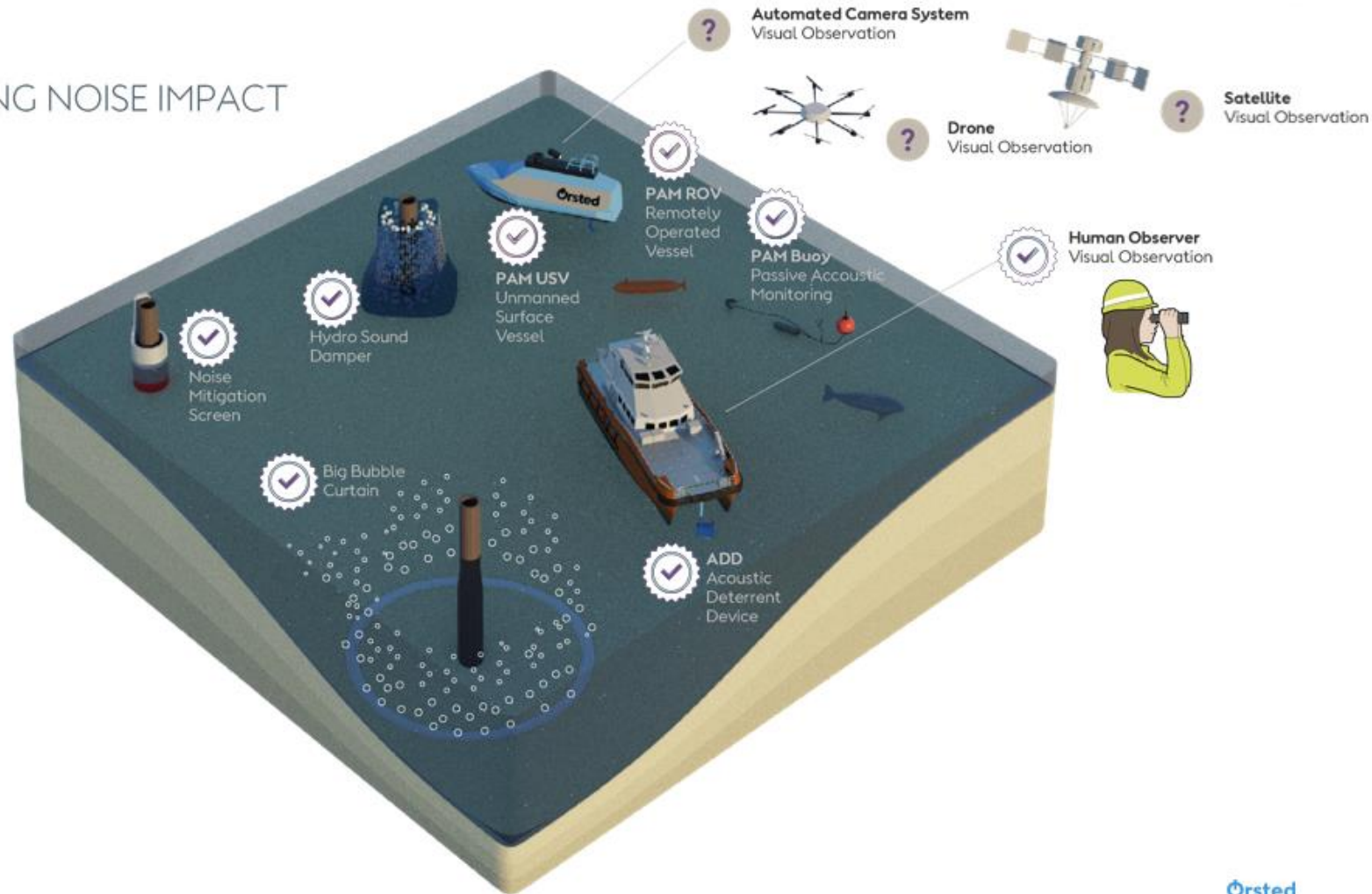
Jack Up
Dynamic Positioning (DP)

