SUSTAINABLE ENERGY ACTIONS FOR ISLANDS

European Islands, test and demonstration sites frontline for marine energies. PLOCAN contribution

PLOCAN consorcio PLATAFORMA OCEÁNICA DE CANARIAS

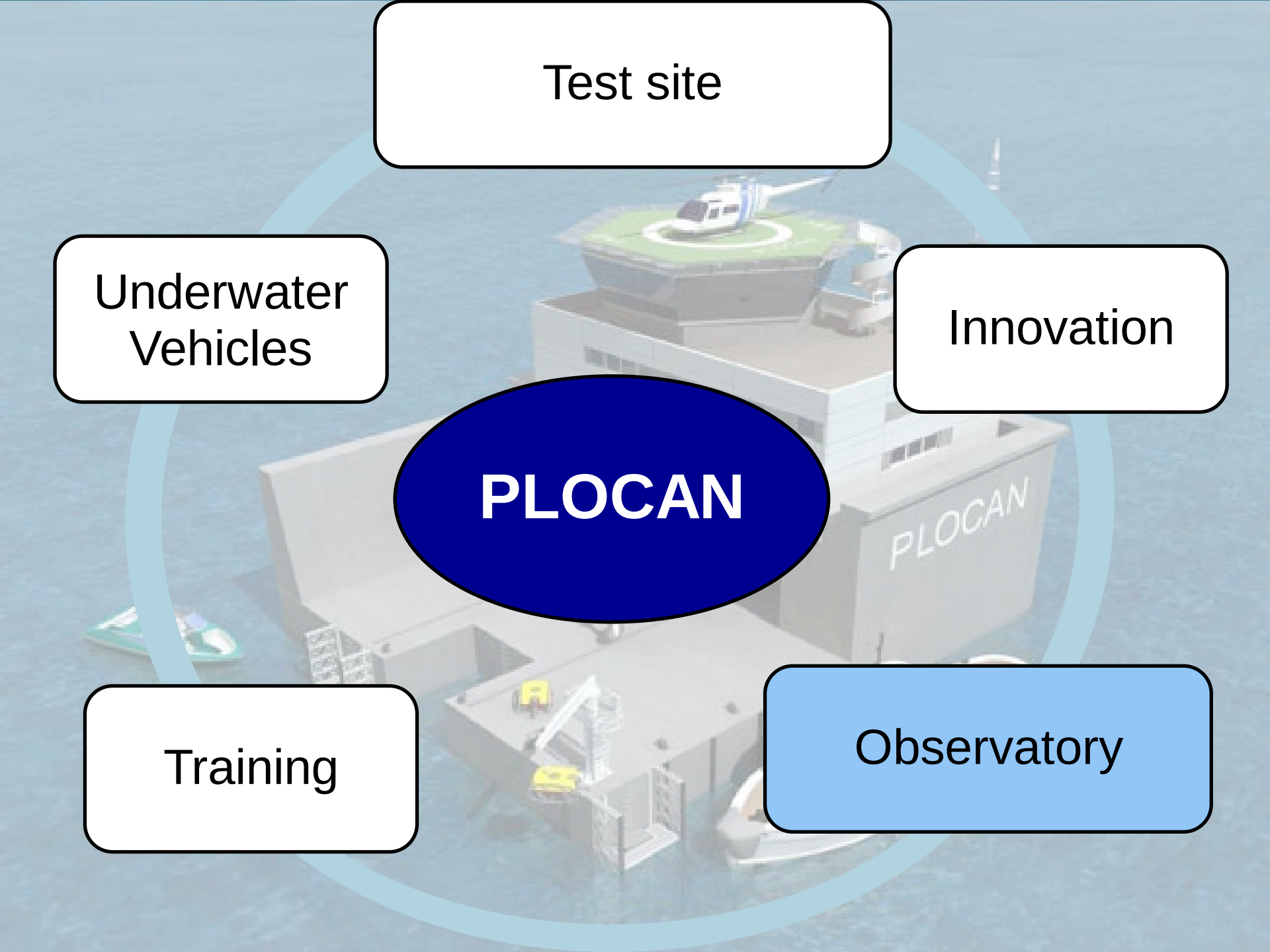
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

Gobierno de Canarias

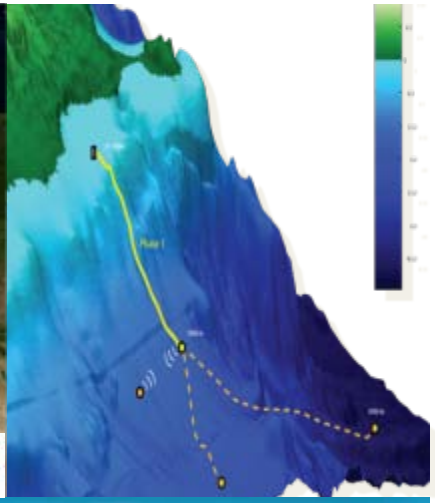
canarias OBJETIVO de PROGRESO

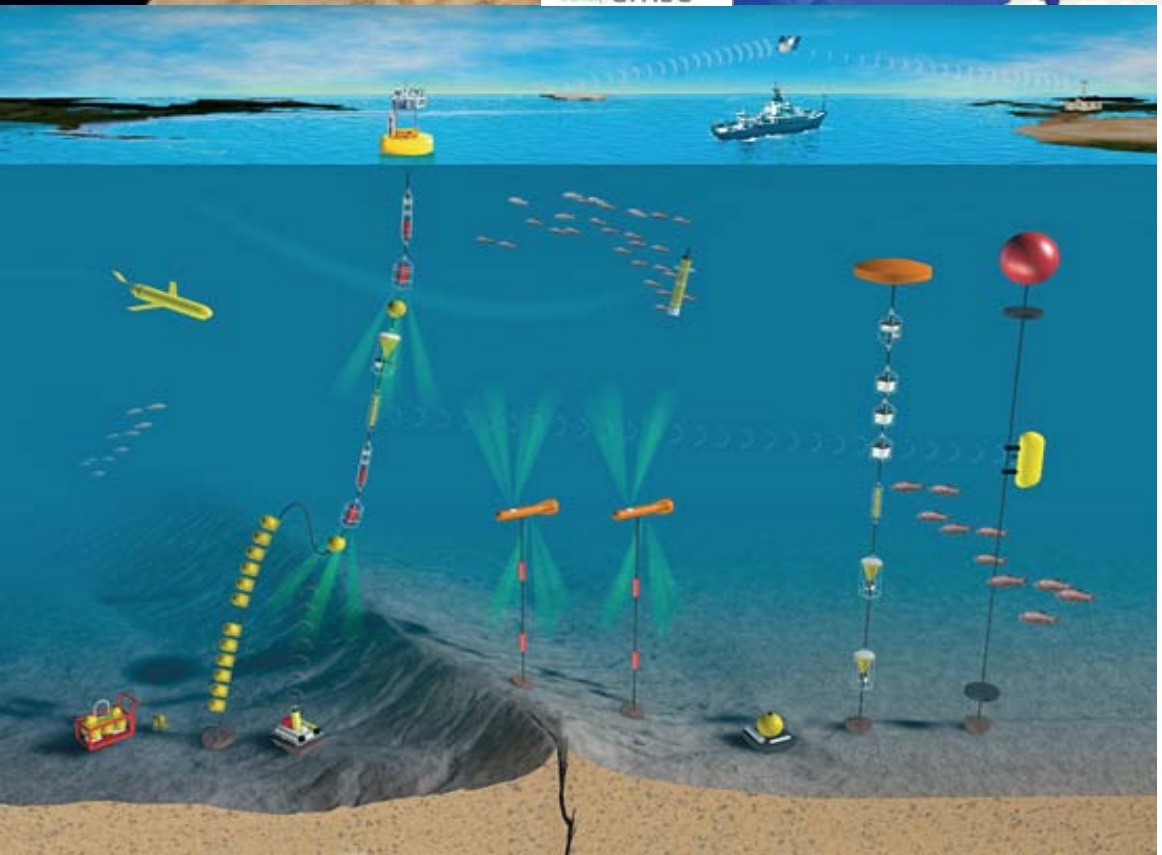
Fuerteventura, 2 Marzo de 2012.

