



# ETIPOCEAN

European Technology & Innovation Platform for Ocean Energy

## **Mapping & prioritisation of key policy fields for ocean energy**



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<b>Authors</b>	Lotta Pirttimaa, Donagh Cagney
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## 1. Introduction

ETIP Ocean is a recognised advisory body to the European Commission, part of the EU's main Research and Innovation policy, the Strategic Energy Technology Plan (SET Plan)<sup>1</sup>. It aims at defining research and innovation priorities for the ocean energy sector and promoting solutions to the industry and European and national policy makers.

The primary objective of the work package 6 is to coordinate stakeholders' activities in the different sectors, providing specific and extensive advice to policymakers on wider energy and research related policies beyond the confines of the SET Plan. This work package will ensure that stakeholders' perspectives and the learnings from the other work packages are fed into these wider policy processes.

The purpose of this report is to identify the policy fields that have the largest impact on the ocean energy sector and that may influence the progress of the SET Plan Ocean Energy Implementation Plan in reaching its targets. The report will provide the basis for ETIP Ocean's policy coordination activities. Through structured mapping and prioritisation of key policies at national, EU and international level, this report highlights the areas that are the most critical in terms of supporting the development of the sector.

## 2. Mapping and Prioritisation Methodology

Mapping the key policy fields complements and expands the high-level mapping of current ocean energy activities in Member States and regions performed by the SET Plan Working Group<sup>2</sup>.

The mapping exercise was done by the task leader by preparing a template of different policy areas based on previous publications (listed in [Annex I](#)). For each policy areas, concrete legislative or regulatory programmes or projects were identified at national, EU and international level (Table 1). The aim of the list is not to be exhaustive but to give examples of the existing programmes and projects.

Then, the policy fields were prioritised by the consortium by scoring each one, on the scale of 1-5, by: (1) the potential impact of each policy on the viability of the sector; and (2) the degree of policy change foreseen over the lifetime of the project (until the end of 2021). Scores from each project partner were added together to form the total scores (see [Annex II](#)). They were presented for validation to the ETIP Ocean Steering Committee – which comprises of a wide range of ocean energy sector representatives.

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<sup>1</sup> [https://setis.ec.europa.eu/system/files/set\\_plan\\_ocean\\_implementation\\_plan.pdf](https://setis.ec.europa.eu/system/files/set_plan_ocean_implementation_plan.pdf)

<sup>2</sup> 'SET-Plan Ocean Energy - Implementation Plan', Temporary Working Group Ocean Energy, March 2018