Installation Methods

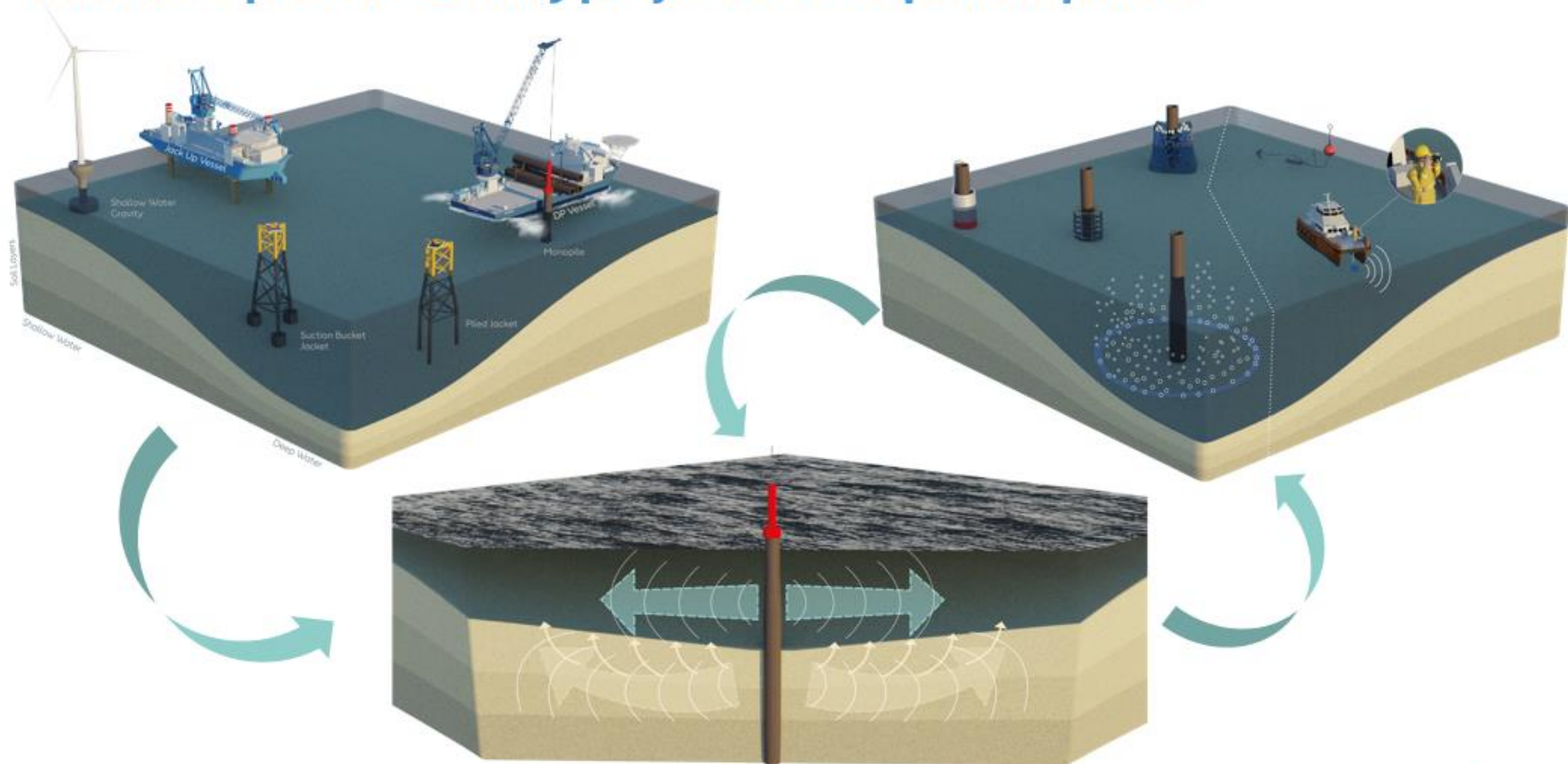
Pile Driving Methods
Standard Hydraulic Hammer
Long Pulse Driving
Vibro Driving



