

**Title:** Environmental Monitoring Plan of the pre-operational phase of the Biscay Marine Energy Platform (*bimep*) project.

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**Abstract for Poster presentation**

The Biscay Marine Energy Platform (*bimep*) is an offshore infrastructure for the demonstration and testing of wave energy harnessing devices promoted by the Basque Entity of Energy (Ente Vasco de la Energía - EVE). *Bimep* is located close to Arminza town (Basque Country, Northern Spain) and it consists on an 5.3 km<sup>2</sup> sea area between 50 and 90 m depths where four static submarine cables will be placed, operating at 13kV and 5MW. On the first of June 2009, the General Council on Environmental Quality Assessment of the Ministry of Rural, Marine and Natural Environment of the Spanish Government, on the light of the Environmental Impact Study (EIS) of the *bimep* project undertaken by AZTI in 2008, decided not to submit the project to the whole Environmental Impact Assessment (EIA) process. Nevertheless, the Environmental Impact Statement (EIS) of the Ministry, taking into account the great uncertainties about some predicted environmental impacts, underlined the need to implement the proposed Environmental Monitoring Program (EMP) of the EIS which is proposed to be undertaken in four different steps or phases: (i) preoperational phase; (ii) during installation and commissioning and (iii) operational phase. This work presents the methodology and results of the preoperational phase on some environmental factors such as, ichthiofauna, benthic communities, marine acoustics, mammals, and hydrodynamics. The results of this phase have improved the information and characterization of the environmental characteristics of the *bimep* area described in the EIS, which will be used in later phases of the EMP in order to check if the observed impacts are in the range of the impacts foreseen in the EIS, together with the checking of the fulfilment of mitigating measures proposed in the EIS.

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# The Biscay Marine Energy Platform (BIMEP)

## Preoperational Environmental Monitoring Plan

BILBAO MARINE ENERGY WEEK

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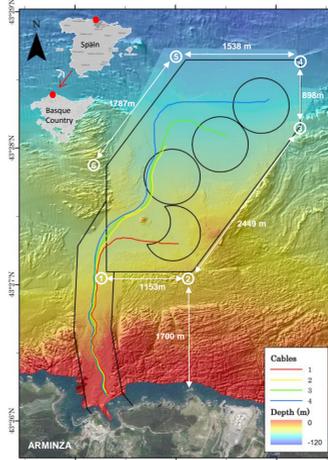


EVE  
Ente Vasco de la Energía

### 1. INTRODUCTION

- On the first of June 2009, the General Council on Environmental Quality Assessment of the **Ministry of Rural, Marine and Natural Environment of the Spanish Government**, on the light of the **Environmental Impact Study (EIS)** of the **BIMEP project** ([www.bimep.com](http://www.bimep.com)) undertaken by **AZTI**, decided to **not submit** the project to the whole Environmental Impact Assessment (EIA) process.
- Anyway, the **Environmental Impact Statement (EIS)** of the Ministry, taking into account the great uncertainties about some predicted environmental impacts, underlined the **need to implement** the proposed **Environmental Monitoring Program (EMP)** of the EIS.
- Consequently, on August 29th of 2011, the **Basque Entity of Energy** (promotor of the BIMEP project) entrusted to **AZTI** the **development** of the **PREOPERATIONAL** phase of the EMP. This work present the methodology of this preoperational phase on some environmental factors such as, ichthyofauna, benthic communities, marine acoustics, mammals, and hydrodynamics.
- The objective is to establish the “zero state” of the environment in order to be able to compare this status during the construction and operational phase of BIMEP and then to see if real impacts match with the predicted ones