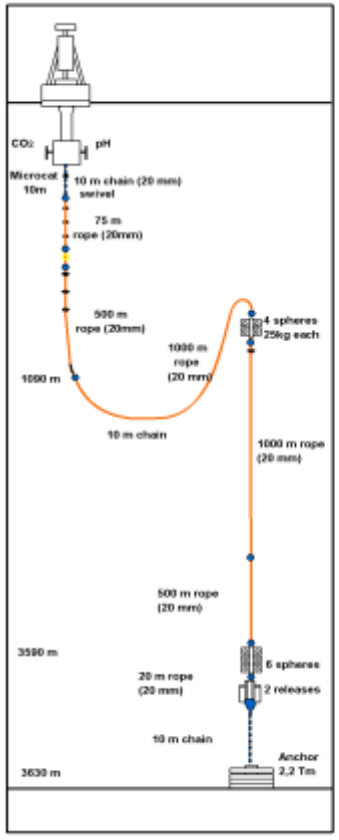
José Joaquín Hernández Brito

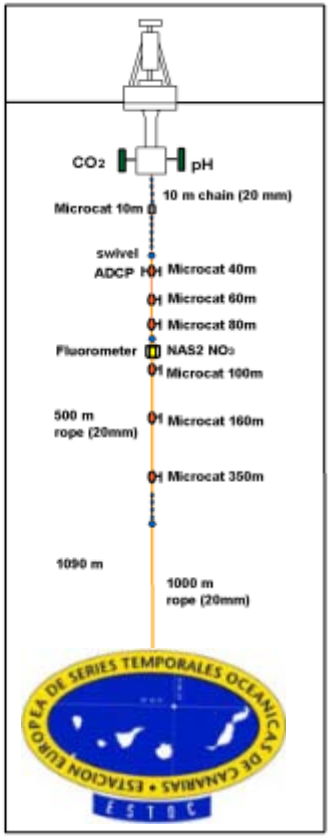

Test site
Underwater Vehicles
Innovation
PLOCAN
Training
Observatory

Observatory

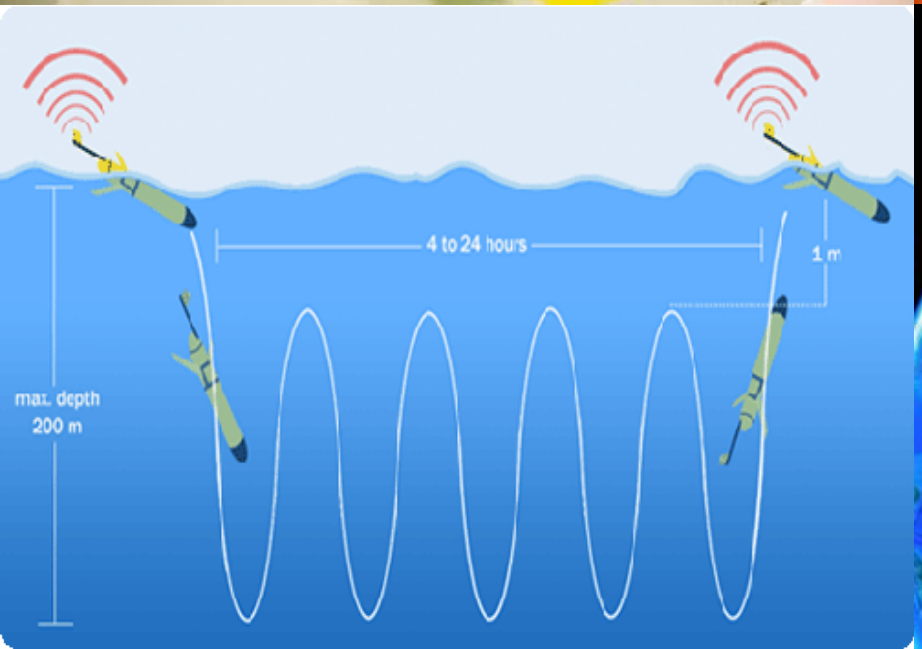








Underwater vehicles



Test site

Innovation

Training

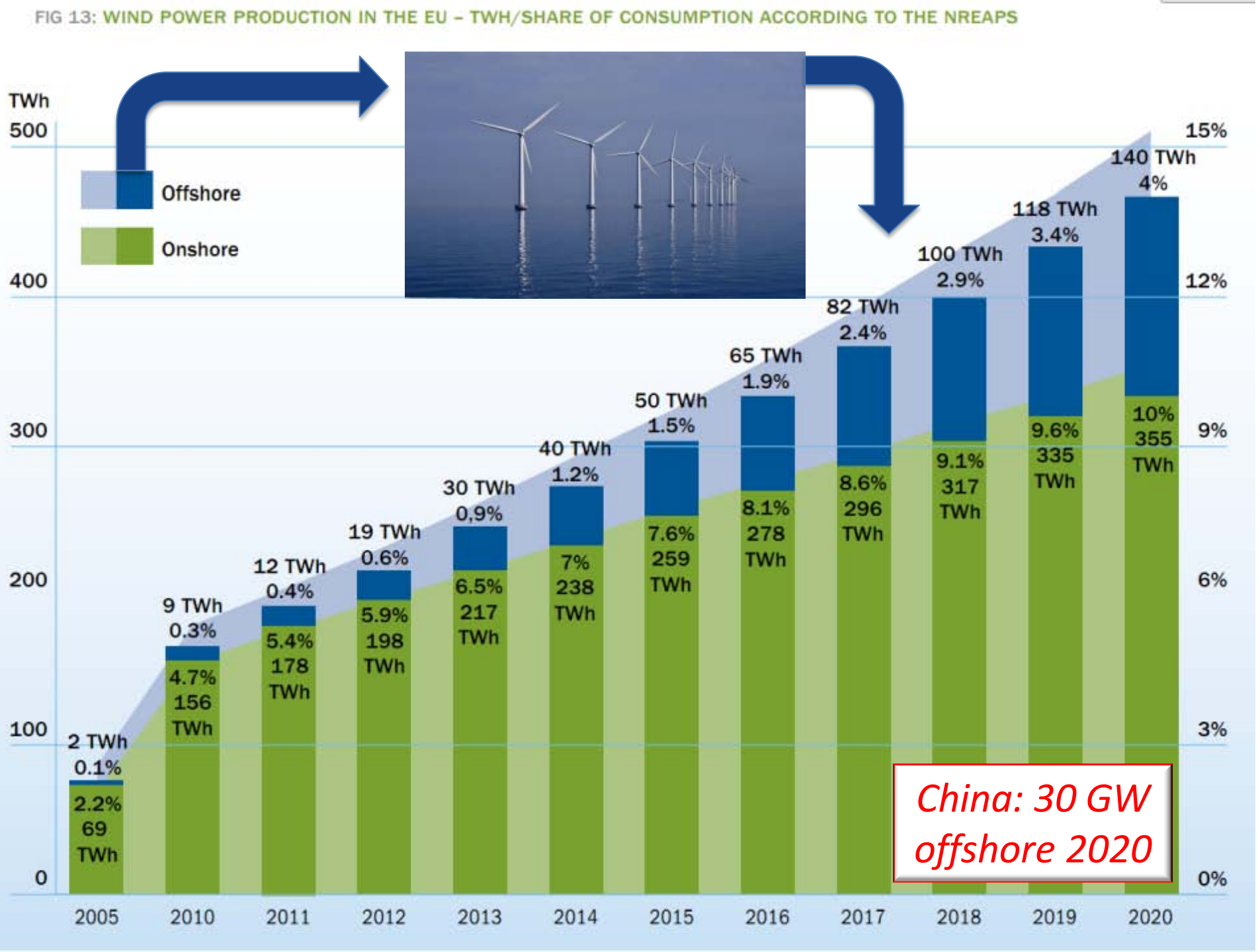
Offsshore wind energy in shallow water

Operational and commercial

Offsshore wind energy in shallow water

Operational and commercial

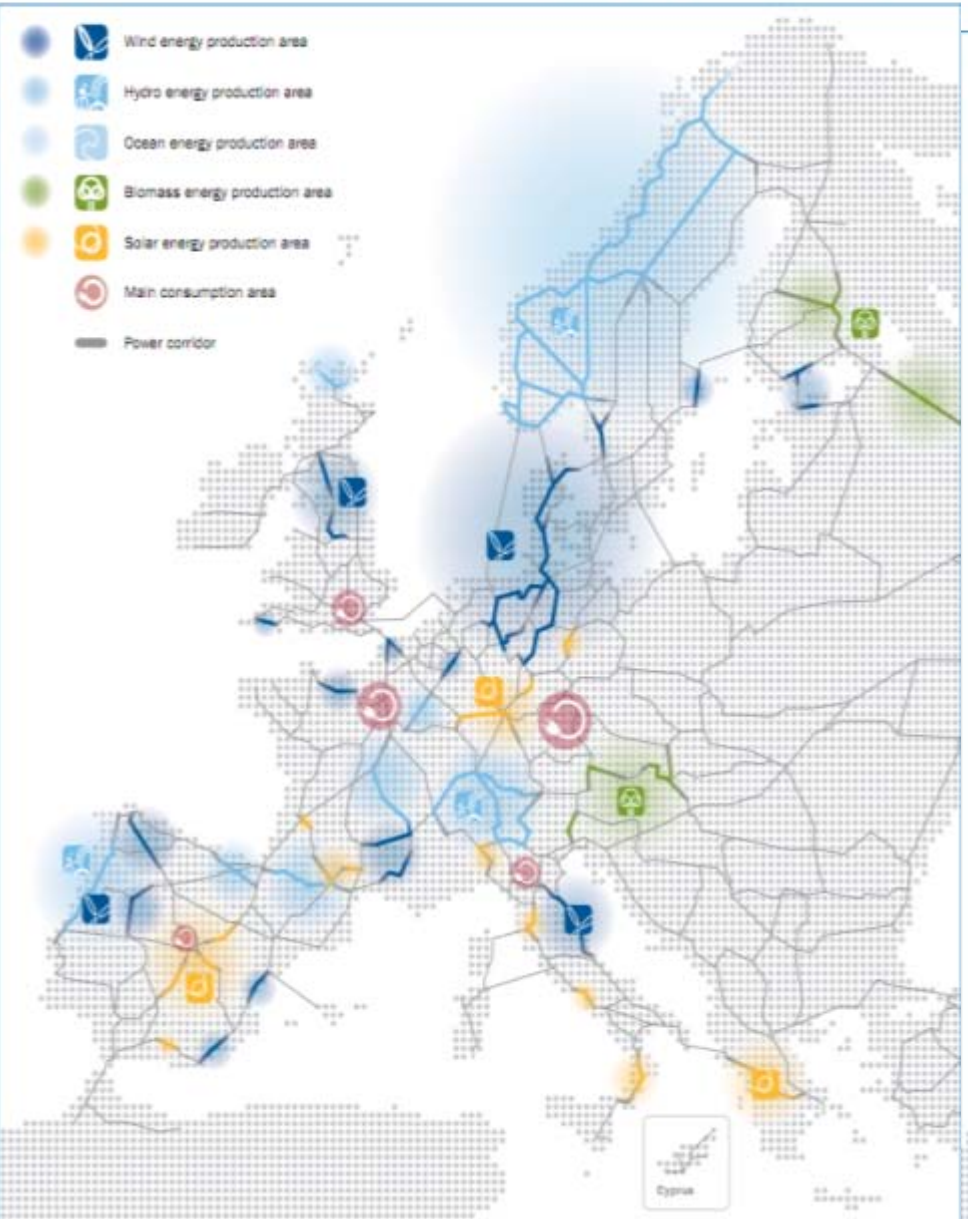
