

# COLLABORATIVE R&D *...THE INDUSTRY OF SCIENCE...*

Cristina Oyón  
Strategic Initiatives  
SPRI

lehiatzeko  
aldatuz goaz  
transformamos  
para competir

EUSKADI *Goza ezazu*

EUSKO JAURLARITZA

INDUSTRIA, BERRIKUNTZA,  
MERKATARITZA ETA TURISMO SAILA



GOBIERNO VASCO

DEPARTAMENTO DE INDUSTRIA,  
INNOVACIÓN, COMERCIO Y TURISMO

EUSKADI *Saboriala*



- Building research facilities
  - depends upon the expertise and technologies that emerges from the private sector
  - is an opportunity for the industry to work on the frontiers of science and technology
- Strategies and examples that try to overcome limitations through R&D collaborative frameworks
  - Spanish Strategy for the Industry of Science
  - Examples within the Basque Innovation System
- The ESS opportunity



The Industry of Science is formed by a set of companies that work for organizations in charge of the conception, design, construction, exploitation and maintenance of scientific facilities and instrumentation in any area that contributes to the advance of science and technology and to the support of scientific communities researching in the frontiers of knowledge

## ...Industry of Science – scientific communities considered

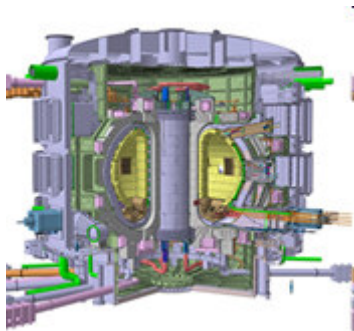


materials science

astro



particle physics



fusion

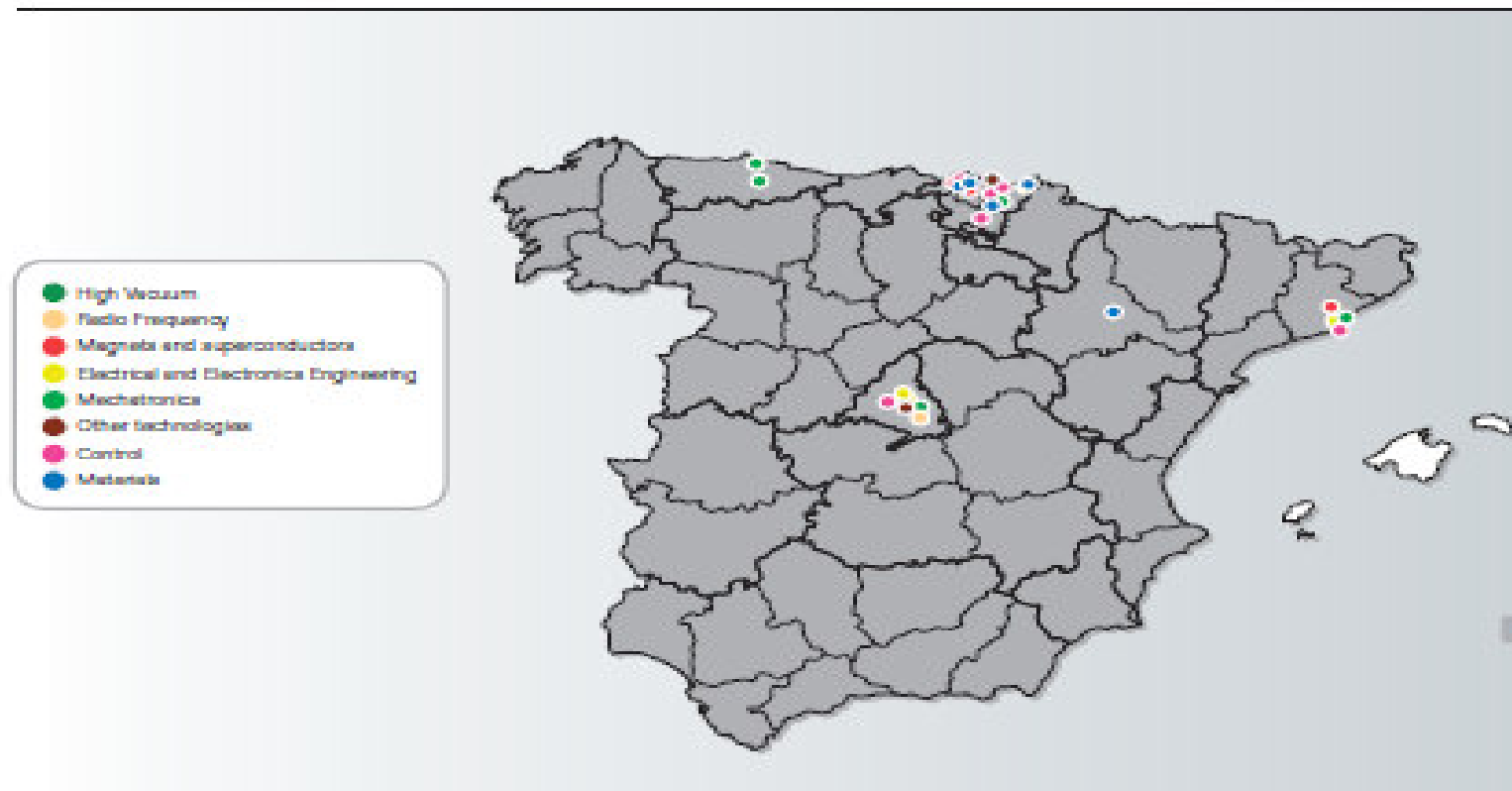
bio



energy

## ...Industry of Science – Spanish agents

### Geographical distribution of agents by technology





### INEUSTAR, the Spanish Industry of Science Association

- ❖ Non profit and private association composed by companies active in the Industry of Science sector.
- ❖ It is formed by companies from every corner of the Spanish territory which work in national and international science projects and installations.
- ❖ INEUSTAR tries to improve the Spanish ratio of industrial returns in scientific projects and installations by working together with the Spanish Public Administration.
- ❖ Early and up-to-date information, project identification, support programmes, post grade education, new investments, collaboration and alliances program, and so on; are some of the INEUSTAR activities.