Table 1: Mapping of key policy fields for ocean energy

Policy field	National	EU	International
<b>Technology push, including funding for research &amp; development – distinction between applied and underpinning research funders</b>	<ul style="list-style-type: none"> <li>○ SEAI Prototype fund (IE)</li> <li>○ Sweden Ocean Energy Fund (SE)</li> <li>○ Investissement d'avenir (FR)</li> <li>○ ADEME (FR)</li> <li>○ Basque Ocean Energy Fund (ES)</li> <li>○ Wave Energy Scotland (UK)</li> <li>○ Innovate UK (UK)</li> <li>○ Dutch 'Top Sector' policy (NL)</li> <li>○ European Structural and Investment Funds</li> </ul>	<ul style="list-style-type: none"> <li>○ Horizon 2020</li> <li>○ Horizon Europe</li> <li>○ Breakthrough Energy Ventures - Europe</li> <li>○ Ocean ERA-NET Co-fund</li> <li>○ InnoEnergy</li> <li>○ European Innovation Council</li> <li>○ LIFE Programme</li> <li>○ European Maritime + Fisheries Fund</li> </ul>	<ul style="list-style-type: none"> <li>○ Department of Energy (US)</li> <li>○ Ocean Cluster (Canada)</li> <li>○ Breakthrough Energy Ventures</li> <li>○ Mission Innovation</li> </ul>
<b>Demonstration projects: Financial instruments</b>	<ul style="list-style-type: none"> <li>○ European Structural and Investment Funds</li> <li>○ Investissement d'avenir (FR) Saltire Fund (UK)</li> <li>○ Scottish Investment Bank (UK)</li> <li>○ Nama Facility (UK, DK, DE)</li> </ul>	<ul style="list-style-type: none"> <li>○ FORESEA</li> <li>○ OceanDemo</li> <li>○ Blue Gift</li> <li>○ Innovation Fund</li> <li>○ InnovFin EDP</li> <li>○ Blue Growth Investment Platform</li> <li>○ Horizon 2020</li> <li>○ European Maritime + Fisheries Fund</li> </ul>	<ul style="list-style-type: none"> <li>○ Emerging Renewable Power Program - Natural Resources Canada</li> <li>○ KfW – German Development Bank</li> <li>○ European Bank for Reconstruction and Development</li> <li>○ Agence Française de Développement</li> </ul>
<b>Market pull mechanisms (incl. revenue support)</b>	<ul style="list-style-type: none"> <li>○ Feed-in tariff in Italy</li> <li>○ UK historic 'Renewable Obligation Certificates' scheme</li> <li>○ 'Stimulation of Sustainable Energy Production' scheme in Netherlands</li> </ul>	<ul style="list-style-type: none"> <li>○ Innovation Fund</li> <li>○ Revised Renewable Energy Directive</li> </ul>	
<b>Environmental consenting</b>	<ul style="list-style-type: none"> <li>○ EMEC Project (UK)</li> <li>○ Marine Scotland (UK)</li> <li>○ Monitoring of individual projects</li> </ul>	<ul style="list-style-type: none"> <li>○ European Maritime + Fisheries Fund</li> <li>○ RiCORE project</li> <li>○ Revised Renewable Energy Directive</li> <li>○ Marine Strategy Framework Directive</li> </ul>	<ul style="list-style-type: none"> <li>○ OES-Environmental</li> </ul>
<b>Marine Spatial Planning</b>	<ul style="list-style-type: none"> <li>○ National Marine Spatial Plans</li> </ul>	<ul style="list-style-type: none"> <li>○ Marine Spatial Planning Directive</li> </ul>	<ul style="list-style-type: none"> <li>○ Marine Spatial Planning global</li> <li>○ World Ocean Council</li> </ul>
<b>Certification and standardisation</b>	<ul style="list-style-type: none"> <li>○ British Standards Institute (UK)</li> </ul>	<ul style="list-style-type: none"> <li>○ MET-Certified</li> <li>○ American Bureau of Shipping</li> </ul>	<ul style="list-style-type: none"> <li>○ ISO certification</li> <li>○ International Electrotechnical Commission</li> </ul>