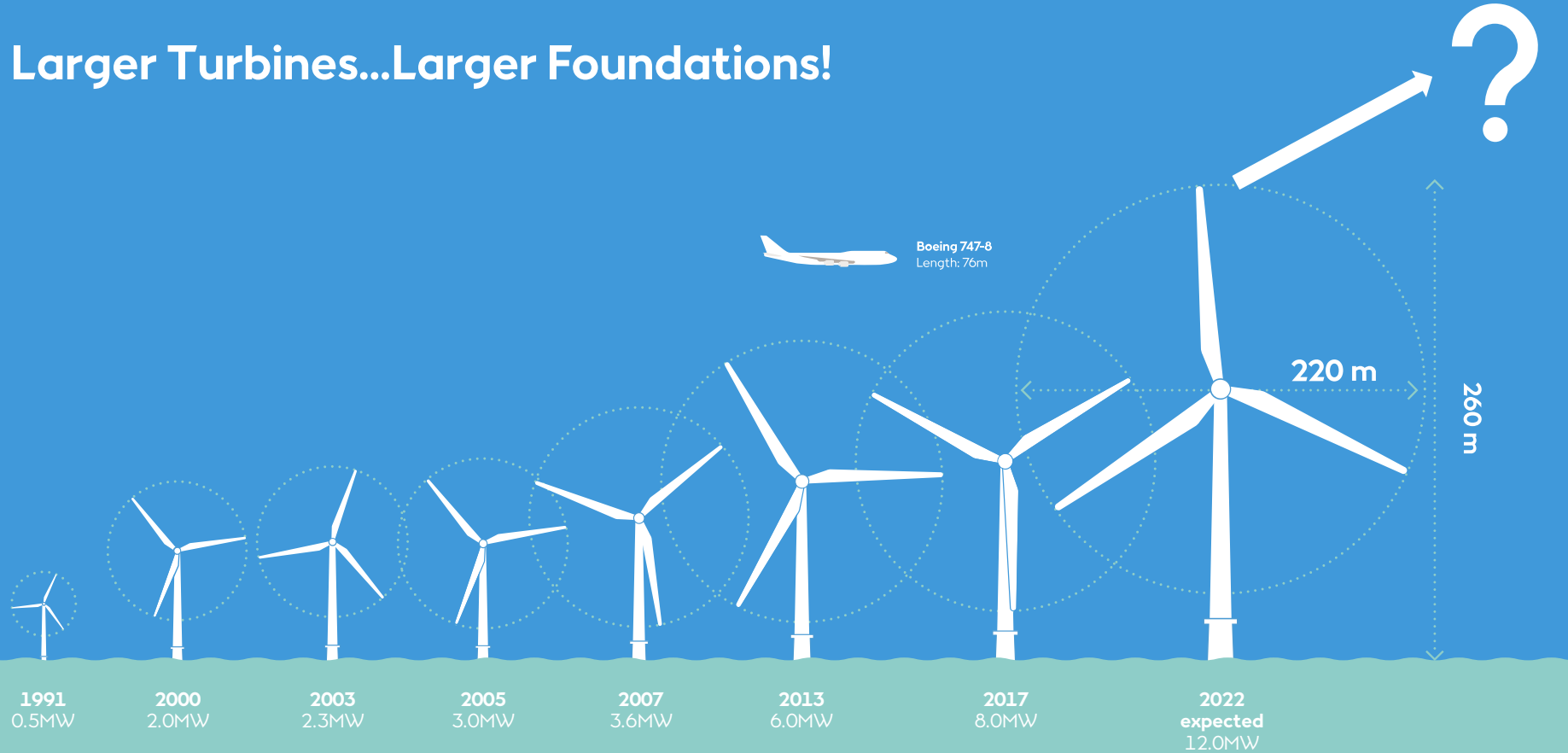
REDUCING NOISE IMPACT



Iterative process during project development phase



Larger Turbines...Larger Foundations!



What is the Future for Foundation Installation



Vibropiling?



Gravity Base
Foundations?



Noise Abatement /
Reduction?



Suction Bucket Jackets?