Part of the Spanish  
*State Innovation Strategy E2I*  
market axis

Based on 3 dinamization vectors:

- Management of contributions to international Large Research Infrastructures
- Investments in the Spanish Map of Singular Scientific and Technological Infrastructures
- Public support programmes for industrial R&D





## ...*IdC* - contributions to Large Research infrastructures

Spain contributes with aprox 160 M€/year to the following international research facilities:

- ALMA Atacama Large Millimeter Array
- CERN European Organisation for Nuclear Research
- EMBL European Molecular Biology Laboratory
- ESA European Space Agency
- ESO European Southern Observatory
- ESRF European Synchrotron Radiation Facility
- ESS European Spallation Source
- FAIR Facility for Antiproton and Ion Research
- ILL Institute Laue Langevin
- ISIS Neutron Source
- ITER International Thermonuclear Experimental reactor
- XFEL X-Free Electron Laser

# ... **IdC** – Map of Singular Scientific and Technological Infrastructures

## MAPA DE INSTALACIONES CIENTÍFICAS Y TÉCNICAS SINGULARES



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GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE EDUCACIÓN  
Y CIENCIA

### ÁREAS DE INVESTIGACIÓN

Astronomía e Investigación Espacial

Ciencias del Mar, de la Vida y de la Tierra

Ciencias Socioeconómicas y Humanidades

Tecnologías de la Información y las Comunicaciones

Ciencias de la Salud y Biotecnología

Física de Partículas y Microscopía

Energía

Ingeniería





## ... *IdC* – Public support programmes

CDTI, the Spanish public entity devoted to the management of public instruments aiming at promoting R&D, supports the stimulation of the IdC market through

- Enabling IdC support programme
  - R&D projects
  - Technology transfer
  - Outreach
  - Creation of NTBCs
- Public procurement, precommercial and innovative

## Basque strategies for industrial diversification in knowledge intensive sectors...



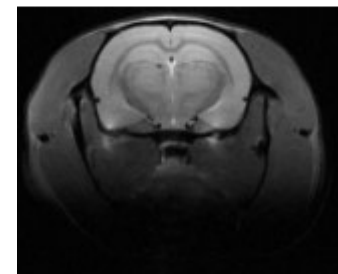
## ...knowledge generation in the Basque innovation System