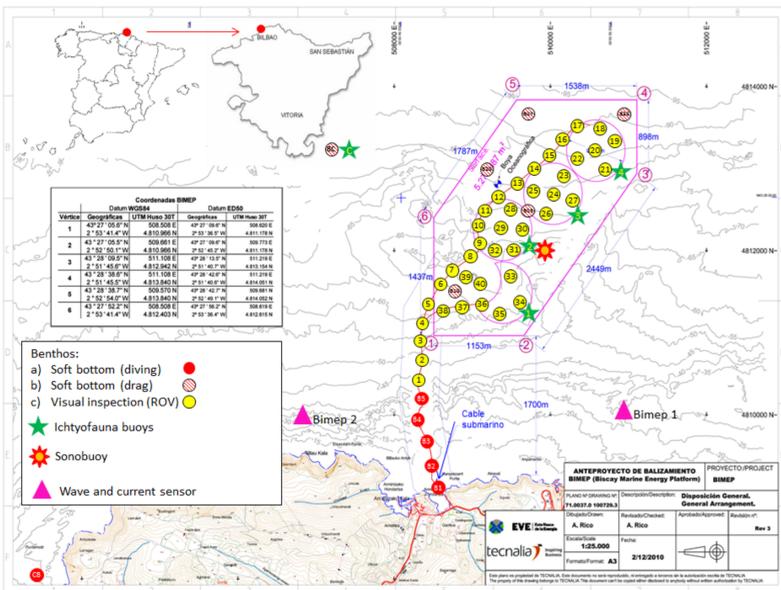
### 2. THE BIMEP PROJECT



- Promoted by the **Basque Entity of Energy (EVE)**, BIMEP represents an **offshore test site** for the demonstration and proving of **wave energy converters (WEC)**
- It consists of 5,3 km<sup>2</sup> sea area between 50 and 90 m depths where four static submarine cables will be placed, operating at 13kV and 5MW.
- Wave energy generation devices will be connected to these cables through dynamic submarine cables.
- In land, BIMEP will provide a research centre in Arminza (Bizkaia, Basque Country, Northern Spain) where developers will be able to control the behavior and performance of the devices.

For this purpose a public society named **bimep S.A.** was created between the Basque Government and the Spanish Ministry of Industry

### 3. METHODOLOGY

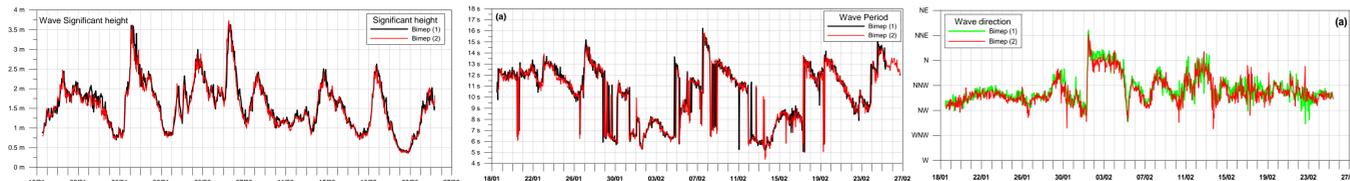


On the light of the expected impacts identified by the EIS of bimep, the EMP focus on the monitoring of:

