ETIPOCEAN

European Technology & Innovation Platform for Ocean Energy

ETIP Ocean Funders Roundtable
Presentation of the Strategic Research & Innovation Agenda

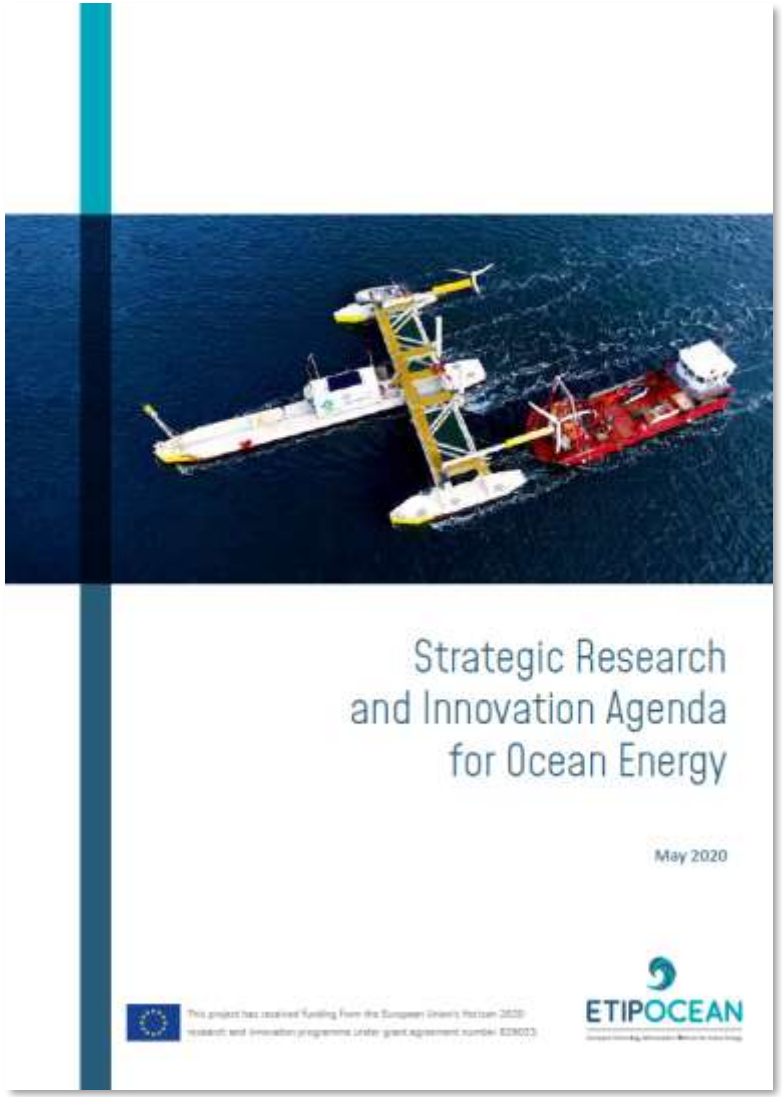
10 September 2020

tecnalia

THE UNIVERSITY of EDINBURGH

WavEC Offshore Renewables

Ocean Energy Europe



- A reference document for the whole ocean energy sector and specifically for **public funding organisations** (EC, Member States and Regional Agencies) with the aim of inspiring research calls.
- Updates **key priority challenge areas** for research, technology development and innovation from the previous strategic agenda in 2016
- Defines specific objectives and actions to carve the path towards **Ocean Energy commercialisation**
- Developed in close cooperation with **sector stakeholders**
- **Officially launched on June 19th**

Link to download

Offshore Renewable Strategy

The ocean energy sector is ready for large-scale development. It will bring grid-balancing benefits and help Europe decarbonise its electricity system.

Just Transition

Ocean energy creates jobs in coastal regions that have suffered from the decline of traditional industries such as shipbuilding or fishing.

Biodiversity Strategy

Ocean energy technologies will function in harmony with marine wildlife and with little or no visual impact.