## Molecular Imaging Facility

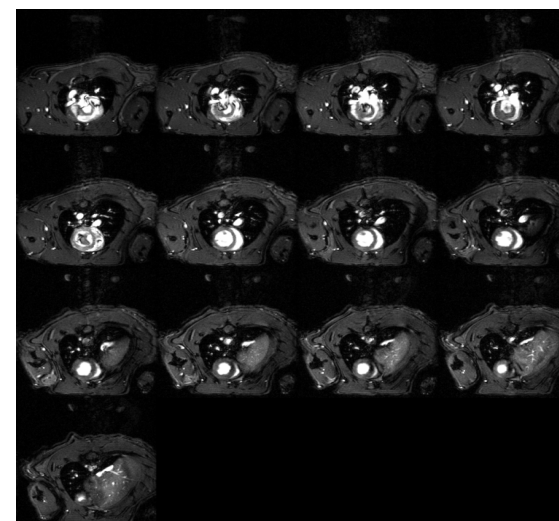
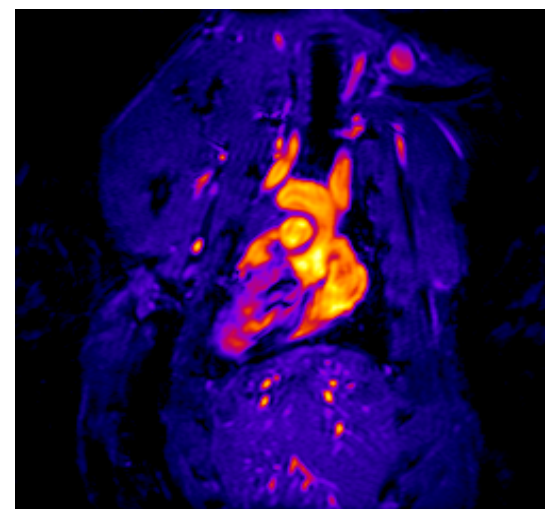
- Singular unit to study living organisms in a non-invasive manner
- Comprises a fully equipped
  - **radiopharmaceutical** setting with a cyclotron for the synthesis of radiotracers
  - **nuclear imaging platform** that includes positron emission computed tomography scan (PET-CT), a single photon emission computed tomography scan (SPECT-CT)
  - **magnetic resonance imaging** (MRI) with a 11,7 Tesla magnet
  - **animal facility**





## Molecular Imaging Facility

The facility allows complementary approaches for the enlightenment of the mechanisms of action of the drugs and the effectiveness in a disease treatment by monitoring the response to different therapies.





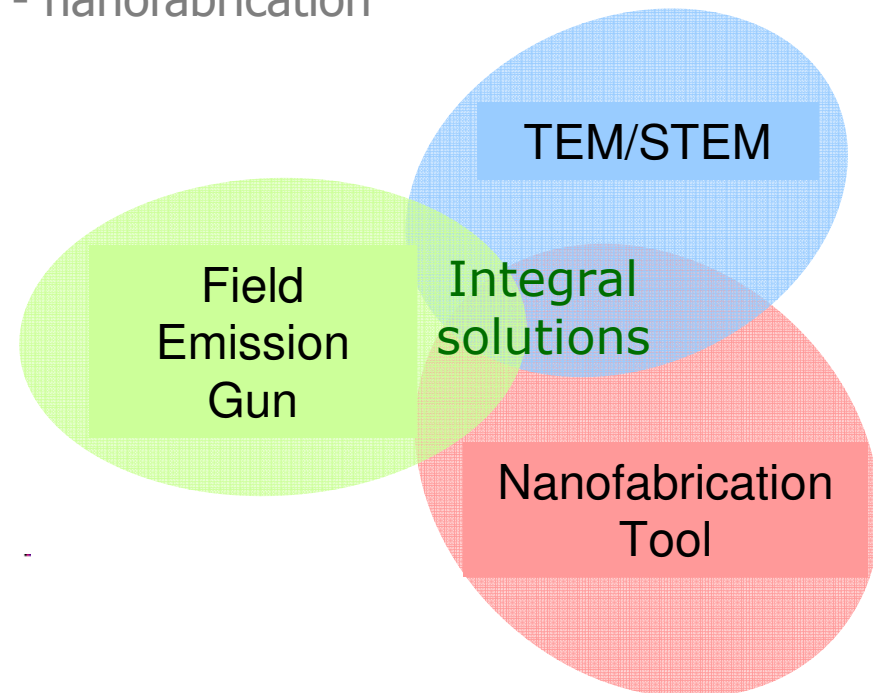
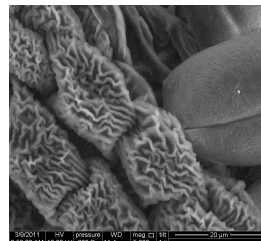
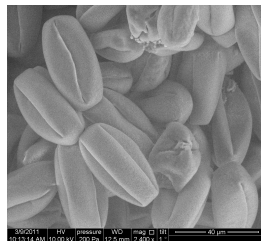
## Molecular Imaging Facility

- The facility is used for the industrial production of radiopharmaceuticals that are distributed for diagnostic test of diseases such as cancer or Alzheimer in the health network through an agreement with the cyclotron manufacturer
- This agreement allows to have some economic return as a complement of research activity while it maintains a close collaboration with the cyclotron provider for maintenance and further improvements that interest both partners, collaboration that materialises in joint R&D projects