			<ul style="list-style-type: none"> <li>○ Lloyd's Register</li> <li>○ DNV GL</li> <li>○ Bureau Veritas</li> <li>○ BT projects' Tidal Technology Center</li> <li>○ EMEC</li> </ul>
<b>Electricity market design (excl. revenue support)</b>	<ul style="list-style-type: none"> <li>○ National Regulatory Authorities</li> <li>○ Priority dispatch &amp; Balancing responsibility exemption for demonstration projects</li> </ul>	<ul style="list-style-type: none"> <li>○ Market Design Regulation &amp; Directive</li> <li>○ Revised Renewable Energy Directive</li> <li>○ State Aid</li> <li>○ ENTSO-E Grid Codes</li> </ul>	
<b>Ocean energy targets &amp; strategies</b>	<ul style="list-style-type: none"> <li>○ Offshore Renewable Energy Development Plan (IE)</li> <li>○ Programmation pluriannuelle de l'énergie (FR)</li> </ul>	<ul style="list-style-type: none"> <li>○ Strategic Energy Technology Plan</li> </ul>	<ul style="list-style-type: none"> <li>○ Ocean Energy Systems targets</li> </ul>
<b>Information sharing</b>	<ul style="list-style-type: none"> <li>○ National Associations</li> </ul>	<ul style="list-style-type: none"> <li>○ Ocean Energy Europe</li> <li>○ ETIP Ocean</li> <li>○ Marine Energy Alliance</li> <li>○ Ocean Power Innovation Network</li> <li>○ European Energy Research Alliance</li> </ul>	<ul style="list-style-type: none"> <li>○ Ocean Energy Systems</li> </ul>