FIG 13: WIND POWER PRODUCTION IN THE EU – TWH/SHARE OF CONSUMPTION ACCORDING TO THE NREAPS



European renewable energy grid

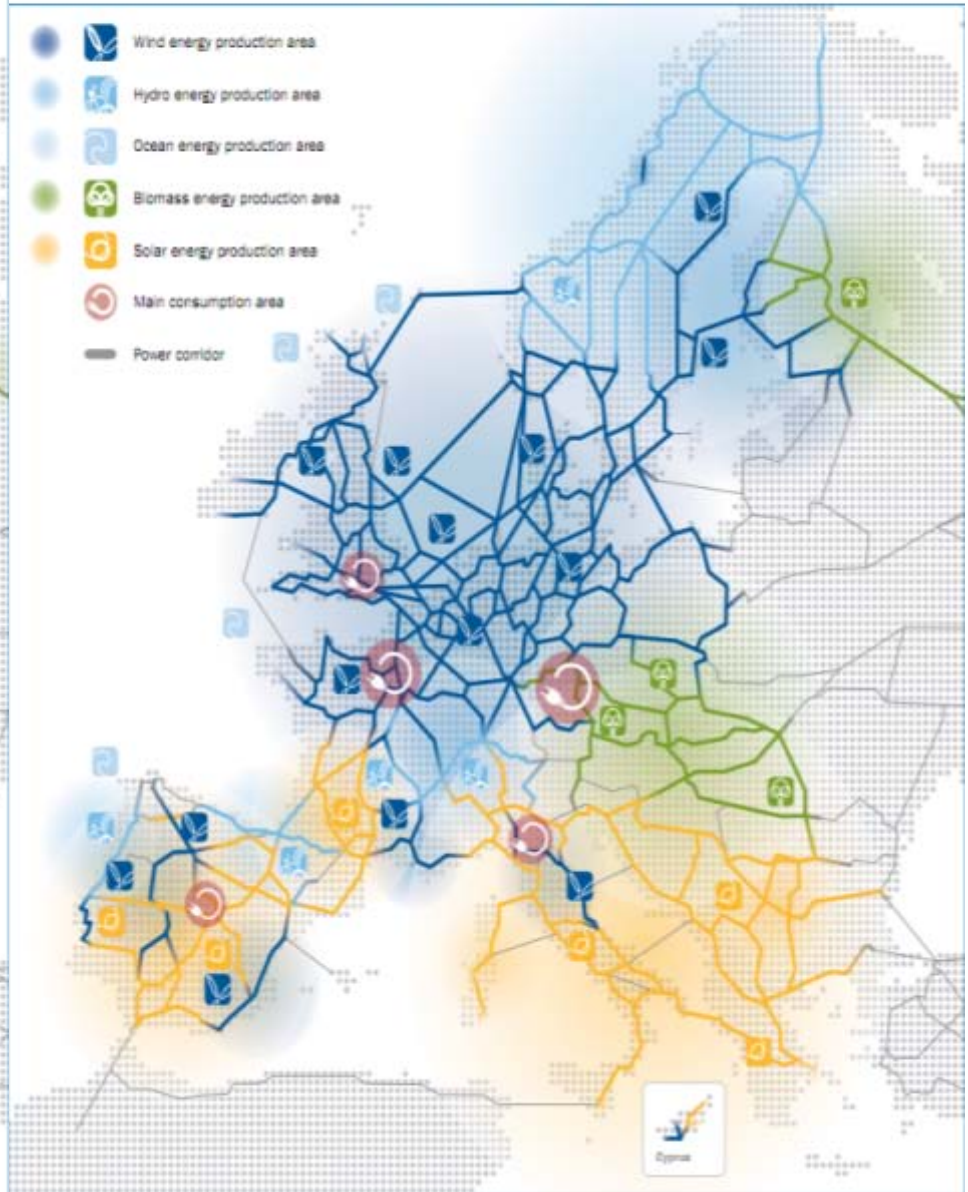
2010

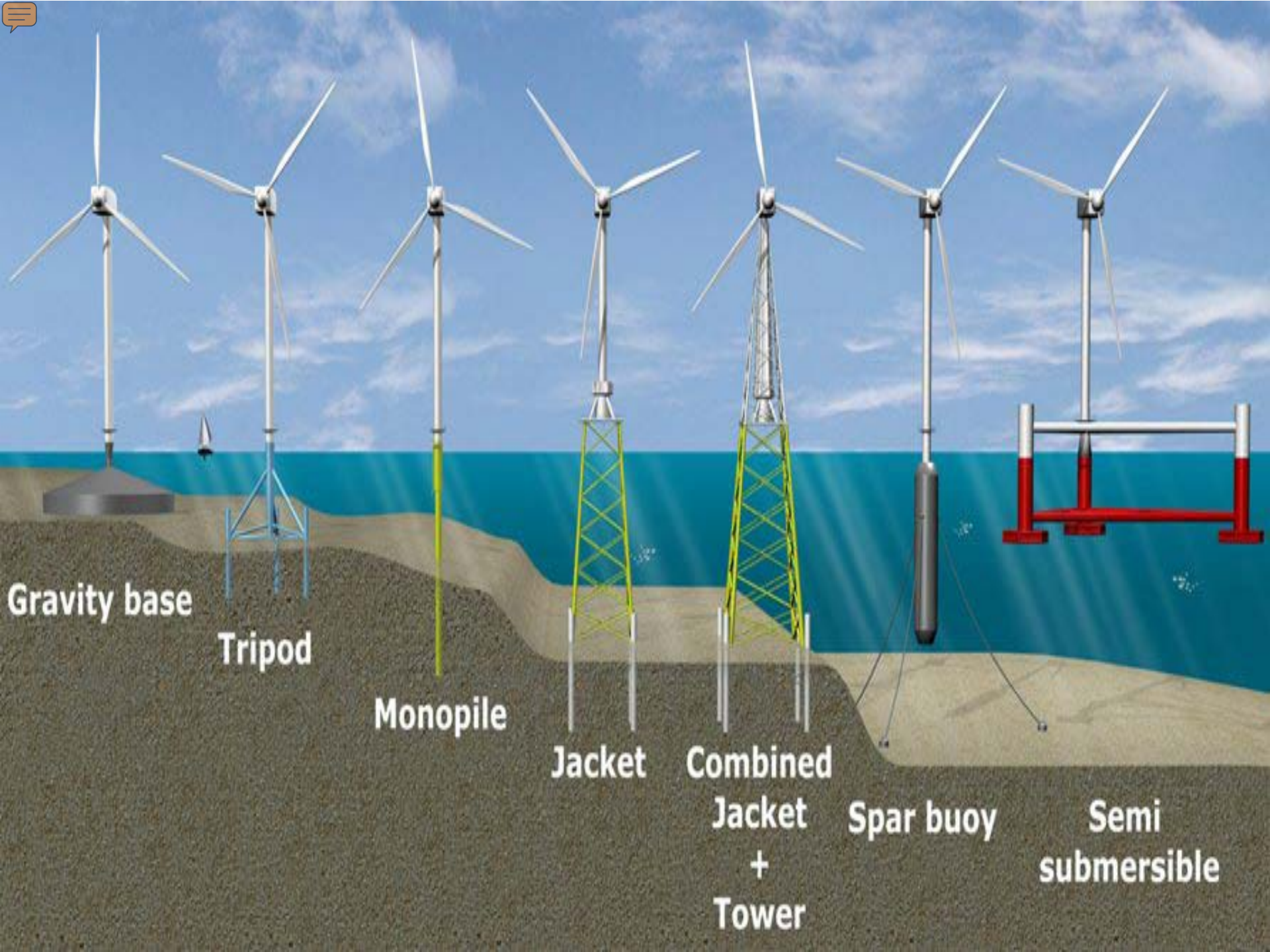
This map shows the current role of renewable energy sources in a fragmented power system. After hydro, wind is the largest renewable power generation source, with around 4.8% of EU electricity demand. Wind energy already has a considerable share in the Northern German, Danish and Iberian power systems.