SME Strategy

Most ocean energy companies are innovative SMEs that contribute to a climate-neutral & socially sustainable economy.

Industrial Strategy

European companies lead the world in ocean energy. They have the potential to dominate the high-value global market and keep Europe sustainable and competitive.

Climate Law

Renewable ocean energy helps the EU reach the target of net zero greenhouse gas emissions by 2050.

Circular economy action

Developments in ocean energy will respect the circular economy perspective in the design of technologies throughout lifecycles.

100GW Capacity

10% of Europe's electricity consumption

Ocean energy will deliver large volumes of the renewable energy that Europe needs

Ocean energy complements other renewables and balances electricity systems

European companies

World leader in tidal stream and wave energy

Ocean energy sector is led by European companies

EUROPEAN GREEN DEAL

Ocean energy will help deliver a prosperous transition

Ocean energy global market

€53bn / year

by 2050

Ocean energy can create

400,000 jobs

by 2050

Ocean energy will help deliver a just transition

Ocean energy works in harmony with local communities and the environment

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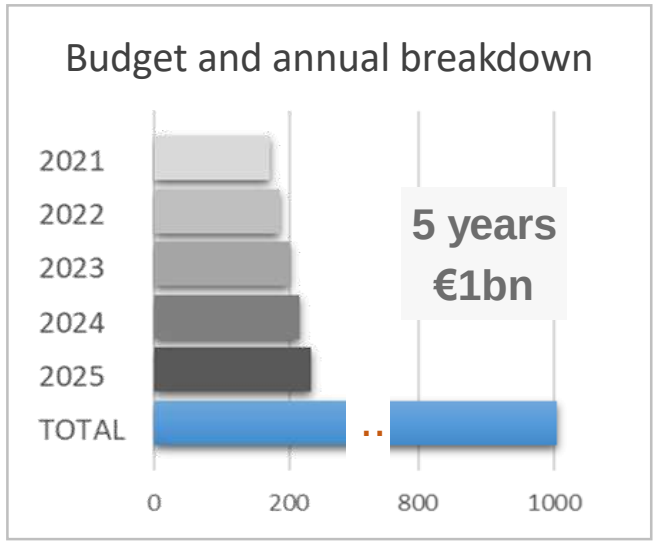
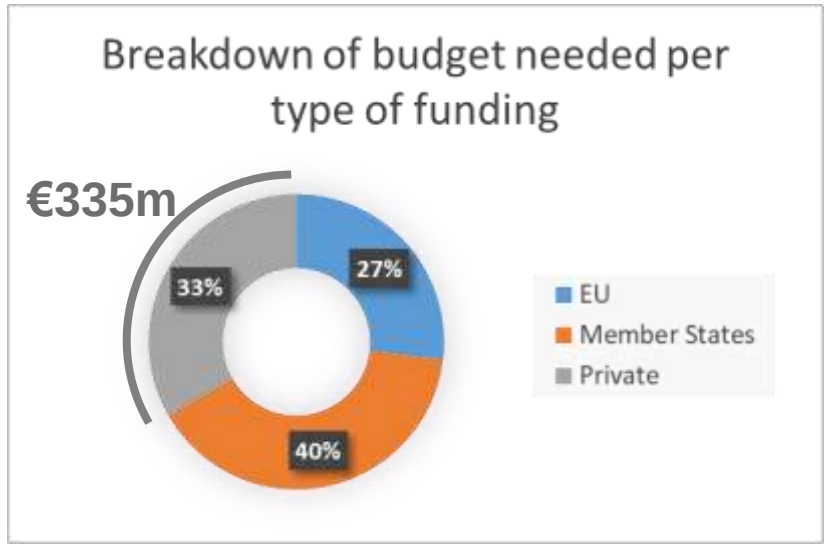
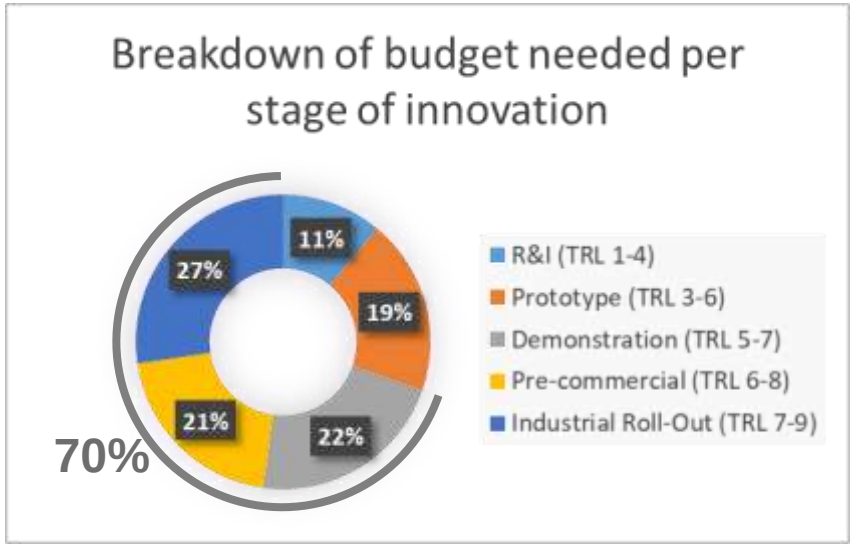
Public funding will leverage private investment