<b>Renewable energy targets</b>	<ul style="list-style-type: none"> <li>○ National Energy &amp; Climate Plans</li> </ul>	<ul style="list-style-type: none"> <li>○ Governance Regulation</li> <li>○ Revised Renewable Energy Directive</li> <li>○ 2050 Long-term Strategy</li> </ul>	<ul style="list-style-type: none"> <li>○ Paris Agreement</li> </ul>
<b>Prizes</b>	<ul style="list-style-type: none"> <li>○ Saltire Prize (UK)</li> </ul>	<ul style="list-style-type: none"> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○ X PRIZE Foundation</li> </ul>
<b>Climate Change initiative</b>	<ul style="list-style-type: none"> <li>○ Carbon pricing</li> </ul>	<ul style="list-style-type: none"> <li>○ Emissions Trading Scheme</li> </ul>	<ul style="list-style-type: none"> <li>○ United Nations Framework Convention on Climate Change targets</li> </ul>
<b>Skills Development</b>		<ul style="list-style-type: none"> <li>○ Marie Curie Fellowship Scheme</li> </ul>	

### 3. Results and Discussion

The results show that in general, the national and European level policy areas are perceived as more important than the international-level policy areas; the average scores for the national and EU-level policy areas were 27,8 and 27,3, respectively, whereas for the international-level policy areas it was only 21,4. Amongst the ten highest policy areas, only two policy areas are international (see [Annex III](#)). The next sections consider policy areas in national, EU and international-level contexts.



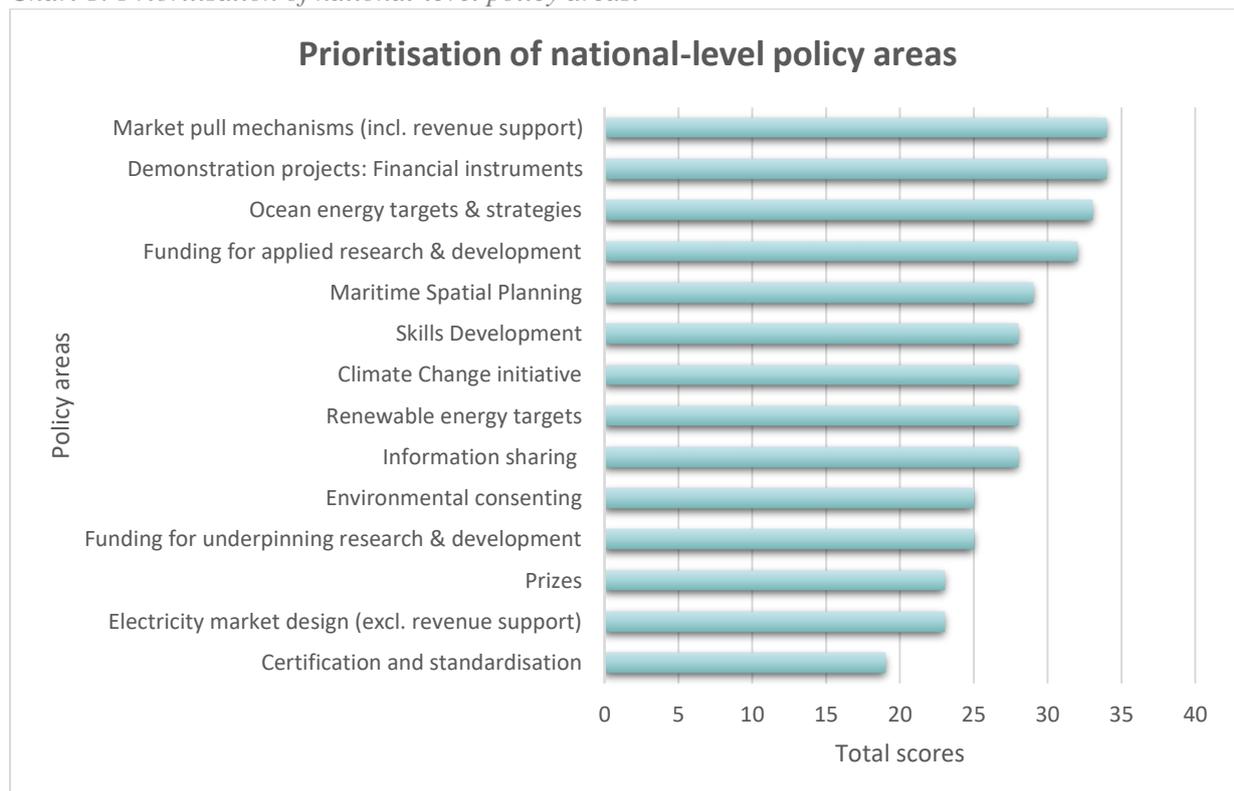
### 3.1 National policies needed to support market take-up