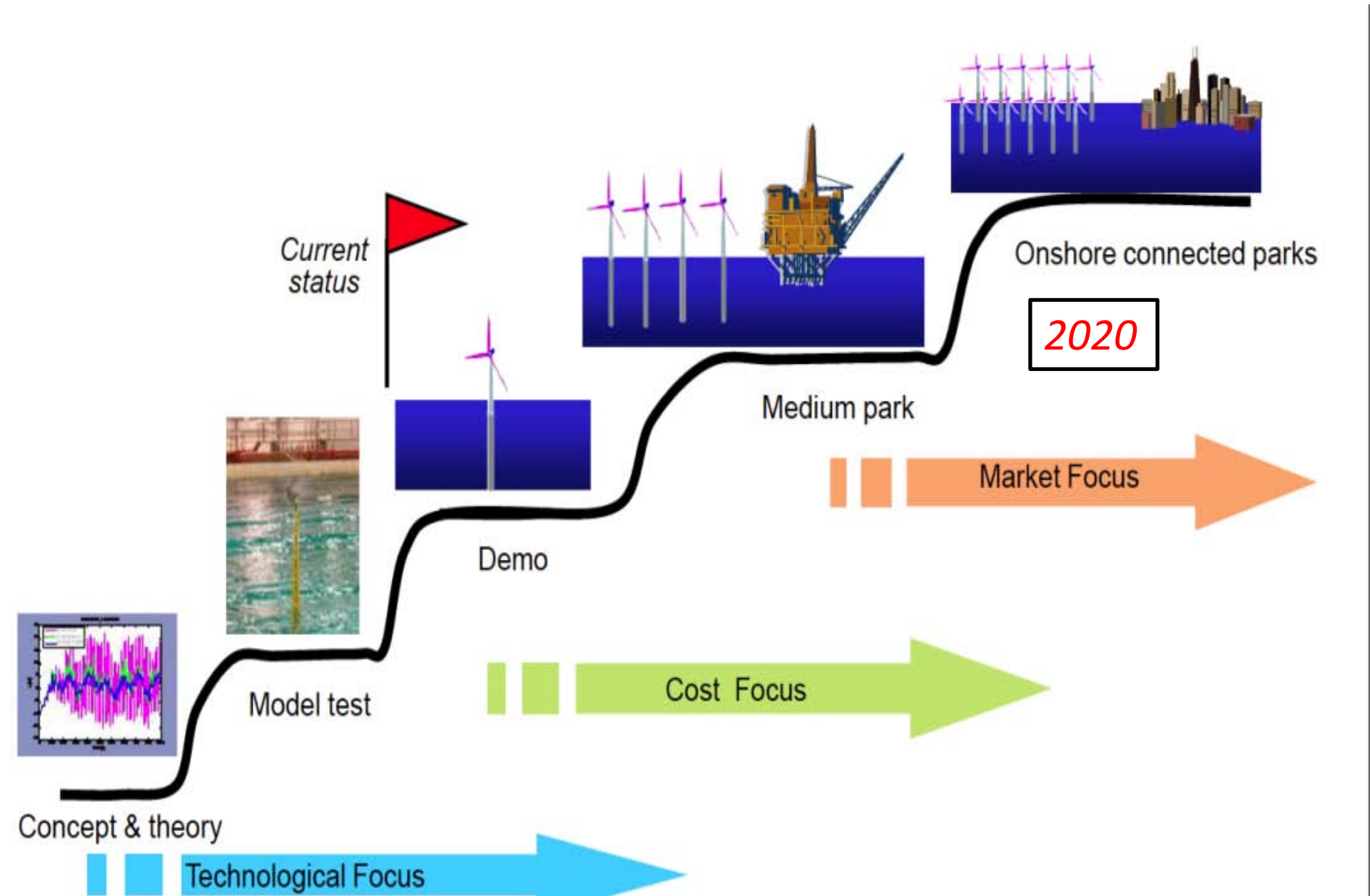
2050

In 2050 the system operates with 100% renewables, with the necessary grid infrastructure in place and full market integration. Wind power will meet up to 50% of Europe's electricity demand, dominating in the North Sea and Baltic Sea areas, and the Iberian Peninsula, Southern France and Central Italy. Variable renewables will be balanced with hydro power production in Scandinavia, the Alps and the Iberian Peninsula. Photovoltaic and concentrated solar power will play a crucial role in the Southern European power market, and biomass generation in Central and Eastern European countries.

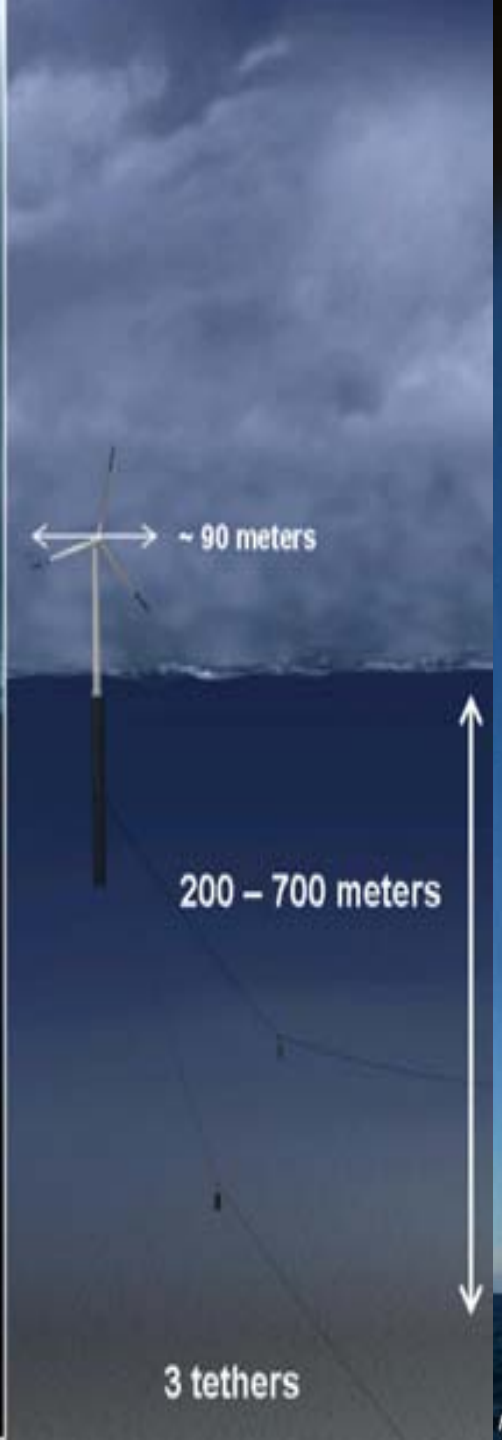



Gravity base
Tripod
Monopile
Jacket
Combined
Jacket
+
Tower
Spar buoy
Semi
submersible