The right EU and national public funding at the right stages of development can attract and unlock significant volumes of private investments.

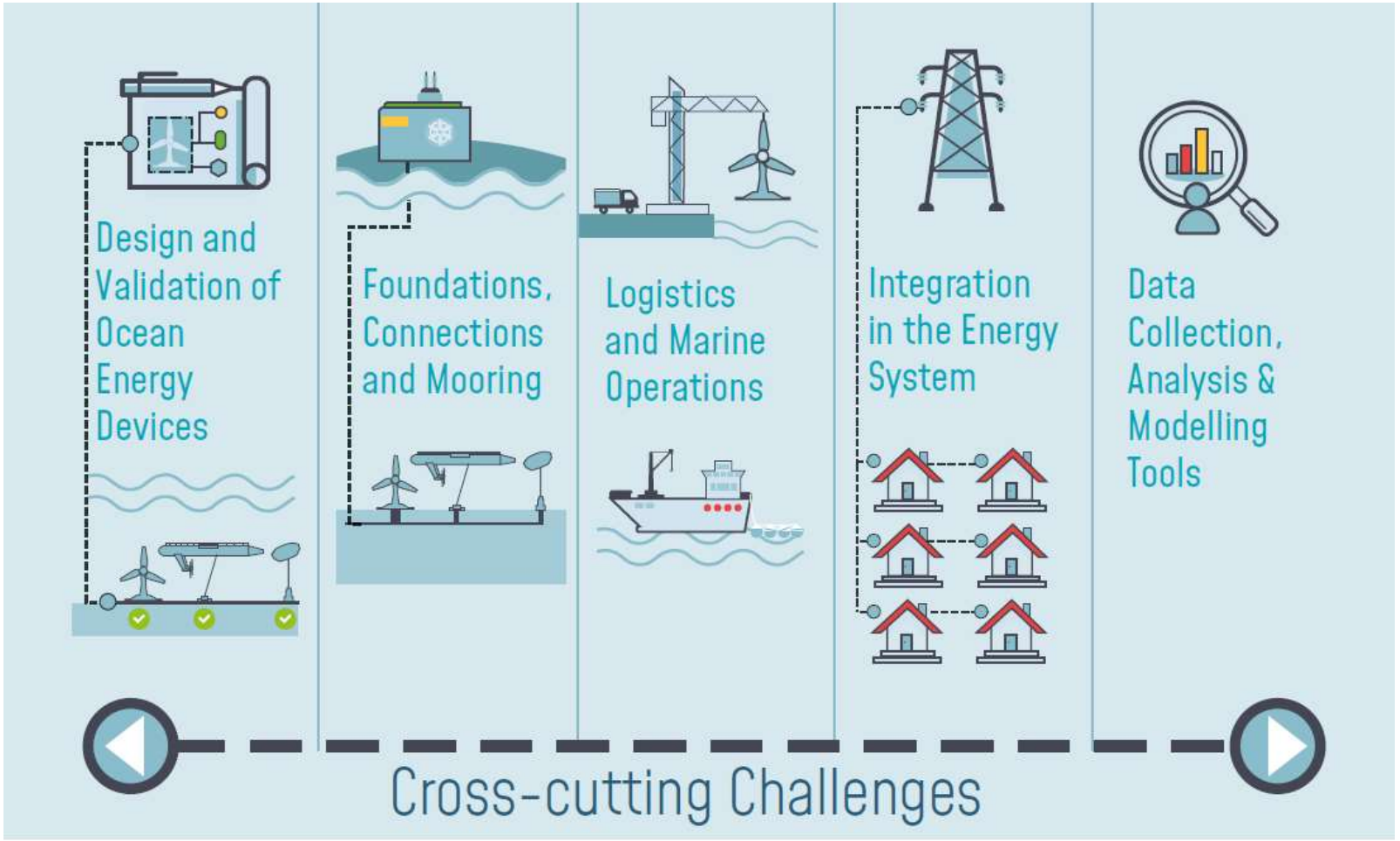






Challenge Areas

- Not to be addressed in isolation
- Implementation driven by a systemic innovation approach
- Optimal balance between open data and confidentiality
- Contribute to the expected impacts described in each Priority Topic
- Demonstrate a wider impact on European Green Deal objectives



Priority Topics

For each priority topic, the SRIA defines:

- Scope
- Applicability (wave, tidal, others)
- Actions
- Expected impact
- TRL (entry/exit)
- Budget Required (number and size of projects)

DESIGN AND VALIDATION OF OCEAN ENERGY DEVICES

Demonstration of ocean energy devices to increase experience in real sea conditions
Demonstration of ocean energy pilot farms
Improvement and demonstration of PTO and control systems
Application of innovative materials from other sectors
Development of novel wave energy devices
Improvement of tidal blades and rotor

FOUNDATIONS, CONNECTIONS AND MOORING

Advanced mooring and connection systems for floating ocean energy devices
Improvement and demonstration of foundations and connection systems for bottom-fixed ocean energy devices

LOGISTICS AND MARINE OPERATIONS

Optimisation of maritime logistics and operations
