Advancements on MRE

CLÚSTER MARÍTIMO Y LOGÍSTICO de las Illes Balears

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1.Balearic Islands Maritime Cluster

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8 Projects

TOURISM - NAUTICAL
RENEWABLE ENERGIES
MARINE
BLUE ECONOMY

IKAT

MedBAN

GREEN MARINE MED

CallmeBLUE

REDCCF

BLUE ECOSYSTEM
Interreg Euro-MED

COMMUNITY OF PRACTICE

ROE
RENEWABLE OCEAN ENERGY
NEOTEC

FUTURE WORK LINES

SECTORIAL

- **Energy sector:**
  Renewable Energies
  Marines – S3
- **Tourism sector**
- **Ports and Maritime Transport**
- **Fishing and Aquaculture Sector**

HORIZONTAL

- **Environmental**
- **Equality**
- **Entrepreneurship**

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2.Energy challenges & alternatives in MRE

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Challenge - 1

Green Deal European Climate Law

Reduction of greenhouse gases by **55% by 2030**

Challenge - 2

European strategy on marine renewable energy

Developing oceanic

Challenge - 3

EU Biodiversity Strategy

Protection of **30%** of marine protected area **by 2030**

OBJECTIVE

CLIMATE NEUTRALITY IN EUROPE

2.Energy challenges & alternatives in MRE

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The selection of a renewable energy technology is based on the following variables:

1- Energy density m2

2- Prediction

3- Environmental impact

4- Negative sectoral externality (visual impact / spatial occupation)

5- Costs (Installation and maintenance)

6- Circularity of materials at the end of their useful life

7- Complementarity

To achieve climate neutrality and at the same time cover energy needs

2.Energy challenges & alternatives in MRE

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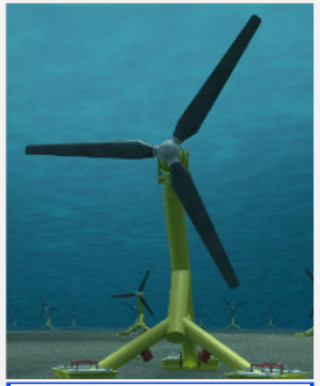
SOLAR

- Low power density
- Low recyclability

WIND

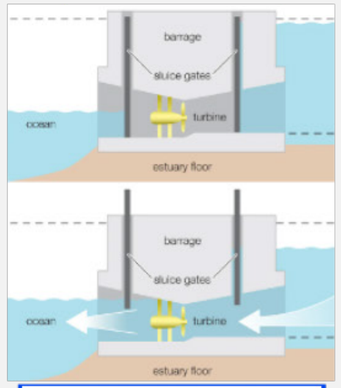
- Low power density
- Low predictability
- High visual impact

CURRENT



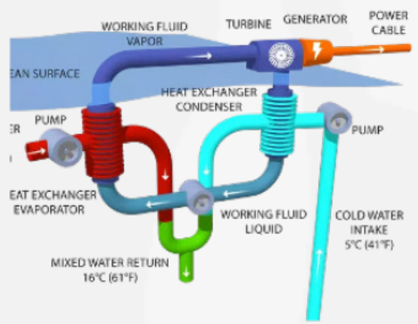
- High installation cost
- High environment impact
- High maintenance cost

TIDE



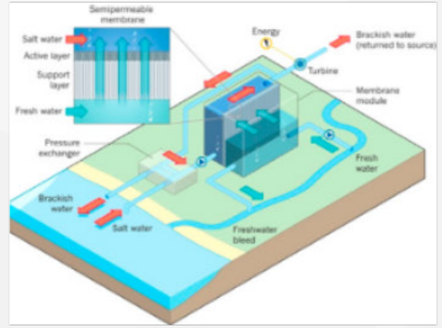
- High installation cost
- High environment impact

TERMAL GRADIENT



- High installation cost
- Low efficiency
- High maintenance cost

SALINITY GRADIENT



- High environment impact
- High maintenance cost

WAVE

- High power density
- Predictable
- Low visual impact
- Low installation cost
- Low environment impact
- Low maintenance cost