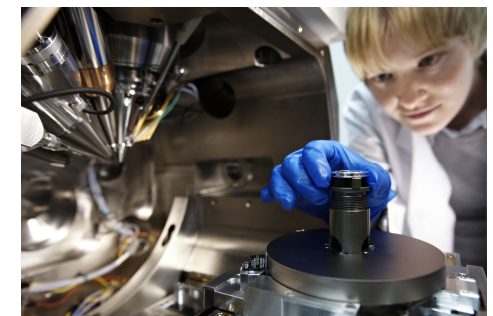
## Advanced Electron Microscopy Laboratory

- the Titan™ scanning transmission electron microscope (S/TEM) - the world's most advanced commercially-available microscope,
- the Environmental Scanning Electron Microscope ESEM Quanta™ FEG (field emission gun) - imaging of fluids under microfluidic conditions
- a Helios NanoLab™ DualBeam™ - nanofabrication tool

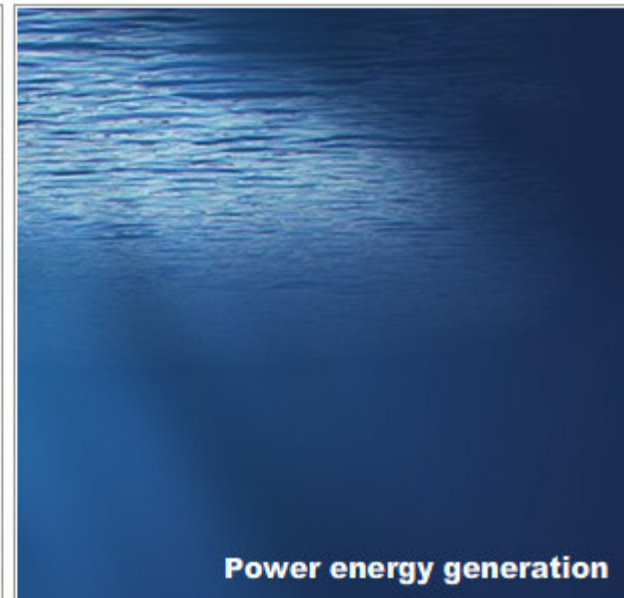
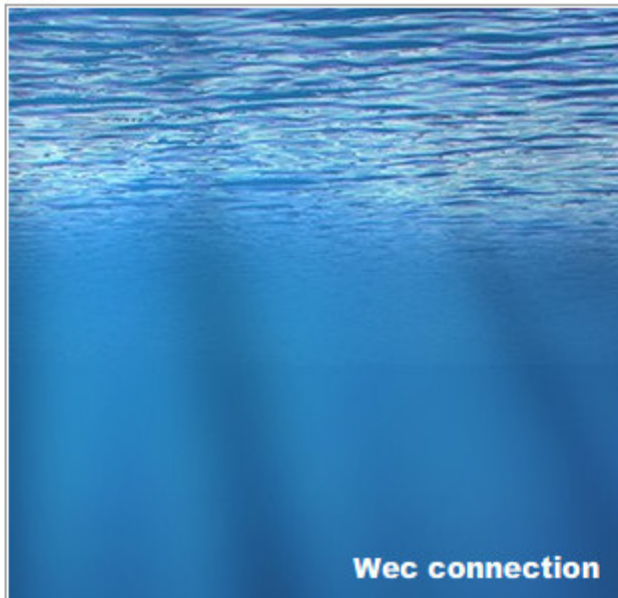
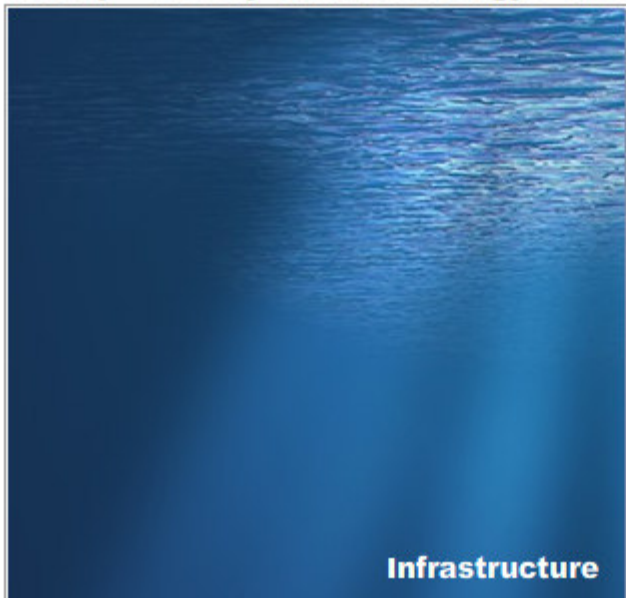