Instrumentation for condition monitoring and predictive maintenance

INTEGRATION IN THE ENERGY SYSTEM

Developing and demonstrating near-commercial application of ocean energy in niche markets
Quantifying and demonstrating grid-scale benefits of ocean energy

DATA COLLECTION & ANALYSIS AND MODELLING TOOLS

Marine observation and modelling to optimise design and operation of ocean energy device
Open-data repository for ocean energy

CROSS-CUTTING CHALLENGES

Improvement of the environmental and socioeconomic impacts of ocean energy
Standardisation and certification

Design and Validation of Ocean Energy Devices

Priority Topics	APPLICABILITY	TRL	BUDGET REQUIRED	TOTAL BUDGET
Demonstration of ocean energy devices to increase experience in real sea conditions	WAVE, TIDAL	MEDIUM-HIGH	€150M	€705M
Demonstration of ocean energy pilot farms	WAVE, TIDAL	HIGH	€350M	
Improvement and demonstration of PTO and control systems	WAVE	MEDIUM-HIGH	€60M	
Application of innovative material from other sectors	WAVE, TIDAL	MEDIUM-HIGH	€25M	
Development of novel wave energy devices	WAVE	LOW-MEDIUM	€45M*	
Improvement of tidal blades and rotor	TIDAL	MEDIUM-HIGH	€55M	
Development of other ocean energy technologies	OTEC/SALINITY	LOW-MEDIUM	€20M	

*This budget does not include the European Pre-Commercial Procurement Programme for Wave Energy Research & Development launched within the H2020 call LC-SC3-JA-3-2019.

