

# Ocean Energy Forum



## Ocean Energy Forum

Draft Strategic Roadmap Key Recommendation 4.1

### **Establish a Europe-wide Phase-Gate procedure**

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<b>Context;</b>	Following publication of the Forum's <i>Draft Strategic Roadmap</i> in October 2015 (where 6 key recommendations were outlined to help develop the ocean energy sector), the Forum has been tasked with producing action plans for each recommendation to help realise the aims and ambitions of the Roadmap. The actions plans will be included in the final Strategic Roadmap due to be published in November 2016.

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	<p><b>This paper is for key recommendation 4.1</b> (page26 of Roadmap):</p> <p><b>Establish a Europe-wide phase-gate procedure – 2016 to 2025</b> – for sub-systems, components and devices whereby funding is only made available once clear performance indicators, determined by an independent multi-disciplinary panel of experts from a variety of stakeholders, have been achieved.</p> <p>The paper will be discussed at the Forum’s open session conference in Edinburgh. All Forum members are welcome to participate and contribute to the discussion.</p>
<b>Next steps</b>	<p>To reduce the risk of significant device failures in the demonstration phase, device sub-systems and components should be tested and effectively validated prior to use on full-scale devices.</p> <p>In Edinburgh, we will discuss a proposal to help guide creation of a new co-operative R&amp;D funding instrument. Specifically we would like to seek opinion on the basic structure of the proposal:</p> <ul style="list-style-type: none"><li>• Fit for purpose</li><li>• Gaps</li><li>• Usefulness (how would process work for you?)</li><li>• Timelines (how long would phases take)</li><li>• Public sector participation</li></ul>
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## Ocean Energy Forum – Technology Work Stream

### A European Phase-gate technology development process for components and devices

The Ocean Energy Forum's draft Roadmap (October 2015), puts forward an action plan with six key actions to bring the ocean energy sector forward to commercialisation and industrial roll-out.

The actions are designed to tackle the main barriers at each phase of ocean energy's development.

For the R&D and prototype phases, the creation of an EU-wide phase gate technology development process for components (draft roadmap section 4.1) is envisaged.

This paper sets out how such a phase gate process could be set-up, how it could function and which private and public stakeholders would be required to participate.

### Rationale

Where a technology or concept is unproven, it is difficult to stimulate private investment for demonstration projects due to the perception of unreliability. Accessing such risky private capital is particularly problematic amidst an unprecedented financial crisis.

Reducing the risk of demonstration device failures and, therefore, reassuring private investors is key for less mature ocean energy technologies – such as innovative wave energy concepts, OTEC and salinity gradient – and for game-changing innovations in the better understood wave concepts and tidal technologies.

To this end, before a device is demonstrated at full-scale in real sea conditions, it is important to ensure that critical components and sub-systems are tested and effectively validated. In parallel, validation of the interaction of the components and subsystems in the device as a whole needs to progress at the same pace.

Taking a device to demonstration in real sea conditions with greater certainty over the capabilities of the critical components and how they interact within the device, reduces the risk of the latter failing and, therefore, reduces risk perception for investors.

### Why a phase-gate process?

A phase-gate process determines clear performance indicators that tests on components, sub-systems and devices need to reach before moving on to the next phase in their development. The indicators are built upon existing industry standards. Until and unless the performance indicators are achieved, resources for further stages of development or demonstration of the components or sub-systems are not engaged. Consequently, defining the right indicators is critical to the process.

Once the components and devices have met all their performance indicators, their use in full-scale demonstration devices reduces investors' perception of technology risk and increases the chances of the demonstrator being successful.

Funding for the proposals should be made available if there is

- cooperation between research centres and industry to test components and concepts;
- a willingness to make public information on lessons learnt (the type of information should be determined by the Advisory Group, excluding IP-related information);
- the project partners commit to using their IP or making it made available on the market at commercial rates within 4 years.

## What could an EU-wide phase-gate process look like?

### 1) A Public-Private Partnership

The European Commission sets up a Public-Private Partnership (PPP) with interested Member States. A budget is earmarked by both the European Commission and the Member States to fund calls for projects.

### 2) Industry Expert Committee

The European Commission, in close cooperation with Member States and the European Technology and Innovation Platform for Ocean energy (ETIP), designates a committee of experts with a proven track record in industry and research in the various ocean energy technologies and their sub-families.

Building on the technology challenges identified by TP Ocean’s Strategic Research Agenda (publication forthcoming) and summarised in the Ocean Energy Forum Roadmap, the committee determines which critical components and sub-systems should be prioritised in the phase-gate process.

A matrix with the relevant phases for components and devices per ocean energy technology should be developed by the expert committee. Ranging from early feasibility to proof of concept. Below is an example of such a matrix.

Table 1: Example of phase matrix

	<b>Feasibility</b>	<b>Experimental modelling</b>	<b>Lab testing</b>	<b>Controlled/ sheltered sea test</b>	<b>Relevant sea condition</b>	<b>Validated concept</b>
<b>Array (If applicable)</b>						
<b>1 Full-scale device</b>						
<b>1 Medium-scale device</b>						
<b>1 Small-scale device</b>						
<b>Key components</b>						

The European Commission commissions a first performance indicator document using existing certification standards as a starting point. On the basis of this first analysis, the Industry Expert Committee defines phases precisely and the performance criteria that need to be met before a concept can move from one phase to another.

The focus of the phase-gate procedure should, however, be on the likelihood of a concept achieving its end goal.

The expert committee also suggests how much funding is required for each phase for each component or subsystem. Early phases generally requiring less funds than later phases.

### 3) Advisory Group

An advisory group composed of 25 senior representatives, different from the Expert Committee, of both equipment manufacturers, supply chain, ocean energy project developers and sector investors should also be set-up to inform and create consensus with the Expert Committee what areas and which components to prioritise.

This group will, therefore, inform the Expert Committee when determining which components, sub-systems, device and array designs should be part of the phase-gate process.

### 4) Calls for proposals and Funding

With the defined KPIs for each identified critical component, the PPP launches calls for proposals. For each call for proposals, components and sub-systems developers can ask for funding at any stage as long as it is possible to demonstrate that the performance indicators of previous phases have been met.

Figure 1 – Ocean energy phase-gate instrument management