## Advanced Electron Microscopy Laboratory

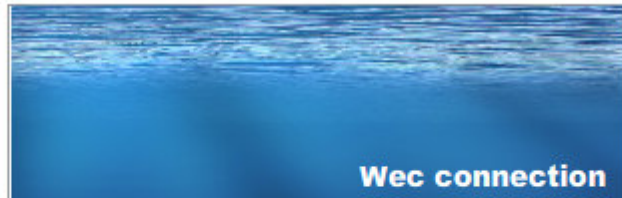
- A leading American scientific instrumentation company has chosen CIC nanoGUNE as reference centre for the installation and demonstration of these equipments and has signed an agreement for
  - access to the newest technologies in the fields of electron microscopy and focused-ion-beam nanofabrication,
  - active role in the transfer of these new technologies to other research centers and/or industry.
  - development of five research projects that will be carried out by teams involving researchers from both entities



### bimep - Biscay Marine Energy Platform



## bimep - Biscay Marine Energy Platform

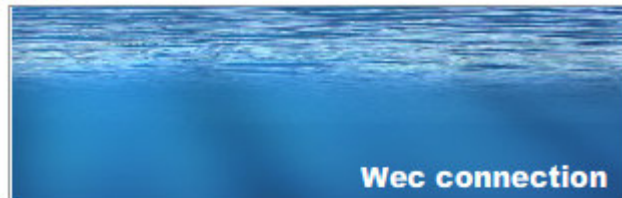


The **bimep - Biscay Marine Energy Platform** – is an ocean infrastructure for research, demonstration and operation of wave-energy capturing systems on the open sea. The Cantabrian Sea offers exceptional conditions for testing the effectiveness of the new mechanisms and technologies for harnessing wave energy currently being developed by companies throughout Europe. The facility has modern underwater infrastructures with a connection to the power grid on the mainland, and an entire telecommunications system for systematically gathering and analysing the data from the systems being tested at sea.



