

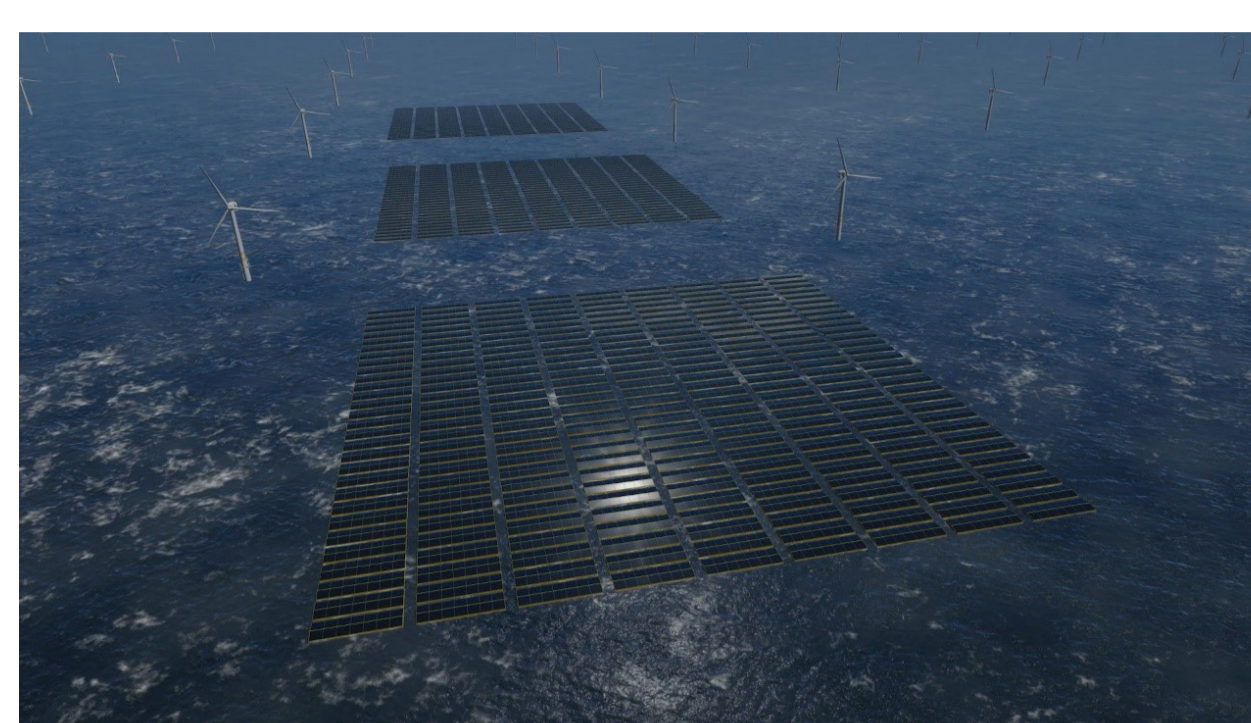


The concept

BAMBOO is a visionary project transforming Europe's approach to offshore renewable energy. Our goal is ambitious: to enable Europe's approach to offshore renewable energy by developing a groundbreaking offshore solar system spanning 1 km² with an installed capacity of 50-200 MW that fits in-between 4 offshore wind turbines and has a complementary energy profile. This initiative is set to become the industry standard for future offshore solar projects, crucial for Europe's climate goals for 2030 and 2050, by enabling 5x more energy generation per unit of sea space.

Oceans of Energy is a pioneer in offshore solar. Its mission is to bring clean and abundant renewable energy, in harmony with nature, to people living along the coasts worldwide. The company deployed the world's first offshore solar farm engineered to withstand the high waves of the Dutch North Sea in 2019. After being awarded the first offshore solar farm at a wind farm site, Oceans of Energy is now aiming to develop an industry standard for 1km² scale offshore solar farms.

Lightweight, robust, flexible, sustainable - are the fundamental characteristics of the bamboo-plant-inspired design philosophy of the technology to withstand the offshore environment