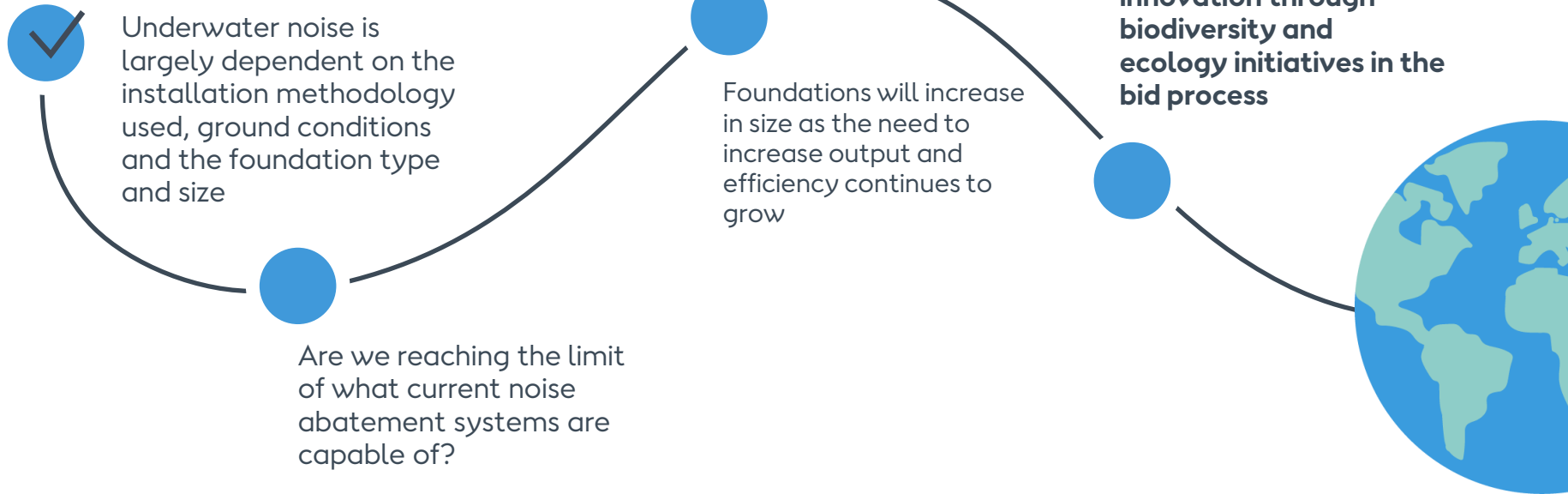


Alternative Piling?



Alternative piling /
foundations?

How to Drive Future Reductions in Underwater Noise Effects

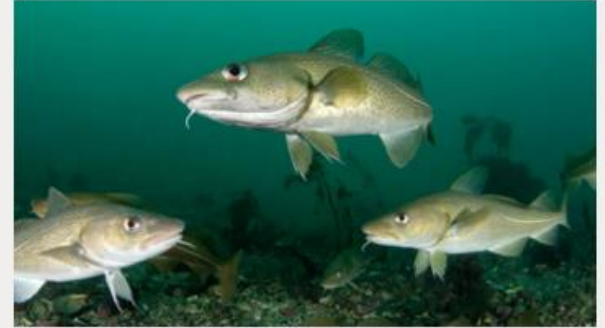


How Ørsted works with innovative monitoring

Acoustic telemetry NL: Collection of data on Atlantic cod behaviour around cod pipes using acoustic telemetry coupled with acoustic tags together with Wageningen University.

Acoustic telemetry US: Receivers in the water year-round to monitor for tagged fish. Species that will be tagged include black sea bass, horseshoe crabs, bluefin tuna, shortfin mako sharks, and blue sharks. Off the NE US coast Ørsted are deploying dozens of receivers. Many existing receivers are located inshore, but the presence of OWFs can extend coverage.

Real-time monitoring of marine mammals US: Partnership with ThayerMahan and Scripps Institute of Oceanography, amongst others, to demonstrate the use of advanced monitoring technology during construction activities. This included advanced technologies for thermal imaging and directional hydro-acoustics with species classifiers to increase understanding of marine mammal distribution and behaviour and facilitate effective marine mammal mitigation procedures during construction.



An aerial photograph of a turbulent ocean surface. The water is a deep, dark teal color, and the surface is covered in intricate, swirling patterns of white foam and churning water, indicating strong currents or a storm. The lighting is dramatic, with the white foam contrasting sharply against the dark water.

Thank you