Overview

## bimep - Biscay Marine Energy Platform



RESEARCH CENTRE

SUBSTATION

BEACH MANHOLE

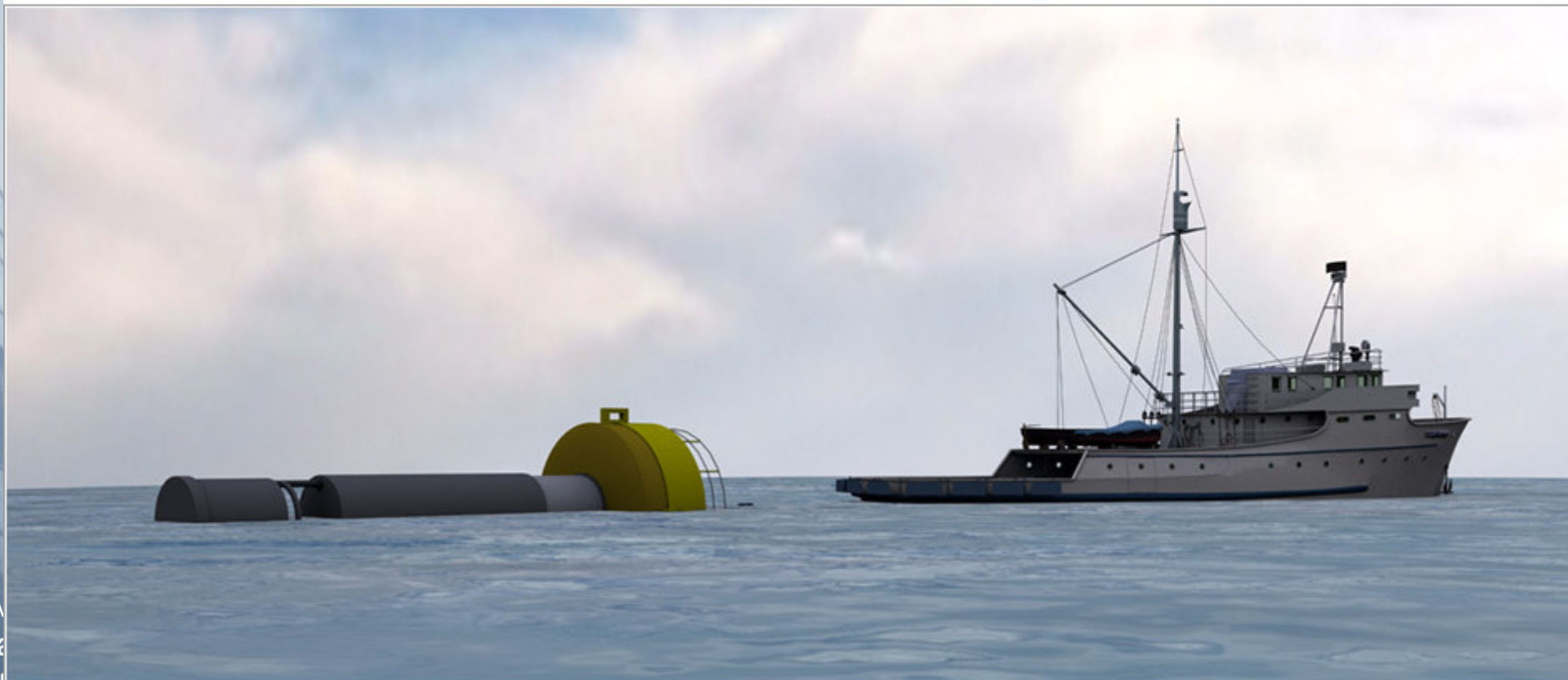


## bimep - Biscay Marine Energy Platform

Infrastructure

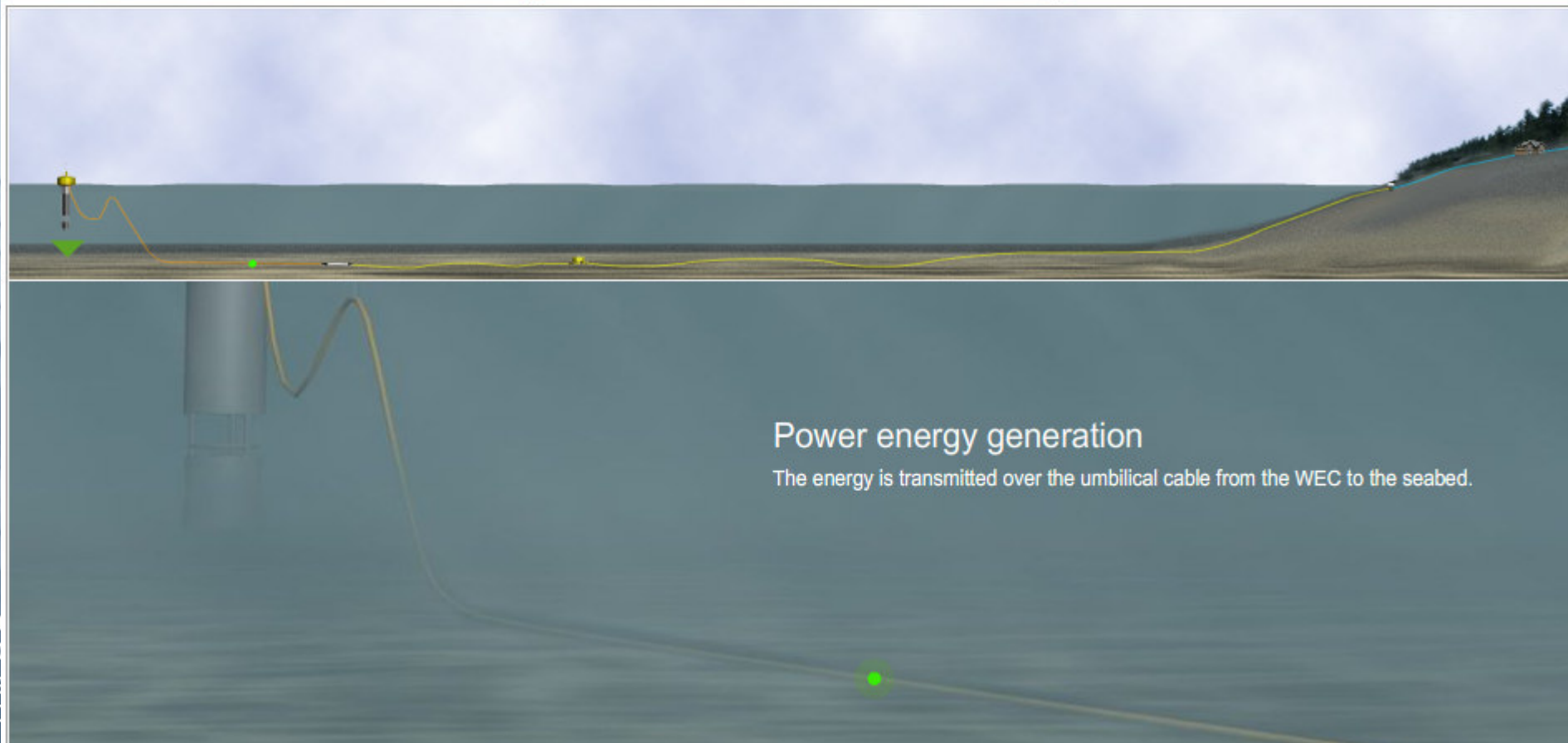
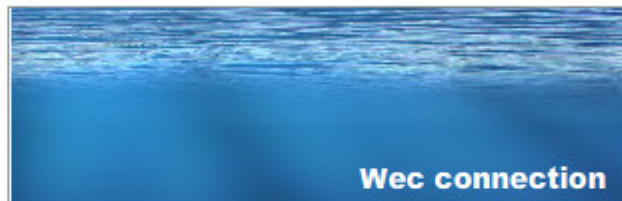
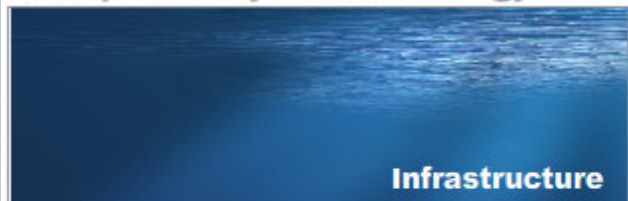
Wec connection