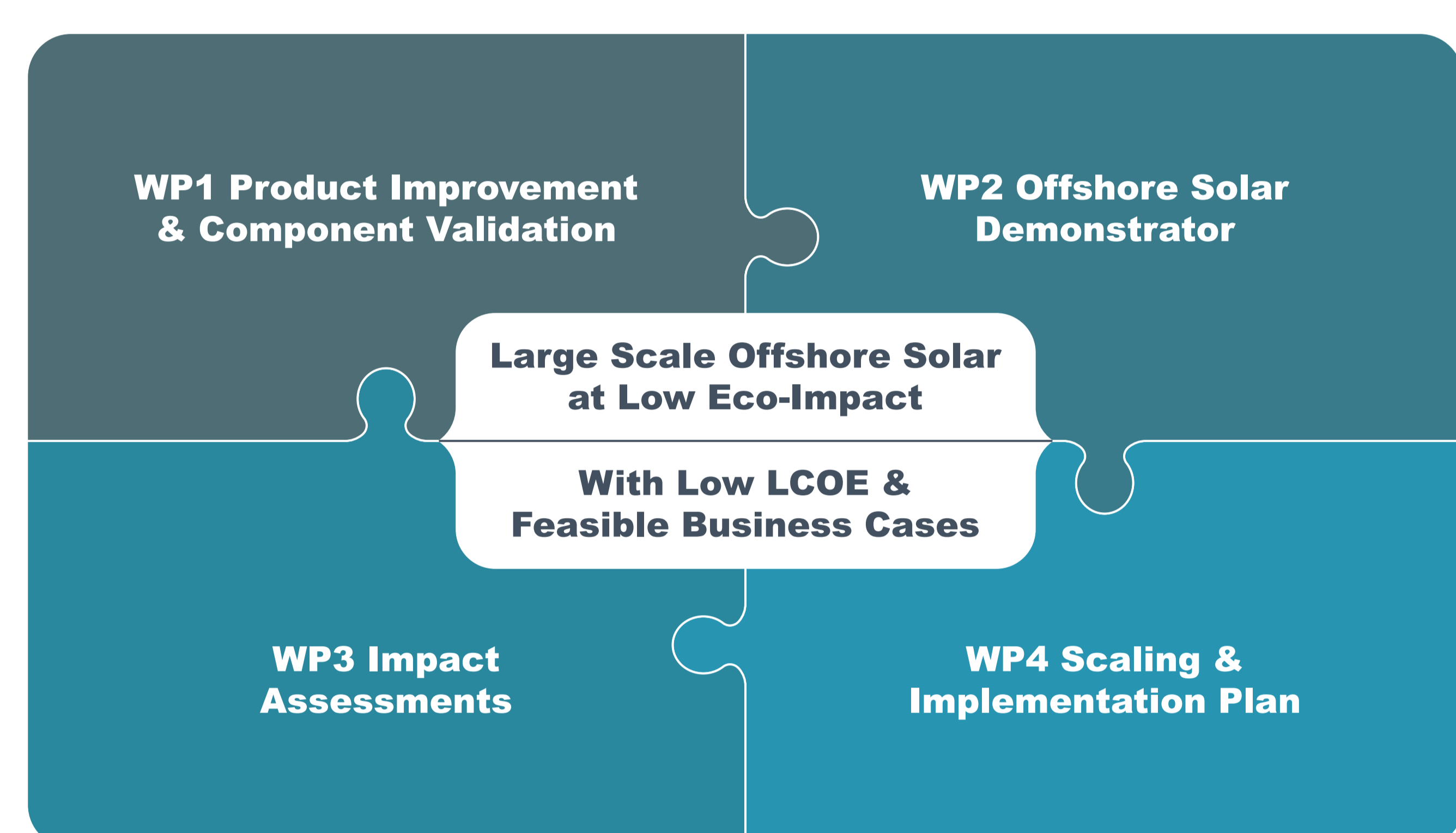
Large scale offshore solar systems in between a wind farm