→ MRE

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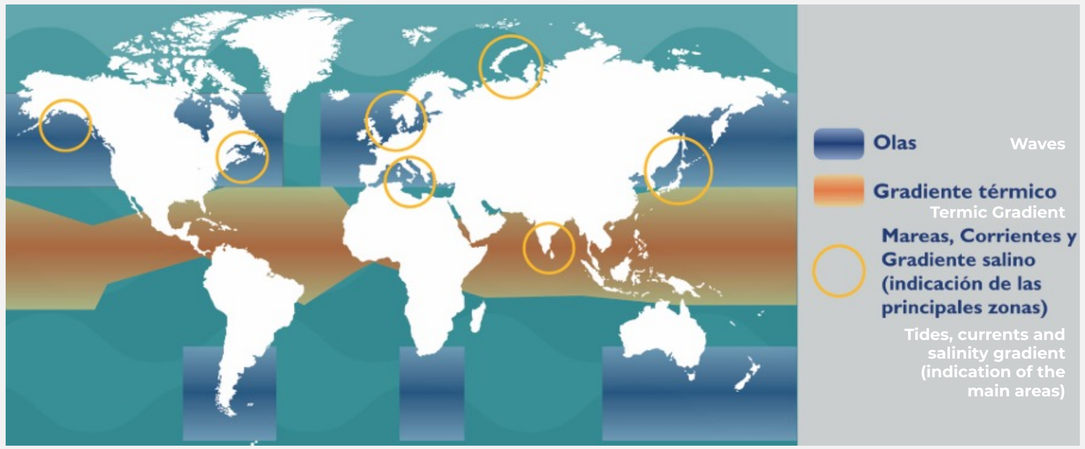
Energy source	Power (GW)	Energy (TWh per year)
Tide	90	800
Current	5000	50000
Salinity gradient	20	2000
Termal gradient	1000	10000
Wave	1000 - 9000	8000 - 80000



- Among the different marine energy sources, currents and waves have the greatest annual energy potential

- Waves are present in a large part of the marine coast. However, marine currents are more localized in specific regions

- Systems that extract energy from currents have a very high installation and maintenance cost and environmental impact

2.Energy challenges & alternatives in MRE

WAVE ENERGY

Wave energy, which harnesses the power of wind, can alone cover **100%** of the world's current electricity demand.

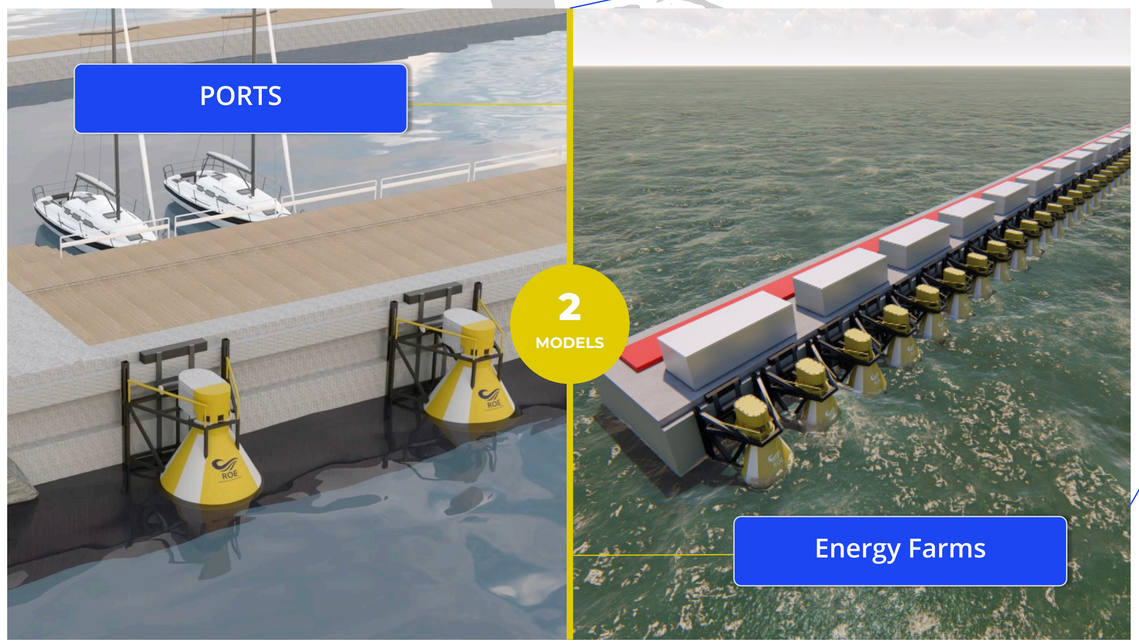
*The Intergovernmental Panel on Climate Change (IPCC) estimates the potential annual global production of wave energy at **29.500 TWh**.*

*Almost **10x** times the annual electricity consumption of Europe **3.000 TWh.***

