REPORT ON

PRELIMINARY MARKET CONSULTATION

ON

THE *TURBOWAVE* PROJECT.

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1. Introduction

The *Ente Vasco de la Energía - Energiaren Euskal Erakundea* (hereinafter, "**EVE-EEE**"), a public body governed by private law and belonging to the Department of Economic Development, Sustainability and the Environment of the Basque Government - *Eusko Jaurlaritza*, launched, by a Resolution of 3 December 2021, a Preliminary Market Consultation (PMC) on technologically innovative solutions for air turbines that can be adapted to the needs of the wave energy sector in general and to the specific technical requirements of the Mutriku plant in particular.

The aforementioned Resolution was published both in the Official Journal of the European Union and in the contractor profile of EVE. Likewise, the PMC was published on the website[1] of SPRI – the Basque Agency for Business Development, where both the terms and conditions of the call and the questionnaire to be completed by those wishing to participate in this Challenge are available.

The objectives of the PMC are:

A. **To identify candidates** potentially interested in developing the project and to verify that there may be sufficient competitive tension during the bidding process.

B. **To check the existing state-of-the-art** in the market in respect of the subject matter of the project, with a view to duly preparing the call for the subsequent tendering procedure for the project and to be able to take into account the responses received.

C. **To determine the most suitable mechanisms** of Public Procurement of Innovation for solving the technical challenges posed.

D. **To check**, with those candidates potentially interested, the suitability of the **scopes, deadlines and budgets** proposed in this PMC to deliver the desired results.

Specifically, the aim is to acquire sufficient knowledge of the most innovative solutions available on the market. These proposals will be used to assess market capacities and to define the functional specifications that involve innovation and are feasible to achieve through the eventual awarding of one or more pilot trials through one of the mechanisms envisaged by the Public Procurement of Innovation.

As a result of this process, a final report on the findings of the PMC has been drawn up to prepare the potential Public Procurement of Innovation tender to solve the Wave Energy Challenge in the field of air turbines. This report describes how the process has been taken forward and its conclusions.

[1] https://www.spri.eus/es/innovacion-comunicacion/reto-undimotriz-proyecto-turbowave/

2. Procedure.

The PMC was conducted in the following phases:

A. **Publication of the resolution of the call for tenders of the PMC** on the Public Procurement Platform of EUSKADI on 3 December 2021 and on the SPRI website.

B. **Specific workshops**:

   i. Presentation of the PMC in Brussels in the Ocean Energy Europe 2021 conference, with 34 registered participants.

   ii. Technical presentation of the PMC at the EVE headquarters (online, due to the restrictions imposed due to the Covid-19 pandemic) on 3 February 2022, with 30 registered participants, detailing the specific technical requirements and to inform on the conditions of current resources.

C. **Deadline for receipt** of applications: 17 February 2022.

D. **Analysis of proposals**.

E. **Conclusions** drawn for the drafting of the potential Public Procurement of Innovation call for tenders.

3. Description of the TurboWave Challenge

The TurboWave Public Procurement of Innovation aims to accelerate the development of air turbine technologies that are tailored to the needs of the wave power industry in general and to the specific technical requirements of the Mutriku plant in particular, with the end goal of building confidence in the wave energy sector and its ability to play a role as a competitive renewable energy source in the future energy mix on a regional and global scale.

The aim of the TurboWave project is to build knowledge on technologically innovative solutions for air turbine concepts. The challenge encompasses the design, development and demonstration of a cost-efficient, reliable and safe bi-directional air turbine system for power generation at the Mutriku wave power plant.

The main technical challenges to be addressed can be expressed in terms of:

A. **Performance**: obtaining quantitative evidence of adequate power conversion capacity and increasing confidence in performance predictions from numerical model simulations.

B. **Controllability**: demonstrating that the turbine has the necessary features and elements to enable an optimal energy capture and conversion over a wide range of operating states.

C. **Reliability**: demonstrating adequate levels of availability through a robust and safe prototype operation throughout a representative trial period (12 meses).

D. **Maintainability**: demonstrating that preventive and/or corrective maintenance, including modification, adjustment, repair and replacement, can be performed with reasonable measures and incurring minimal system downtime.

E. **Affordability**: increasing the reliability of estimated technology costs (capital and operational) of air turbines for wave energy.

The TurboWave project anticipates having air turbine prototypes installed and fully operational at the Mutriku wave power plant for a significant period (around 12 months) to meet the previously described challenge. The initial budget estimated for the future Public Procurement of Innovation is EUR 3,200,000.