Power energy generation

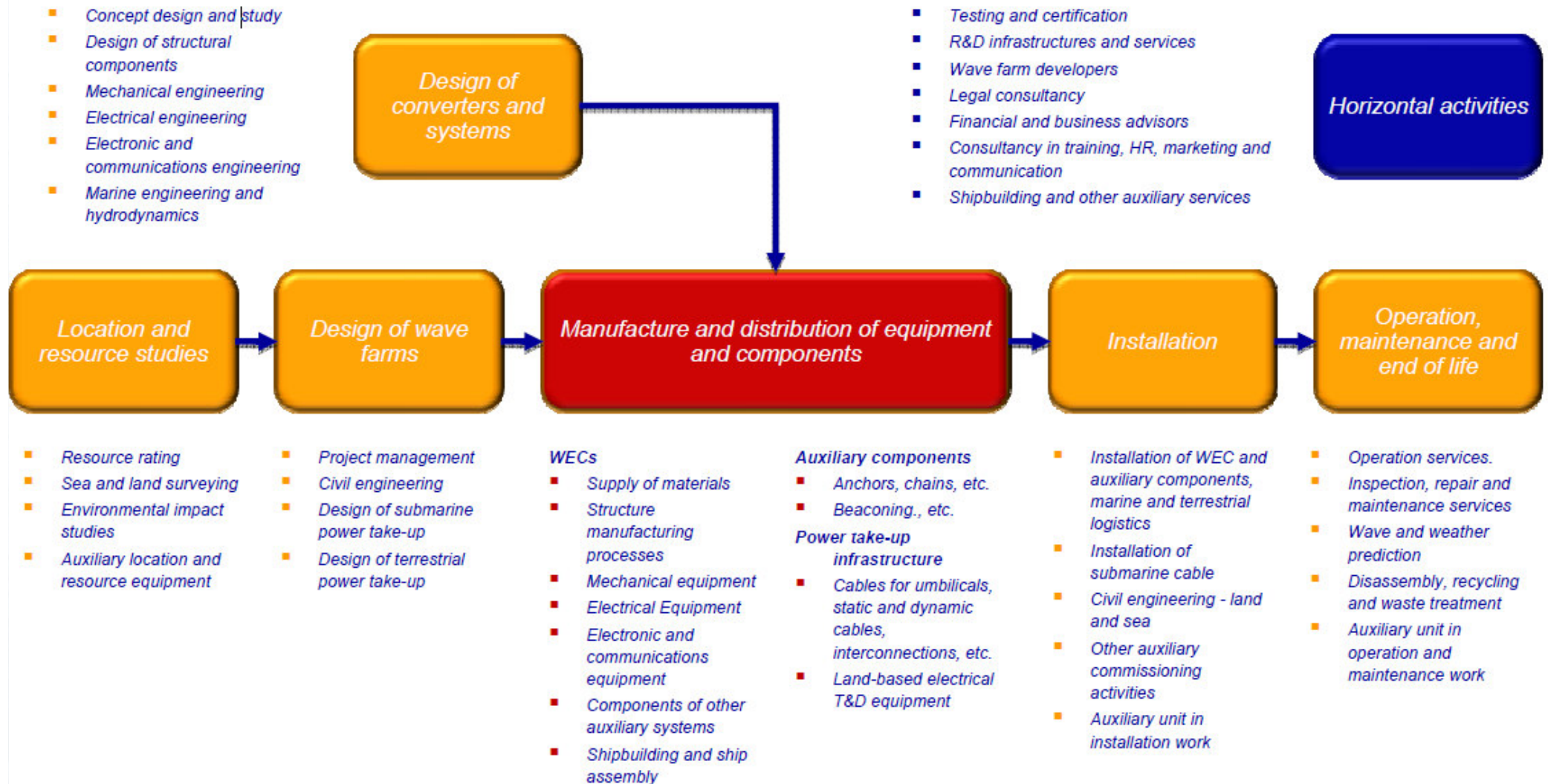


A tug boat tows the WEC to the selected deployment point, inside one of the circular areas around each berth, marked with a marker buoy.

