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COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Blue Energy

Action needed to deliver on the potential of ocean energy in European seas and oceans by 2020 and beyond

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1. INTRODUCTION

The energy potential of our seas and oceans well exceeds our present energy needs. A variety of different technologies are currently under development to harness this energy in all its forms including waves, tides, salinity gradients and thermal gradients. Deployment is currently limited but the sector has the potential to grow, fuelling economic growth and creating jobs not only along the coasts but also inland along its supply chains.

As the EU steps up its effort to reach the objectives of the Europe 2020 Strategy[1] and contemplates its energy and climate policy beyond 2020, it is opportune to explore all possible avenues to stimulate innovation, create economic growth and new jobs as well as to reduce our carbon footprint. Given the long-term investments required, action needs to be taken now in order to ensure that the ocean energy sector can play a meaningful part in achieving our objectives up to 2020 and beyond. This impact assessment looks over the horizon at a promising new technology and considers the various options available at the EU level to support its development.

2. PROBLEM DEFINITION

The development of this promising sector is currently hampered by several technological and non-technological barriers. These will have to be addressed if the sector is to reach its full potential.

Cost reduction, financial and profitability issues

The cost of exploiting ocean energy is currently high compared to conventional but also other renewable energy sources, which have long benefitted from strong public support. Most of the existing ocean energy technologies are still in the demonstration phase and the progress towards capital cost reduction remains obstructed by residual technical challenges. The relative novelty of these technologies and perceptions of high risk can deter investors. Moreover, the complexity of the technological landscape leads to a diffusion of research and development efforts, which makes for a slower progress along the learning curve.

[1] COM(2010) 2020, 3.3.2010

Infrastructure issues

The lack of certainty in the grid planning process, long connection lead times and prohibitive transmission costs can deter investment into ocean energy. Network reinforcements offshore but also on land and across borders are a fundamental condition for ocean energy development. The availability of access to suitable port facilities and specialised vessels also needs to be addressed.

Administrative & regulatory issues

Lengthy and excessively complicated licensing and consenting procedures have been flagged up as a major barrier to the development of ocean energy projects. The deployment of ocean energy is hampered by uncertainty about the proper application of environmental legislation which may further prolong the consenting procedures and place an additional administrative and financial burden on project developers.

Environmental issues

At present, data on the environmental impacts of ocean energy is limited. Research is often too costly for project developers to undertake individually. More research and development along with a better exchange of information will be required to understand and mitigate the adverse environmental impacts of ocean energy installations.

3. ANALYSIS OF SUBSIDIARITY AND EU ADDED VALUE

The EU's competence in the area of ocean renewable energy is set out in the objectives of the Treaty on the Functioning of European Union relating to energy, the internal market and the environment. When compared to separate Member State initiatives and budgets, coordination of activities related to research but also other non-technological issues at European level would accelerate the development of the sector.

4. POLICY OBJECTIVES

The general objective of the policy intervention is to enable the ocean energy sector to make a meaningful contribution to Europe's employment, innovation, climate and environmental objectives in the medium term, alongside more established renewable energy technologies. More specifically, the aim is to tackle the aforementioned barriers by encouraging collaboration between the technology developers, policy makers, investors and other stakeholders so as to bridge the gap between research and the market.

5. POLICY OPTIONS

Option 1 (**current policy framework)** entails a continuation of current policy initiatives at EU level which affect ocean energy either directly or indirectly. An ERA-Net on ocean energy will contribute to the strengthening of research coordination amongst Member States. The Commission and stakeholders will continue to explore ways to reinforce ocean energy funding under the new Horizon 2020 programme. Offshore grid developments will continue to be discussed in existing initiatives such as the North Seas Countries' Offshore Grid Initiative (NSCOGI). Discussions will continue on the proposal for a Directive on Maritime Spatial Planning (MSP) and on the proposal amending the Environmental Impact Assessment Directive, which is intended to simplify procedures so as to reduce unnecessary administrative burdens.

Option 2 (**enhanced political and industry coordination)** involves the setting up of a forum bringing together all relevant stakeholders. Its objective would be to devise viable solutions to

the challenges outlined above and develop a strategic roadmap, which would set out industrial development milestones within a clear timeframe as well as an indicative implementation plan. Active engagement by Member States and the European Commission in this process would send a clear political signal of support.