The results in Chart 1 show that the national policy fields generally score very highly. The average score of 27,8 is the highest of all geographical areas. This confirms the criticality of national policies to support the sector's development.

The two highest-scoring policy areas at national level are **financial instruments for demonstration projects** and **market pull mechanisms**. The demonstration phase will help validate the technology's performance with private investors and allow cost reduction via 'learning by doing'. Market pull mechanisms are needed to secure the private investment necessary to finance demonstration and pre-commercial projects. Some financial instruments exist at national level, but earmarked revenue support for ocean energy is still lacking.

The second highest score was given to national **ocean energy targets and strategies**. Clear national-level signals on future markets provide the clarity that investors, utilities and original equipment manufacturers need to commit to emerging technologies such as ocean energy.

Chart 1: Prioritisation of national-level policy areas.



### 3.2 Continued research and demonstration at EU level

The EU-level policy fields score very highly, the average score being 27,3 (Chart 2). The highest-scoring policy field at EU level is **financial instruments for demonstration projects**. Demonstration and pre-commercial projects are often the most difficult to finance due to technology uncertainties and total investment needs. The European Commission has

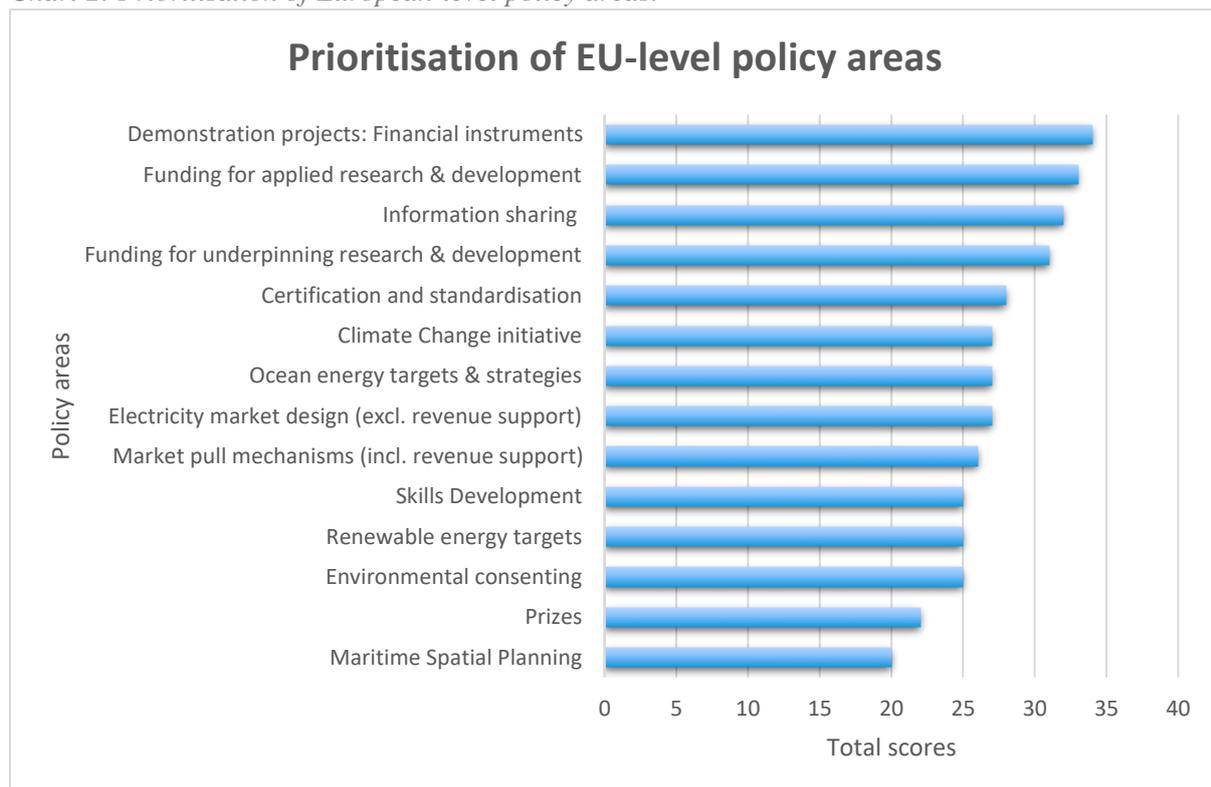


several instruments that offer equity or loans, but they require projects to deliver a return, which is impossible for ocean energy projects without revenue support. Therefore, a blend of grant funding, financial instruments and national-level revenue support (see [3.1](#)) would be needed to deliver demonstration projects.

Funding for both **applied and underpinning research and development** at EU level reached a very high score. This reflects especially the stage of wave energy, where devices are currently going through the research and development (R&D) and prototype stages. Learnings from these stages are very important, as they set a technology up for success by reducing risks in the next stages. Unfortunately, private investors are often reluctant to support R&D and prototype activities, because of high risk and long return times. Grants of up to 100% funding can therefore spur innovation that would otherwise not occur.

The high score of **information sharing** at European level shows that the sector could benefit from dissemination of research results and best practices. This confirms the need for the European-wide ocean energy network that ETIP Ocean provides.

Chart 2: Prioritisation of European-level policy areas.



### 3.3 International certification needed at demonstration stage

The international-level policy areas score lower compared to the national or EU-level policies. The average score is the lowest at 21,4. This reflects the lack of international institutions and policies that directly impact the sector's development.

The international-level policy field with the highest score is **certification and standardisation** (Chart 3). Certification and standardisation of devices, components and sub-systems are more and more needed, as the technology has reached the demonstration