Wave energy Eólica flotante en aguas profundas y oleaje



Employment


~ 90 meters
200 – 700 meters
3 tethers


MarineTraffic.com


OPT
IBERDROLA
RENOVABLE


SCOTTISHPOWER
RENEWABLES


P2-001
pelamiswave.com
e·on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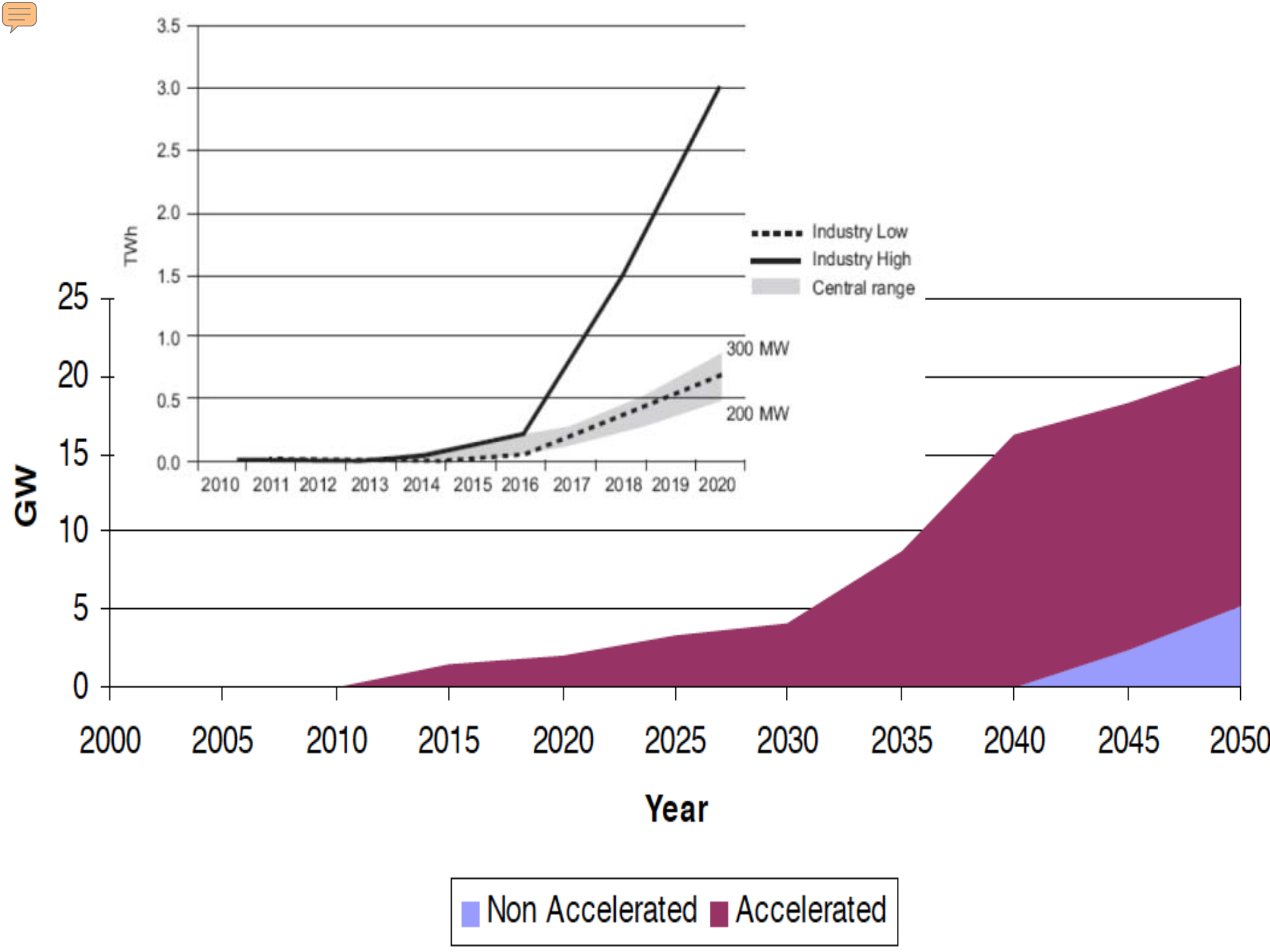
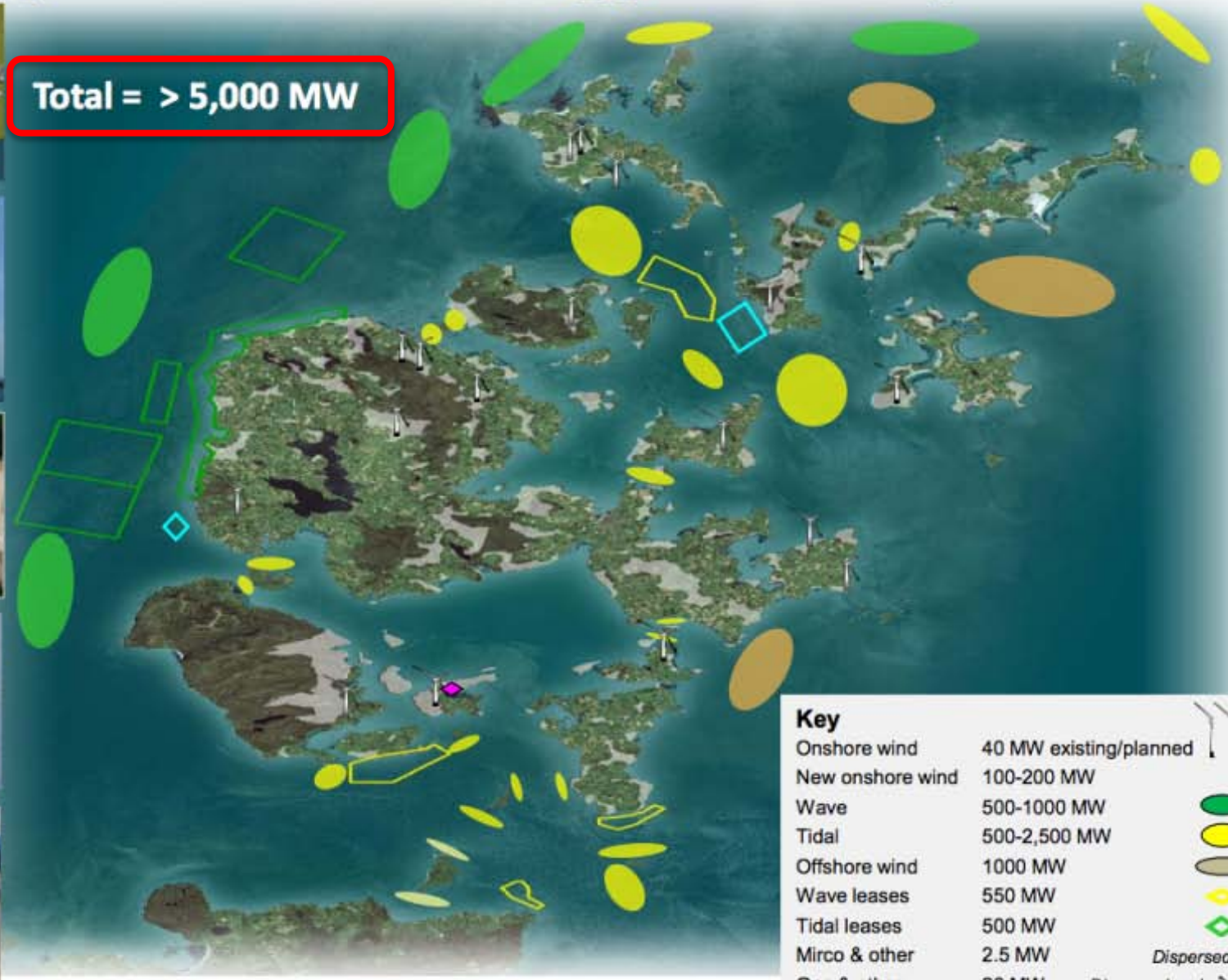
Gobierno
de Canarias
FEDER
systems.com


3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
TWh
2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Industry Low
Industry High
Central range
300 MW
200 MW
25
20
15
10
5
0
GW
2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050
Year
Non Accelerated
Accelerated