Foundations, Connections and Mooring

Priority Topics	APPLICABILITY	TRL	BUDGET REQUIRED	TOTAL BUDGET
Advanced mooring and connection systems for floating ocean energy devices	WAVE, TIDAL	MEDIUM	€50M	€85M
Improvement and demonstration of foundations and connection systems for bottom-fixed ocean energy devices	WAVE, TIDAL	MEDIUM-HIGH	€35M	

Logistics and Marine Operation

Priority Topics	APPLICABILITY	TRL	BUDGET REQUIRED	TOTAL BUDGET
Optimisation of maritime logistics and operations	WAVE, TIDAL	MEDIUM-HIGH	€55M	€80M
Instrumentation for condition monitoring and predictive maintenance	WAVE, TIDAL	MEDIUM-HIGH	€25M	

Integration in the Energy System

Priority Topics	APPLICABILITY	TRL	BUDGET REQUIRED	TOTAL BUDGET
Developing and demonstrating near-commercial application of ocean energy in niche markets	WAVE, TIDAL, OTEC/SALINITY	HIGH	€100M	€106M
Quantifying and demonstrating grid-scale benefits of ocean energy	WAVE, TIDAL	HIGH	€6M	

Data Collection and Analysis and Modelling Tools

Priority Topics	APPLICABILITY	TRL	BUDGET REQUIRED	TOTAL BUDGET
Marine observation modelling and forecasting to optimise design and operation of ocean energy devices	WAVE, TIDAL	MEDIUM-HIGH	€25M	€35M
Open-data repository for ocean energy	WAVE, TIDAL	HIGH	€10M	

Cross-cutting challenges

Priority Topics	APPLICABILITY	TRL	BUDGET REQUIRED	TOTAL BUDGET
Improved knowledge of the environmental and socioeconomic impacts of ocean energy	WAVE, TIDAL	MEDIUM-HIGH	€10M	€20M
Standardisation & certification	WAVE, TIDAL	HIGH	€10M	

Improvement and demonstration of PTO and control systems

APPLICABILITY

Wave Energy Converters.

ACTIONS

- Demonstrate the reliability, robustness and performance of PTO and control systems.
- Optimisation and simplification through standardisation, modularity and scalability of key PTO components.
- Validation of 'wave-to-wire' models* to facilitate global optimisation of ocean energy devices.
- Improvement of control strategies to reduce the impact of the stochastic nature of the input (e.g. reduce extreme loading, increase production).
- Uncertainty assessment of loads and strengths on critical components to derive lifetime, safety factors and reliability.
- Demonstrate delivery of grid-compliant power including short-term energy storage solutions to smooth power output when needed.
- Improve understanding of the limitations in scaling-up PTO components.
- Cooperation between technology developers and key vendors to develop interoperability between systems (e.g. standardisation and unification of SCADA system requirements).
- Pre-normative research to provide guidelines and technical specifications to assist in the certification process.

Example of definition of a Priority Topic

* Mathematical model that incorporates the entire chain of energy conversion from the hydrodynamic interaction between the ocean waves and the wave energy device to the electricity feed into the grid.

Improvement and demonstration of PTO and control systems

EXPECTED IMPACT

- Improve performance, reliability and survivability.
- Convergence (standardisation) and simplification of designs to allow a reduction in maintenance costs.
- Reduce fatigue on components, unexpected failures, unplanned maintenance and thus increase availability.
- Improve manufacturing readiness levels.
- Better knowledge of environmental impacts.
- Contribute to LCOE reduction approaching SET Plan targets (actions should clearly state estimated LCOE at project start and end).
- Knowledge and data exchange, respecting the protection of company IP.
- Reinforce the EU supply chain.

TRL

MEDIUM-HIGH

Some projects should enter with at least TRL3 and finish with TRL6 while others should have a higher TRL ambition (from TRL4-5 to TRL7-8).

BUDGET REQUIRED €60M

Around 10 medium size projects focused on high TRLs and around 5 small projects focused on medium TRLs are required under this topic.

Example of definition of a Priority Topic

Thank you!

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Coordinated by

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