The infrastructure bottleneck would be tackled by fostering a more pro-active dialogue between the industry and the parties responsible for grid planning. It is also foreseen that other infrastructural needs (port services and supply chain) would be identified within the stakeholder forum. Uncertainty about environmental impacts will be addressed by the promotion of voluntary data-sharing.

Differentiated revenue support is key for ensuring that less mature renewable energy technologies can compete on a level playing field. The recognition of the specific needs of less mature technologies within the forthcoming Commission's guidelines on revenue support is therefore an important component of Option 2.

Option 3 (**targeted structural actions)** builds on Option 2. It seeks to consolidate the cooperation between stakeholders and give it a robust institutional support framework. In addition to the measures outlined under option 2, a European Industrial Initiative (EII) would be set up to leverage investment and implement the strategic roadmap.

A dedicated grid planning platform to advance the interests of the offshore renewable industry in the grid planning domain would be set up. To address other infrastructural bottlenecks, a sector-specific body will be tasked with identifying and assessing the specific needs of the sector with respect to the supply chain and to explore possible synergies with other sectors, notably offshore wind, in a bid to reduce costs and exploit synergies.

This option foresees the elaboration of a guidance document to assist with the implementation of Article 13 of the Renewable Energy Directive, which requires Member States to ensure that national authorisation and licensing rules applied to renewable energy installations are "proportionate and necessary". In view of the potential development of ocean energy, this option explores the possibility of developing sector-specific guidelines for maritime spatial planning as well as guidance to assist with implementation of the Habitats and Birds Directives.

6. ASSESSMENT OF IMPACTS

Economic impacts

Under option 1, ocean energy is likely to only make a marginal contribution to the future EU energy mix. The decrease in the levelised cost of electricity is likely to be relatively slow. As a result, the economic benefits in terms the growth of the sector itself and stimulation of economic activity along the supply chains are likely to be correspondingly low. Moreover, with no additional support the EU's competitive edge may be lost to third countries, withering away the growth and jobs already delivered by the industry. Increased cooperation among stakeholders stimulated by option 2 could enhance the impact of public and private investment into the sector and deliver cost reductions. The market uptake would, therefore, likely be above that assumed for option 1 but its magnitude is uncertain as many of the instruments are voluntary in nature.

Recognition of ocean energy as a strategic energy technology and creation of a European Industrial Initiative, as proposed under option 3, is likely to facilitate the project developers' access to finance and strongly stimulate innovation. The guidance documents proposed could yield further savings through avoided transaction costs. On the other hand, options 2 and 3 are

likely to be associated with proportionally higher electricity costs, and entail a certain degree of administrative burden.

Environmental impacts

The deployment of ocean energy has a potential to reduce greenhouse gas emissions. Assuming that with each unit installed an equivalent unit of conventional generation is displaced, the climate change mitigation benefit is assumed to be low under option 1 and relatively higher under options 2 and 3.

Ocean energy installations have a wide range of local environmental impacts, which can be both positive and negative. Taking a precautionary approach, it is estimated that option 1, with a relatively small area taken up by ocean energy installations, will result in a low negative local impact and options 2 and 3 involve a correspondingly higher local negative impact. This could however be counterbalanced by the fact that with increasing installed capacity, the accumulated experience could lead to a development of effective environmental impact management instruments and practices.

Social impacts

The commercialisation of ocean energy is likely to deliver high quality jobs especially under option 3, where deployment levels are the highest. Most of the job creation is likely to take place in the Member States and regions where ocean energy will be deployed although manufacturing and other economic opportunities are likely open in other countries involved in the supply chain. As the sector develops, the demand for highly skilled labour will increase. Under Option 2 and especially Option 3, this growth in demand for skilled engineers may tighten the competition with offshore wind in particular and possibly even oil and gas.

Public acceptance issues could arise with increasing deployment. Higher proliferation of ocean energy under options 2 and 3 could proportionately increase the potential for conflicts with other users of the marine space. This impact could however be mitigated through an early involvement of all stakeholders.

7. COMPARISON OF OPTIONS

Effectiveness

Option 1 fails to deliver on this objective as it would do little to accelerate the commercialisation of ocean energy. Option 2 may stimulate greater cooperation and avoid duplication of efforts however the results will depend on the willingness of stakeholders to engage and are therefore uncertain. While option 3 cannot be expected to fully tackle the identified bottlenecks, it is most likely to alleviate them, giving the industry a tangible stimulus.