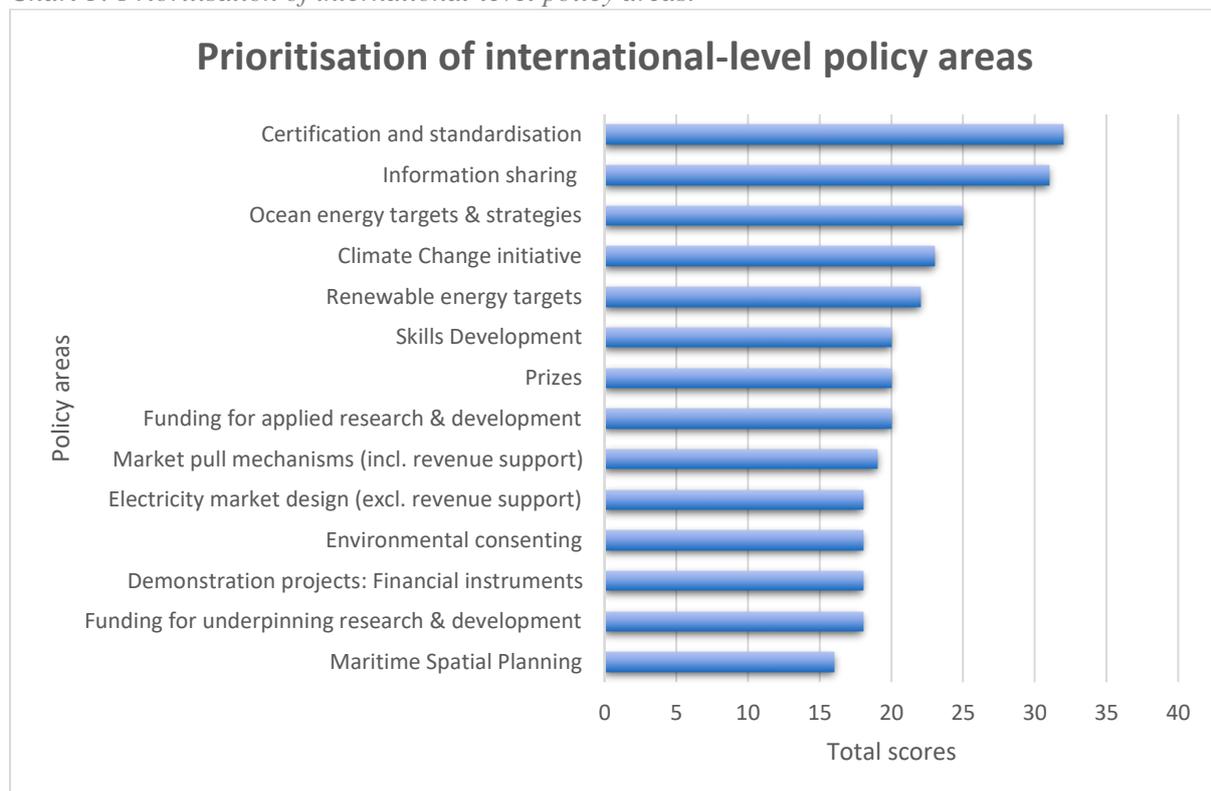


stage. Internationally recognised certificates and standards will give the investors certainty that the technology is approved and will work, both in home markets and in export destinations.

**Information sharing** scored second among the international-level policy areas, showing that cooperation and information exchange should not be limited to EU level. Initiatives such as the Ocean Energy Systems Energy Technology Collaboration Programme (OES), an intergovernmental collaboration to advance research, development and demonstration of ocean energy, are therefore valuable to the sector.

High scores for international-level **climate change initiatives, ocean energy** and **renewable energy targets** reflect the developments of international agreements such as the Paris agreement. Governmental pressure to decarbonisation of the economy requires more support for renewable and low-carbon energy sources.

Chart 3: Prioritisation of international-level policy areas.





## 4. Policy Interactions

To be truly transformative, individual policies should work together to create a 'system of innovation' (Figure 1). Some policies make innovation more effective or efficient. Other policies are fundamental to allowing the innovation to occur in the first place.



Figure 1: System of Innovation

As detailed in the ETIP Ocean 'Powering Homes' report<sup>3</sup> there are five key stages of development that ocean energy technology must pass through. Each stage requires the previous stage to deliver technology – meaning that progress within a stage only happens if the right policy framework is in place in all preceding stages, as well as the stage in question.

But policies for later stages can impact early stage progress too. For example, if there is no visibility of a future market, then private investors and public funders will be less willing to support earlier stage research.

In addition, the right combination of policies needs to be in place within each stage. For example, the demonstration and pre-commercial stages require a combination of revenue support and financial instruments to deploy. Without the revenue support, the financial instruments cannot be drawn down. Without the financial instruments, financial close cannot be reached on a project, and revenue support cannot be tapped into. These two separate policies in fact are dependent upon each other. Without one in place, the other cannot have a real impact.