Marine Energy Parks

Orkney's future energy developments

Total = > 5,000 MW



Key		
Onshore wind	40 MW existing/planned	
New onshore wind	100-200 MW	
Wave	500-1000 MW	
Tidal	500-2,500 MW	
Offshore wind	1000 MW	
Wave leases	550 MW	
Tidal leases	500 MW	
Mirco & other	2.5 MW	*Dispersed*
Gas & other	20 MW	*Dispersed and*
EMEC sites	5 + 7 MW	

aquatera.co.uk

Tim Yeo

Constituency
South Suffolk

Party
Conservative

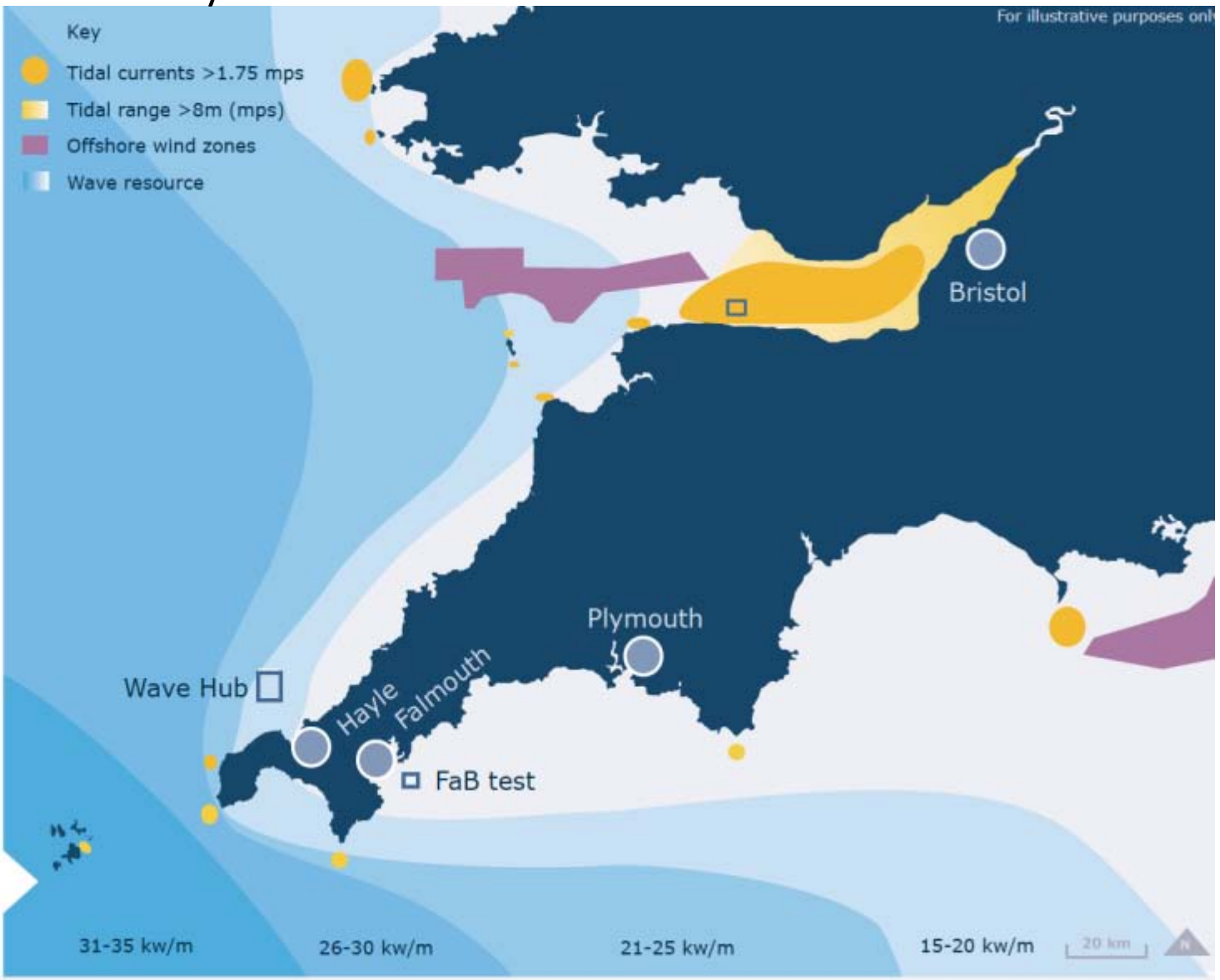
Address as
Mr Yeo

Conservatives

"We are extremely well placed to lead the world in wave and tidal technologies, which could potentially bring significant benefits in manufacturing and jobs, as well an abundant supply of reliable low-carbon electricity."

A focused geographic area but with a broad range of energy resources and capabilities, including:

- estimated 9.2 GW of marine energy & offshore wind resource
- opportunities for Floating Wind & Tidal Range
- industry clusters around Plymouth, Falmouth & Bristol
- extensive research facilities
- Wave Hub 20 MW grid connected site with potential to expand to 50 MW
- FaB Test & Lynmouth demonstration sites
- two Enterprise Zones at Newquay & Bristol Temple Meads
- extensive port facilities
- grid capacity to support early projects



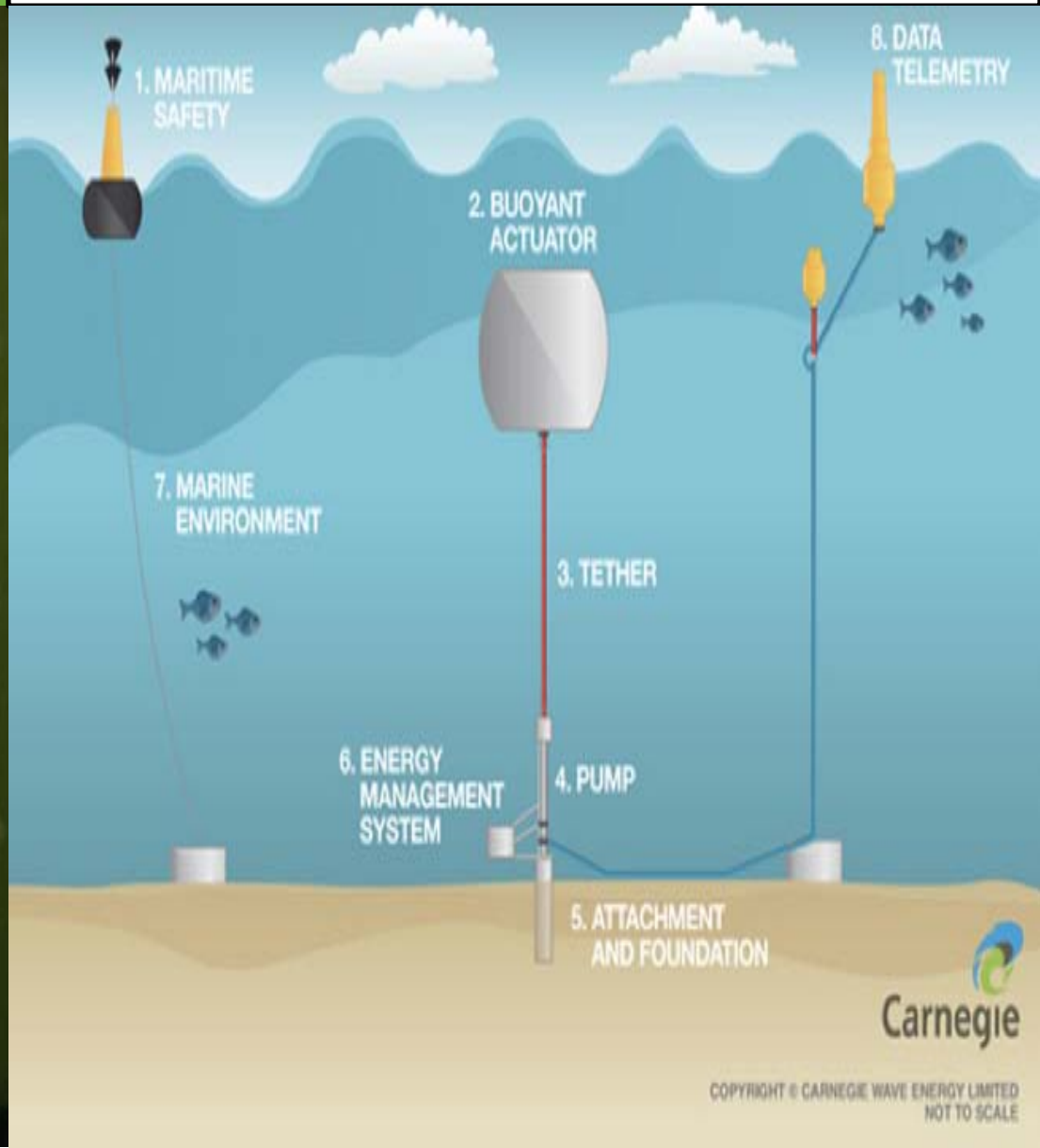
half of the continent's population lives less than 50 km away from the cost…

The annual offshore wind capacity will increase steadily from 1.1 GW in 2011 to 6.5 GW in 2020, an average net ***increase of 21.5% per year***