Efficiency

Option 1 fails against the criterion as it would entail forgoing a substantial part, if not all, of the economic benefits, which development of the ocean energy industry could bring about. The establishment of a forum under option 2 requires a certain effort but is likely to deliver improvements. Its impact would be however highly dependent on stakeholders' willingness to participate. The creation of a European Industrial Initiative for ocean energy (option 3) would involve a greater commitment on the part of the involved stakeholders. Weighed up against the costs, option 3 is judged to be most efficient, with the exception of a creation of a

dedicated body to advance ocean energy interests in grid planning as it would overlap with existing initiatives.

Coherence

All policy options are coherent with EU long term policy objectives, including those related to climate, energy, environment and economic growth.

Feasibility

Whilst some measures are feasible in the short-term; certain measures from option 3 are only viable in the longer-term. For instance, the industry must have established a strategic research agenda to establish an industrial initiative. Guidance documents to complement the environment-related directives require the availability of data on the environmental impacts. The sector-specific guidance to complement the Maritime Spatial Planning Directive would only be possible once the directive is implemented and its impacts are known. Rather than deciding between option 2 and 3, it might therefore be more appropriate to adopt the option 2 measures as a first step to form a basis for option 3 measures, which will help the industry to advance further.

The comparative analysis of the three options assessed can be summarised as follows:

Option 1 (Current policy framework)

Certain initiatives, relevant to the development of the sector are underway; however, they do not address some of the specific needs of the sector. With no specific action taken to support ocean energy, technology developers will come under a strong competitive pressure from more advanced renewable and conventional electricity generation technologies, which have already benefited from favourable policy and large amounts of private and public investment in the past.

Option 2 (Enhanced political and industry coordination)

Supporting the sector through stakeholder networking, voluntary information exchange and its greater integration within existing funding mechanisms is likely to alleviate the bottlenecks to some extent and hence deliver improvements. Nevertheless the extent of the positive impacts is uncertain due to the voluntary nature of the initiatives.

Option 3 (Targeted structural actions)

In addition to option 2 instruments, option 3 includes effective tools to raise the profile of the industry, enhance R&D and stakeholder cooperation and mitigate some of the administrative barriers encountered by project developers. It is likely to deliver a strong political signal but some of the measures may only be feasible in the longer term.

Table 1: Comparison of options against expected output

	Option 1 (BAU)	**Option 2**	**Option 3**
Economic Impacts			
Levelised cost of electricity	+	++	+++
Consolidation of research and development	0/+	++	+++
Cost for consumers	-	--	---
Competitiveness	-	+	++
Grid developments	+	++	++
Development of supply chains and ports	0	+	++

Synergies with other sectors	0	+	+
Administrative costs*	-	++/-	++/-
Environmental Impacts			
Climate change mitigation	+	++	+++
Other ecological impact**	-	--	---
Mitigation of uncertainty regarding environmental impact	0	++	+++
Facilitation of legislation implementation	0	0	+
Social Impacts			
Job creation	+	++	+++
Creation of jobs in areas of high unemployment	+	++	+++
Education and training	NA	NA	NA
Skills mapping	0	++	++
Health and safety	NA	NA	NA
Public acceptance***	0	+/-	+/-

Key: + positive impact, ++ substantially positive impact, - negative impact, -- substantially negative impact, 0 no impact, NA – not applicable/very difficult to assess.

* Whilst the proposed measures under options 2 and 3 would reduce the administrative cost over time, there are also costs associated with the administrative effort necessary to implement these measures.
** The nature and extent of other ecological impacts is highly technology specific, but it is prudent to assume that with OE proliferation, the risk of adverse ecological impact would increase.
*** Depends on the level of stakeholder engagement.

8. MONITORING AND EVALUATION

It is proposed that the Commission monitors and evaluates the progress of the ocean energy industry on the basis of the indicators shown in Table 2. The data will be acquired through surveys distributed to relevant stakeholders including technology developers, project developers, investors and targeted research institutions. A first comprehensive evaluation would take place at the latest by 2020.

Table 2: Core indicators to assess development of ocean energy

Indicator	Relevance
Installed capacity	Technology commercialisation
Magnitude of investment into the sector	Perceived reliability, efficiency and cost-effectiveness of the technologies
Number of collaborative undertakings	Industry cooperation and collaboration, synergies
Lead time length (i.e. the total time taken to get building consent and grid connection permits)	Efficiency of planning and licensing procedures