3.Ports

2.200

Mediterranean Ports



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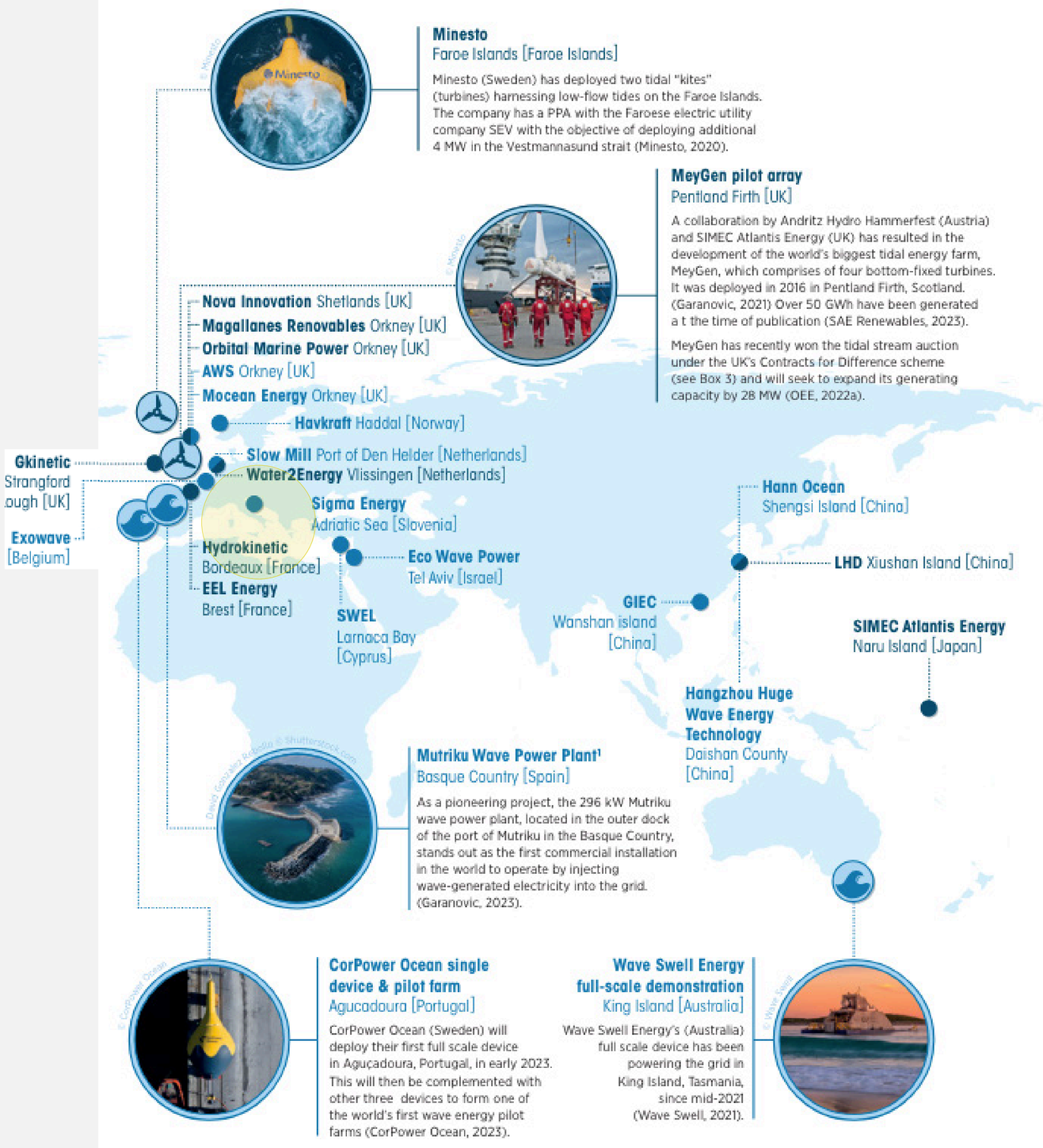
4.Existing devices

From the study carried out by the International Renewable Energy Agency Irena jointly or with the support of Ocean Energy Europe, we can see which projects are in progress that have been developed and financed at European level.

Large devices, with great energy potential, most of which exceed one megawatt, and all the investments have been made in the Atlantic with the support of the European Union.



5.Priorities & aspects

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Priorities and aspects to be considered in a roadmap for MRE implementation

1. Ocean energy offers a clean and predictable service and is a safe source of energy.

2. Ocean energy is one of the technologies that must be developed to guarantee the total decarbonisation of the Mediterranean regions and their ports. Its development is essential for the islands.

3. Ocean energy can complement wind and solar power, providing the essential flexibility to the grid and guaranteeing energy supplies.

4. Wave energy is complementary to wind energy; when the wind stops, wave energy continues to produce energy.

5.Priorities & aspects

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5. Ocean energy can create direct jobs in the Mediterranean. Many of these jobs will be local and located close to the corresponding resource and can be used to support coastal communities by promoting regional economic diversification.

6. To harness the benefits of ocean energy, especially waves, increased investment is required. As more wave capacity is deployed, the cost of this energy will be reduced by economies of scale, rationalisation of supply chains and improvements in equipment. The models of the activities and technologies of ocean energy are like those of offshore wind energy and can achieve similar cost reductions as demonstrated by the Atlantic devices.

Large-scale deployment of ocean energy will generate more dramatic cost reductions, as has been the case with offshore wind energy.

7. Until now, all the projects financed and promoted by the European Union have been concentrated in the Atlantic and Cantabrian seas, with no funding proposals for devices for the Mediterranean, where energy consumption is mainly concentrated.

ROADMAP PRIORITY → Need of fuding EU and South Med projects to reduce costs in **Wave** Ocean Energies

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