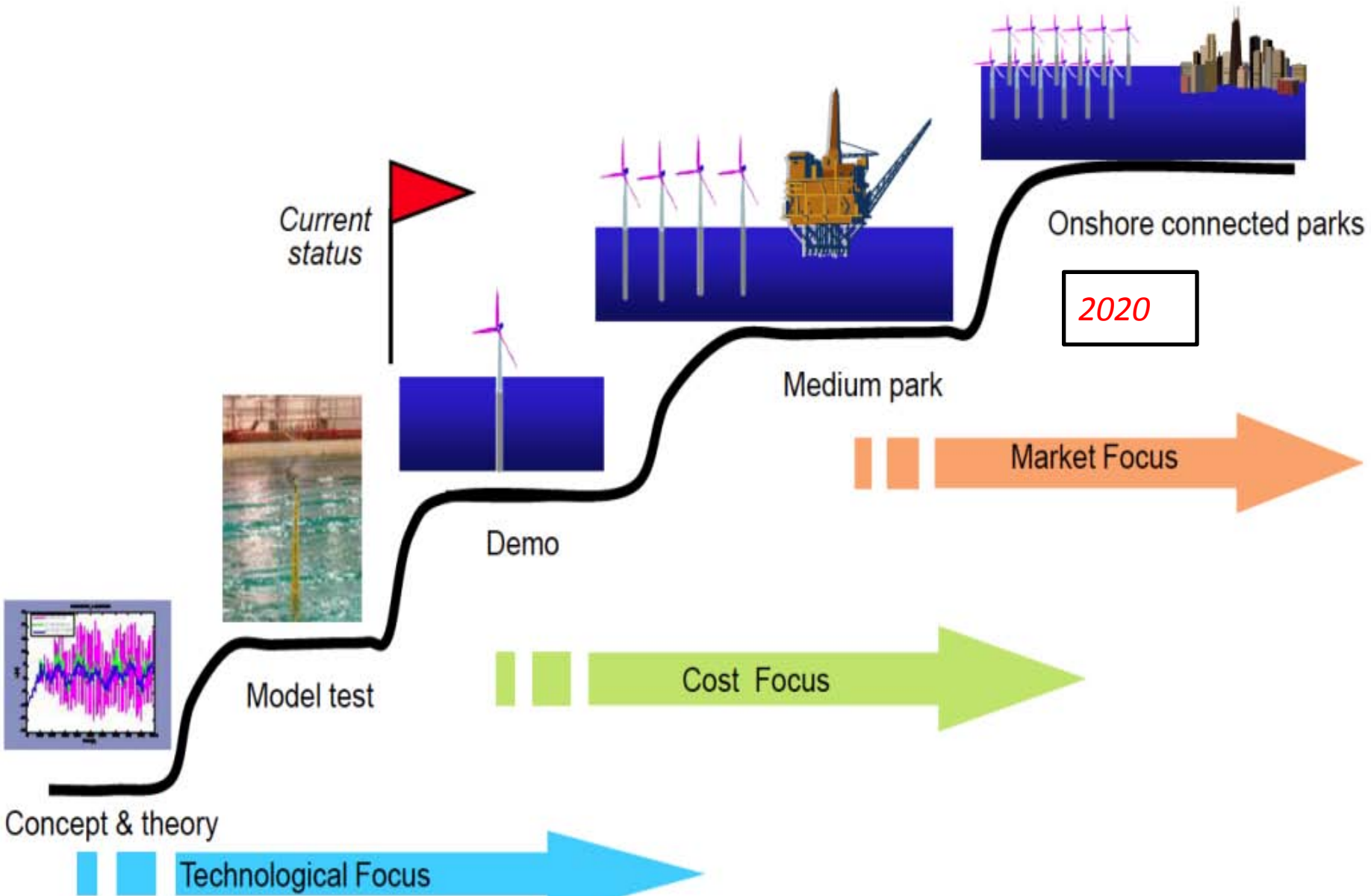
GERRI

Green Energy Revolution - Reunion Island

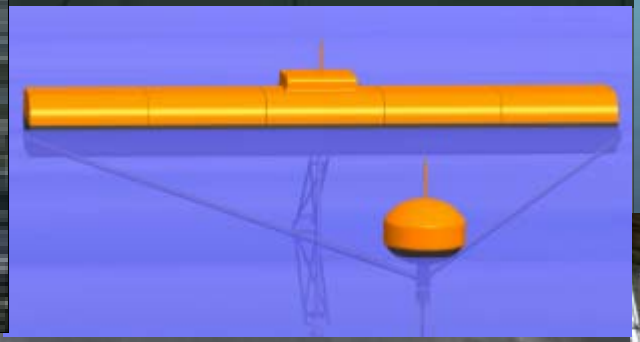
Reunión Island, Energy shelf-sufficient from 2030



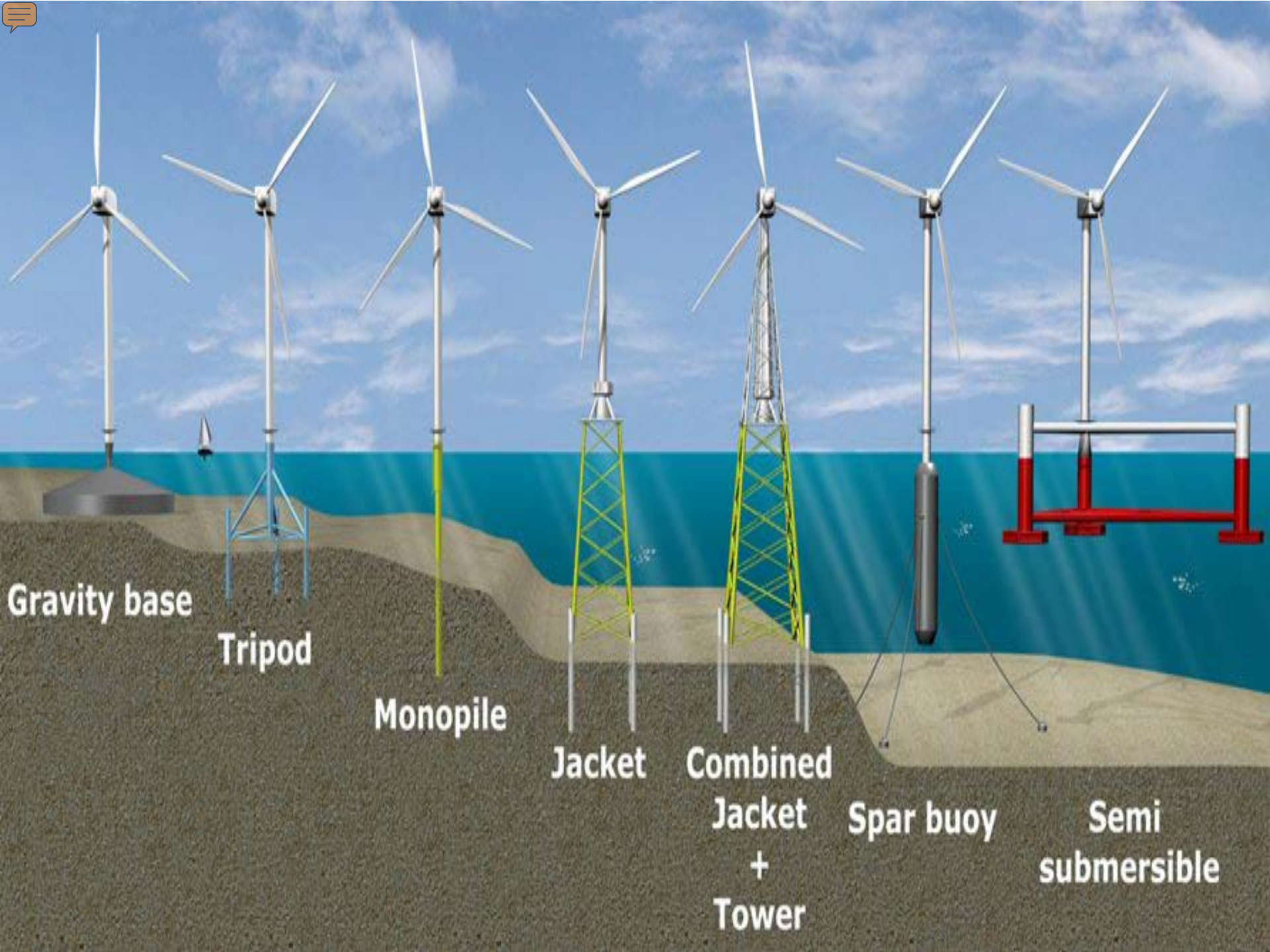
Wave energy converters and offshore floating platforms