With the right policy framework in place at each stage a 'virtuous cycle of innovation' is created. Investors fund earlier-stage research, spurred by the prospect of new markets. This produces better results, which strengthen the later stages of innovation. Finally, learnings from the later stages inspire further earlier stage research, completing the circle.

## 5. Next Steps

The next step in the policy coordination work of ETIP Ocean is the creation of the annual monitoring and participation plan based on the results of the prioritisation and mapping exercise. A gap analysis will be undertaken to avoid duplication with existing activities, taking into account the policy related work done in other work packages of the project. The plan will include key information on the main decision-making authorities, processes and anticipated timelines.

<sup>3</sup> 'Powering Homes Today, Powering Nations Tomorrow – Policy Solutions to Deliver Ocean Energy Industrial Roll-Out', ETIP Ocean, April 2019.



The participation and monitoring plan will set out a list of actions to be undertaken to ensure a coordinated engagement with the identified key policy processes. The actions involve monitoring of developments, consultation of ETIP Ocean platform on specific policy topics, engagement with relevant decision-making authorities & processes, and participation in wider stakeholder events. The actions also involve the dissemination of the learnings from other Work Packages, as well as activities to communicate the key policy developments and their potential implications into the SET Plan Implementation Plan.



## **Annex II – List of key publications**

COGEA & WavEC. (2018). Market Study on Ocean Energy.

Ecorys & Fraunhofer. (2017). Study on Lessons for Ocean Energy Development.

ETIP Ocean. (2019). Powering Homes Today, Powering Nations Tomorrow - Policy Solutions to Deliver Ocean Energy Industrial Roll-Out.

International Energy Agency. (2019). Tracking Clean Energy Progress.

IRENA. (2018). Offshore Innovation Widens Renewable Energy Options – Brief to G7 policy makers.

Ocean Energy Systems. (2018). Annual Report - An overview of ocean energy activities in 2018.

ORE CATAPULT. (2018). Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit.

ORE CATAPULT. (2019). Tidal Stream: Opportunities for Collaborative Action.

Temporary Working Group Ocean Energy. (2018). SET-Plan Ocean Energy - Implementation Plan.

TP Ocean. (2016). Strategic Research Agenda for Ocean Energy.



## Annex II – Scores of the prioritisation exercise

Policy Area	Scope	Potential impact on the viability of the sector	Degree of foreseen opportunity of policy change during the lifetime of the project (until 2021)	Total score
Funding for applied research & development	National	17	15	32
	EU	17	16	33
	International	11	9	20
Funding for underpinning research & development	National	12	13	25
	EU	15	16	31
	International	9	9	18
Demonstration projects: Financial instruments	National	19	15	34
	EU	19	15	34
	International	10	8	18
Market pull mechanisms (incl. revenue support)	National	17	17	34
	EU	14	12	26
	International	10	9	19
Environmental consenting	National	14	11	25
	EU	13	12	25
	International	11	7	18
Maritime Spatial Planning	National	15	14	29
	EU	11	9	20
	International	9	7	16
Certification and standardisation	National	9	10	19
	EU	15	13	28
	International	18	14	32
Electricity market design (excl. revenue support)	National	12	11	23
	EU	14	13	27
	International	10	8	18
Ocean energy targets & strategies	National	18	15	33
	EU	16	11	27
	International	13	12	25
Information sharing	National	14	14	28
	EU	17	15	32
	International	17	14	31
Renewable energy targets	National	14	14	28
	EU	15	10	25
	International	13	9	22
Prizes	National	12	11	23
	EU	11	11	22
	International	12	8	20
Climate Change initiative	National	12	16	28
	EU	16	11	27
	International	14	9	23
Skills Development	National	14	14	28
	EU	12	13	25
	International	10	10	20



## Annex III – Prioritised policy areas