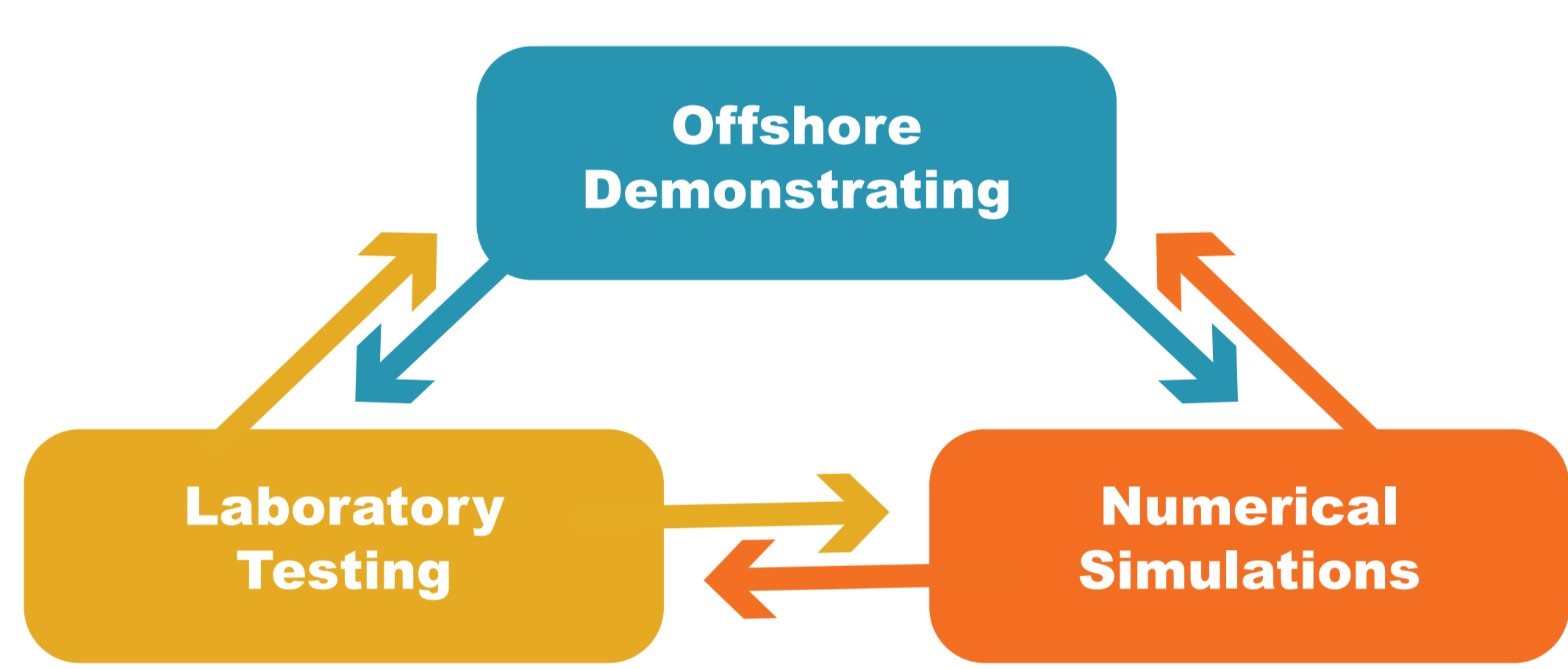
Oceans of Energy offshore solar system

Mission and Ambition

The project's ambition is to tackle the challenges and barriers for the implementation of a sustainable, large-scale offshore solar system of 1 km², that will act as standard industry formats for the rollout of offshore solar projects worldwide, where the specific size of 1 km² equals the space available between four modern offshore wind turbines (10+ MW). A comprehensive Product improvement and component validation program (WP1), a demonstration of a 5 MW-scale offshore solar farm at an offshore site (WP2), a holistic Impact assessment (WP3), and a Scaling plan for the implementation of a 1km² scale project of 50-200 MW (WP4) will be developed.



Project structure and methodology



Project's main objectives

Faced with the challenges of the sea's harsh conditions, BAMBOO will advance the technology through cutting-edge innovations and bring it closer to commercial and financial/investment readiness by tackling technical challenges for scaling up the system and for lifetime performance and reliability.

The project's main objectives comprise:

- Realizing improvements in the design and robustness of the offshore solar system to extend and validate lifetimes to 25 years, in order to decrease the LCoE of offshore solar by 50%, while addressing reliability and performance.
- Expanding the application potential and de-risking investments in offshore solar through enlarging the current demonstration prototype systems to 5 MW scale and extending the testing period from 18 to 54 months.
- Understanding and addressing environmental impacts and opportunities of large-scale offshore solar systems to responsibly expand offshore solar applications and deliver environmental monitoring guidelines and end-of-life strategies for large scale offshore solar.
- Enabling a fundable business case for the implementation of a first 50-200 MW offshore solar system integrated in a wind farm before the end of the project.

WP1 Product improvement & Component Validation

Five key components will be improved and validated with accelerated stress and lifetime testing: floating platform, floating array, PV-modules, transformer, dynamic power export cable.

At three testing facilities key components are tested and improved to validate lifetime performance and reliability in rough offshore environments. The three testing campaigns contribute to the development of industry guidelines and standards for offshore solar components.

WP3 Impact Assessments

Several impact assessment studies are executed and/or impact assessment tools are developed:

- A predictive yield model for offshore solar is developed considering the typical effects of the offshore environment.
- Environmental impact assessments including large-scale offshore solar are executed.
- Life Cycle Assessment and end-of-life recycling aspects strategies are developed for all used materials and components considering sustainable removal and repurposing strategies.

WP2 Offshore Solar Demonstrator

The key improved components are tested and validated in an offshore solar system. Furthermore, experience with installation, operations, maintenance and monitoring practices is obtained. In addition, a feasibility study is executed for robotic cleaning of PV-modules for possible enhancements of power performance.

WP4 Scaling & Implementation Plan

The development and implementation of a 1km² offshore solar system is streamlined by:

- Engineering studies for a km²-scaled offshore solar system.
- Feasibility study for expanding offshore wind farm certification with offshore solar.
- The development of a feasible business case, financing plan, and commercialization plan.

The project particularly includes the world's first large-scale tests for offshore solar systems at sea and will develop a unique floating substation designed for these conditions. The project is furthermore contributing to developing new standards in offshore solar technology.

Project's expected results

Expected Outcome 1

Expand the potential application and minimise the environmental impact of offshore solar technology for nearshore and offshore waters.

Expected Outcome 2

Significant improvement of offshore solar designs that reduce both CAPEX and OPEX, maximize energy output and thus reduce LCoE.

BAMBOO Project Partners



Oceans of Energy



SolarCleano



solarge
Endless Energy

aquatera

aquatera
Atlántico



sirris

Fraunhofer
CSP

MARIN

WavEC
Offshore Renewables

European
MARINE BOARD
Advancing Seas & Ocean Science

VATTENFALL

Our team, a blend of expert companies and research organisations, is dedicated to ensuring the project's success. We are making strides in reducing emissions and positively impacting the marine ecosystem. Join us as we lead Europe towards a greener, more sustainable energy future where innovation meets environmental responsibility.



Funded by the
European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement number 101136142. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.