## bimep - Biscay Marine Energy Platform



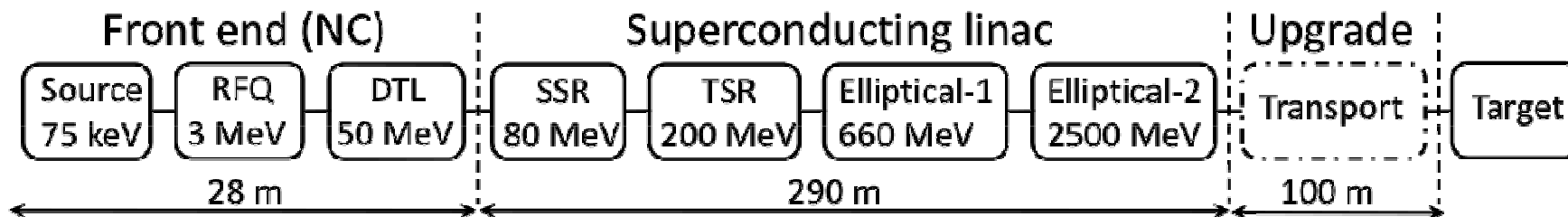
## ✧ The Basque Country has 72 organisations with capacity in the value chain of wave farms commissioning



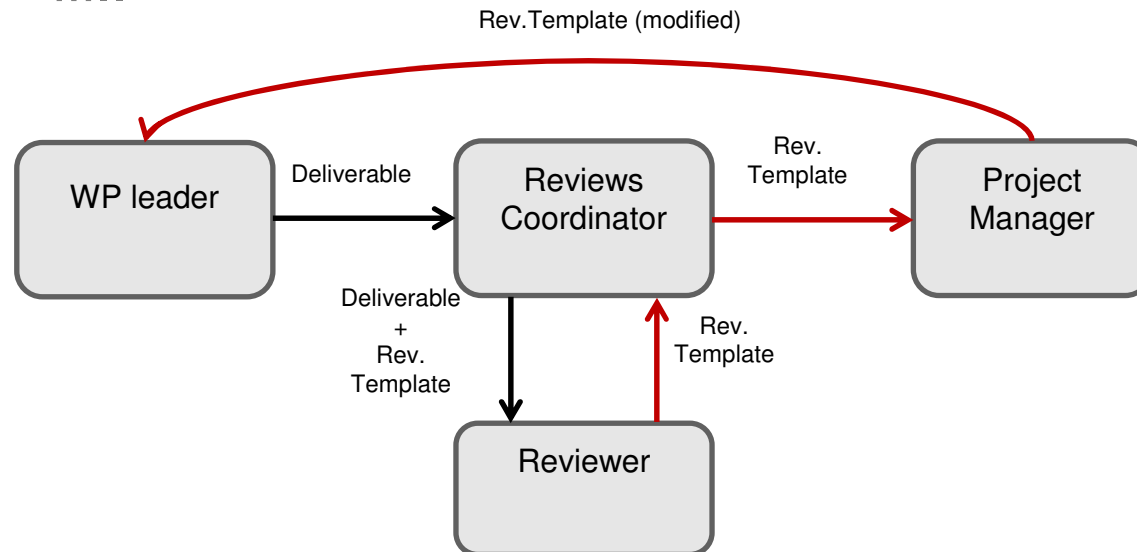
- ESS will be a 5MW long pulse source of slow neutrons, with 22 instruments, driven by a superconducting proton linac.
- The challenge of its construction and exploitation is a clear driver for innovation.
- ESS is currently concentrated upon the delivery of a Design Update report which will form the basis of the building process due to start in February 2013.
- Recent progress has, among other things, a continuous and growing international cooperation with other scientific institutes and universities, necessary for attaining the scientific and technical levels required for the facility.
- These collaborations are being arranged in the framework of the in kind contributions of the 17 country partners



It seems that industry cannot play a relevant role at this stage of development of the ESS project, although there is clear interest from industry as it was shown at the ESS Industry Day organised in Copenhagen in February 2010, with the attendance of more than 400 industrialists, but some ideas have already aroused about how to harvest ESS potential for innovation



- The technical review process of ESS design update projects with expert pools opened to private institutions
- Links between European, national, regional public R&D funding programmes and ESS
- Innovative Public Procurement procedures
- .....



The capacities of the Spanish Industry of Science and the experience of the Basque innovation System in collaborative R&D have in ESS a perfect opportunity to develop further and provide advantage in the construction of the world's most powerful source of slow neutrons for the study of materials.