4. Participation in the PMC

The deadline for receipt of applications closed at 17:00 on 17 February 2022 and the applications were then analysed.

A total of 14 organisations completed the form included in the publication of the PMC within the time frame for submission of proposals.

The information management process for the PMC procedures has worked successfully, ensuring that all the forms and other such documents submitted by the organisations participating in the consultation with their solution have been available at all times.

The proposals received from the organisations participating in the TurboWave project provided a better understanding of the scope of the proposed solutions and their level of technological readiness.

Based on the proposal questionnaires of the organisations participating in the Challenge, **it was concluded that**:

- **the TurboWave challenge can be addressed on the basis of technological trends;**
- **the budget is appropriate for the size and complexity of the Challenge; and**
- **the timeframe envisaged, although feasible, would best be extended for the project to be properly conducted and executed**.

In addition, and on the basis of the information received, it has been confirmed that **the participant organisations have no immediate solutions adaptable to the situation, the application of which meets the needs of the service**.

The identity of the organisations that have participated in the PMC by submitting proposals for innovative solutions is shown below. The purpose of this is, on the one hand, to offer greater visibility to the organisations that have participated in the market consultation stage and, on the other hand, to increase their cooperation by enabling

potential partnerships between them by publicising the actions they propose to meet the needs put forward.

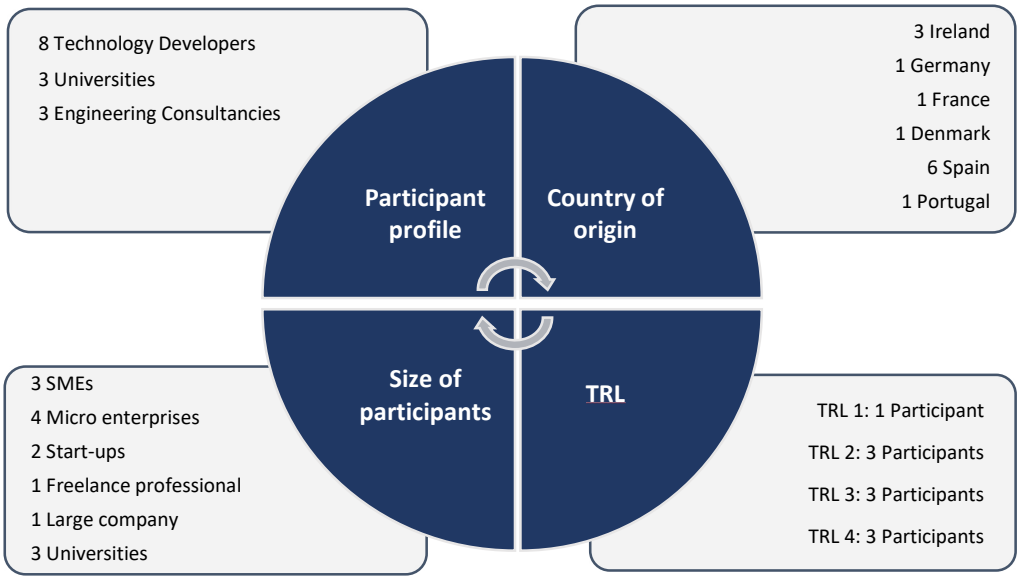
The following participants have completed the form included in the PMC publication within the deadline for the submission of proposals, putting forward solutions to the challenge.

Participants in the PMC	
	• NEW WAVE TECHNOLOGIES • OTTO-VON-GUERICKE-UNIVERSITÄT MAGDEBURG / INSTITUTES IESY AND ISUT • ADVANCED SIMULATION TECHNOLOGIES, S.L. • IDOM CONSULTING, ENGINEERING, ARCHITECHTURE S.A.U. • TRINITY COLLEGE DUBLIN • WAVERAM LIMITED • INPROS • ARRECIFE • TECHNOLOGICAL UNIVERSITY DUBLIN • TÉCNICAS DE VENTILACIÓN CALGE • SEATURNS • INSTITUTO SUPERIOR TÉCNICO, UNIVERSIDADE DE LISBOA • DEVELOPMENT V KIM NIELSEN • BYTEK SMART SOLUTIONS SL

Table 1. Participant organisations in the Preliminary Market Consultation

5. Results analysis

From the analysis of the proposals submitted by the 14 organisations which participated in the PMC, the following is to be highlighted:



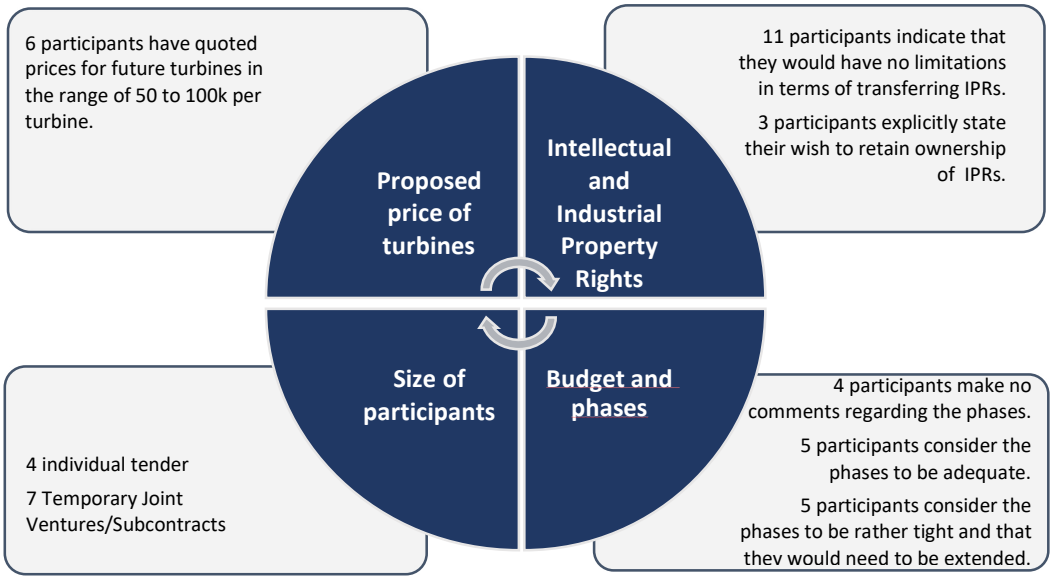


Figure 1. Results obtained from the PMC

The information submitted is outlined in greater detail below.

- **Type of organisation and intention to participate in the future tender**.

From the proposals submitted, it can be concluded that the organisations that have shown interest in the PMC are mostly SMEs, start-ups and universities, although one large company has also participated. Therefore, we understand that participation in future tenders would, in principle, be guaranteed.

- **Technology Readiness Level (TRL)**.

According to the proposals submitted, the average TRL for entry into a future tender would be 3, in relation to the state of the analytical and experimental critical function and/or characteristic proof of concept. Therefore, it is concluded that in the event of going to a Public Procurement of Innovation tender, the TRL for the start of the action must be 3 completed.

- **Suitability of the proposals submitted for the Challenge Posed**.

From the fourteen proposals submitted, it can be concluded that the objectives of this PMC could be met through a variety of ways, as different technologies and solutions to the challenge have been put forward. It is therefore considered that the final development could be guaranteed following the phases of the future call for tenders.

- **Information on aspects to be implemented in future specifications**.

The content of the proposals reveals the need to establish requirements on compliance with standards in future specifications. In terms of the aspects to be assessed in addition to the functional requirements, it is clear that there is a need to implement clauses in

future specifications that adequately assess the technical challenges posed in the TurboWave Challenge, as described in section 3 of this report.

- **Phases and estimated budget**.

According to the proposals submitted by the participant organisations, the estimated budget for phases 1 to 3 is reasonable. However, the estimated execution time should be extended to ensure that all required developments are properly completed. Regarding the price of the turbines, there is no uniform criterion among the solutions provided, so further consultation on this matter at a later date is not ruled out.

- **Intellectual and Industrial Property Rights**.

In relation to future industrial or intellectual property rights that may be developed during the execution of the future contract, the participant organisations are in favor of either sharing the results or granting a license for use in favor of EVE. Therefore, the clauses relating to Industrial Property Rights in future specifications must adequately reflect this circumstance to guarantee the rights of both the future bidding organisations and EVE.

6. Conclusions and next steps

According to the information received from the market, and as a result of the PMC, it has been established that various solutions exist in this market which, through R&D services, would imply technological development and can be specifically adapted to the challenge posed.

The number of proposals submitted (14) would suggest, in principle, that there would be a sufficient level of competition between participants in a potential future tender so as to ensure the efficient use of public funds.

Therefore, **taking into account the challenge posed and the solutions submitted, it can be considered that there are sufficient grounds to open a Public Procurement of Innovation tendering process to provide a solution to this challenge**.