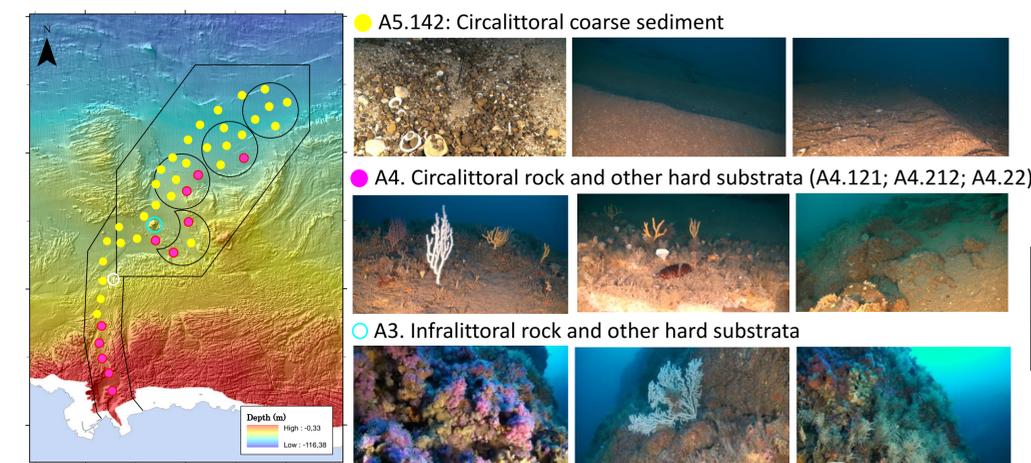
- Benthic communities:** (i) in situ sampling with a Shipeck grab sampler soft bottom sediments in five locations (4 samples inside the BIMEP area and one far beyond in order to act as control area) and by divers in five locations near the landing point of the submarine cable and (ii) visual inspection with a submarine camera in 36 points distributed all along the submarine cable route and the mooring areas.
- Ichthyofauna: Visual census:** (i) Line transects: five 200 m (surveyed 2.5 m each sided of the transect line) transect lines were placed along the tip of a “Isla de las lubinas” submarine mountain; (ii) Stationary methods: four sampling points at a 15 m depth were selected for visual inspection, one in the center of each of the four mooring areas of BIMEP. **Active acoustic methods:** five M3i buoys, developed by Marine Instruments ([www.marineinstruments.es](http://www.marineinstruments.es)), were placed on the 6 of June 2012 in the area, one in each of the four mooring areas and one far enough from BIMEP area to act as control site.
- Underwater noise and marine mammals:** a sonobuoy was moored at 40 m depth. The sonobuoy is able to detect and classify automatically all the acoustic events above the ambient noise (presence of cetaceans and noise) and store the information. It was moored on the 6 of June 2012 and during 5 months the presence of marine mammals and underwater ambient noise was monitored.
- Hydrodynamics:** two Nortek profilers were installed, one in the shadow area of BIMEP, and the other one in a place far beyond from BIMEP in order to act as control area. Additionally, ADCP transects along all the BIMEP area were undertaken.
- Landscape:** The characterisation process of marine landscape was carried out in 4 stages: (i) defining each Landscape unit’s area; (ii) defining each landscape unit’s characteristics; (iii) defining activities, visibility and views and; (iv) presentation of landscape characterisation and base visual analysis

### 4. RESULTS

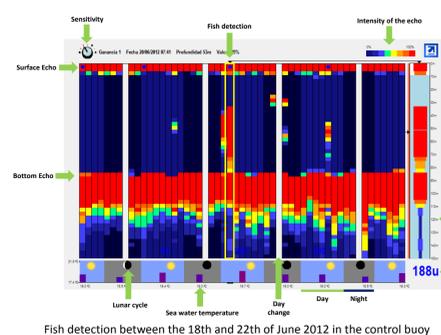
#### 1. Hydrodynamics



#### 2. Benthic communities: EUNIS Habitat Classification 2012



#### 3. Ichthyofauna:



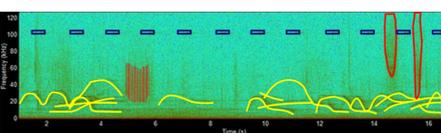
	Number of fish detections 2012						
	J	J	A	S	O	N	D
Buoy 1	46	94	102	93	72	45	21
Buoy 2	267	237	235	126	---	---	---
Buoy 3	170	121	---	---	35	---	---
Buoy 4	183	129	181	94	71	37	22
Control	113	93	95	---	---	---	---

Fish detections more abundant in summer and in the first 30 m of the water column.

#### 4. Underwater sound

	Mean	Mode	Mediane	Max	Min
RMS 1/3 octave 63 kHz	90	88	89	147	77
RMS 1/3 octave 125 kHz	86	84	85	140	78
RMS in all the registered bandwidth SPL	112	110	111	159	99
RMS 5-20 kHz	84	94	94	130	84
RMS 20-80 kHz	93	91	92	142	86

#### 5. Marine mammals



**Documented presence of dolphins** (*Delphinus delphis*, *Tursiops truncatus*) between June and October and mysticetes between September and October

#### 6. Landscape:

All the coastal landscape units have a high value. 8 view point have been identified and different photographic documents have been acquired in order to be able to undertake the visual simulations in the case that a prototype should be installed in bimep



### 5. CONCLUSION

The characterization undertaken in the present work has allowed to collect sufficient and relevant information. This information will allow us to perform at further stages of the environmental monitoring plan (construction phase and operational) the identification, monitoring and evaluation of impacts predicted by the EIS of bimep.

### Acknowledgements



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