OPT

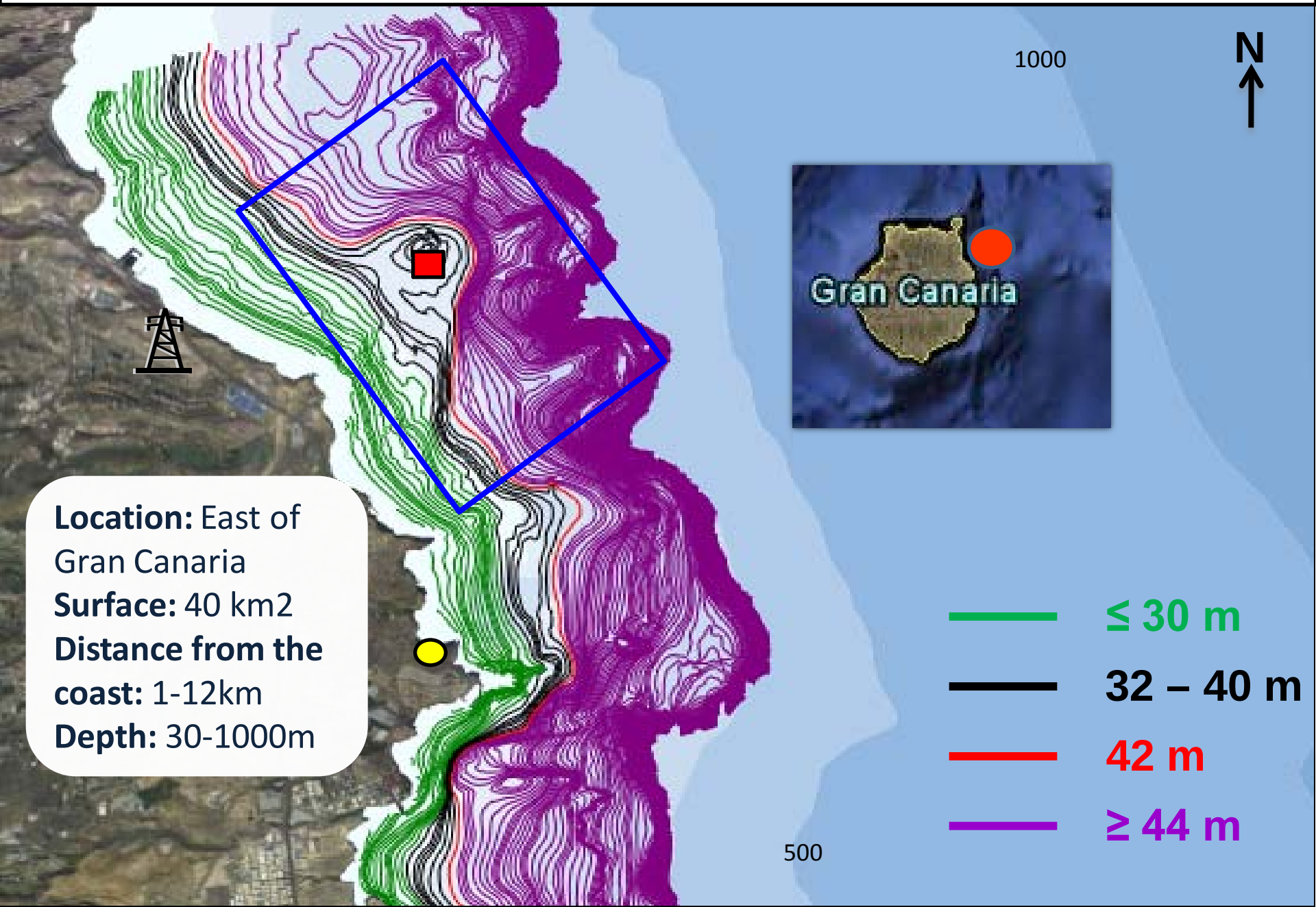



AWS


Gravity base
Tripod
Monopile
Jacket
Combined Jacket + Tower
Spar buoy
Semi submersible


Turbine Lighting
Turbine Nacelle
Turbine Blades
Gangways
Mooring System and Anchors
Heave Plates and Stiffeners

Test site for ocean energy converters

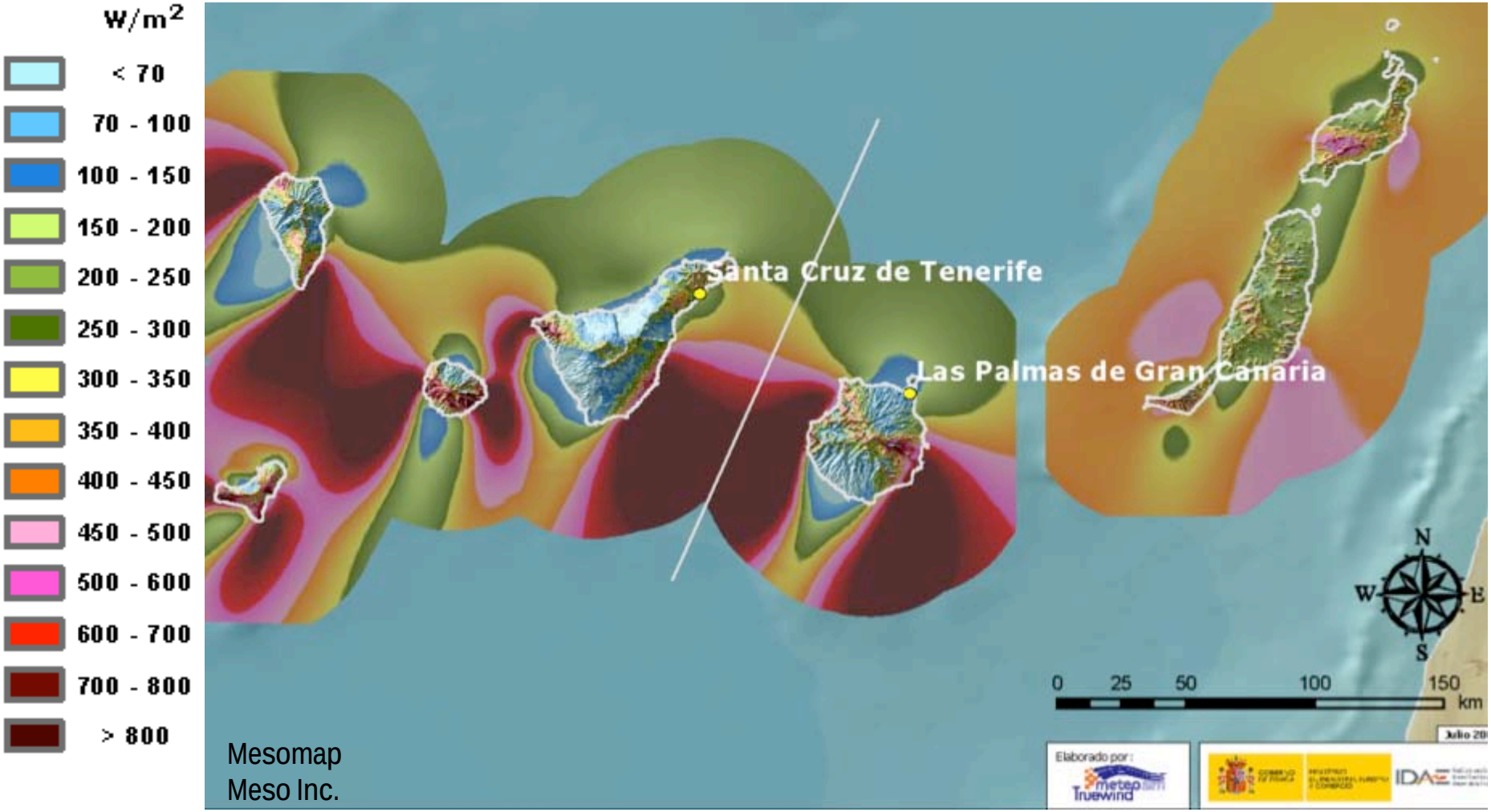


Test site for ocean energy converters

- *Ocean energy converters and associated components*
  - Offshore wind and wave energy converters
  - Structural components
  - Mooring systems
  - Clean energy vectors
- *Integral Project Management*
  - Rise R&D funding
  - Administrative permits, certifications
  - Environmental protection guarantee
  - Link with other providers of services
  - Transportation, customs
- *Competitive advantages:*
  - Appropriate waves and wind
  - Port infrastructure and logistics
  - Operation during most of the year
  - Connectivity to the grid
  - Wide range of bathymetries
  - R&D infrastructures and services
  - Costs and business opportunities
  - Environmental data (observatory)
  - Local market for electricity
  - Weather conditions

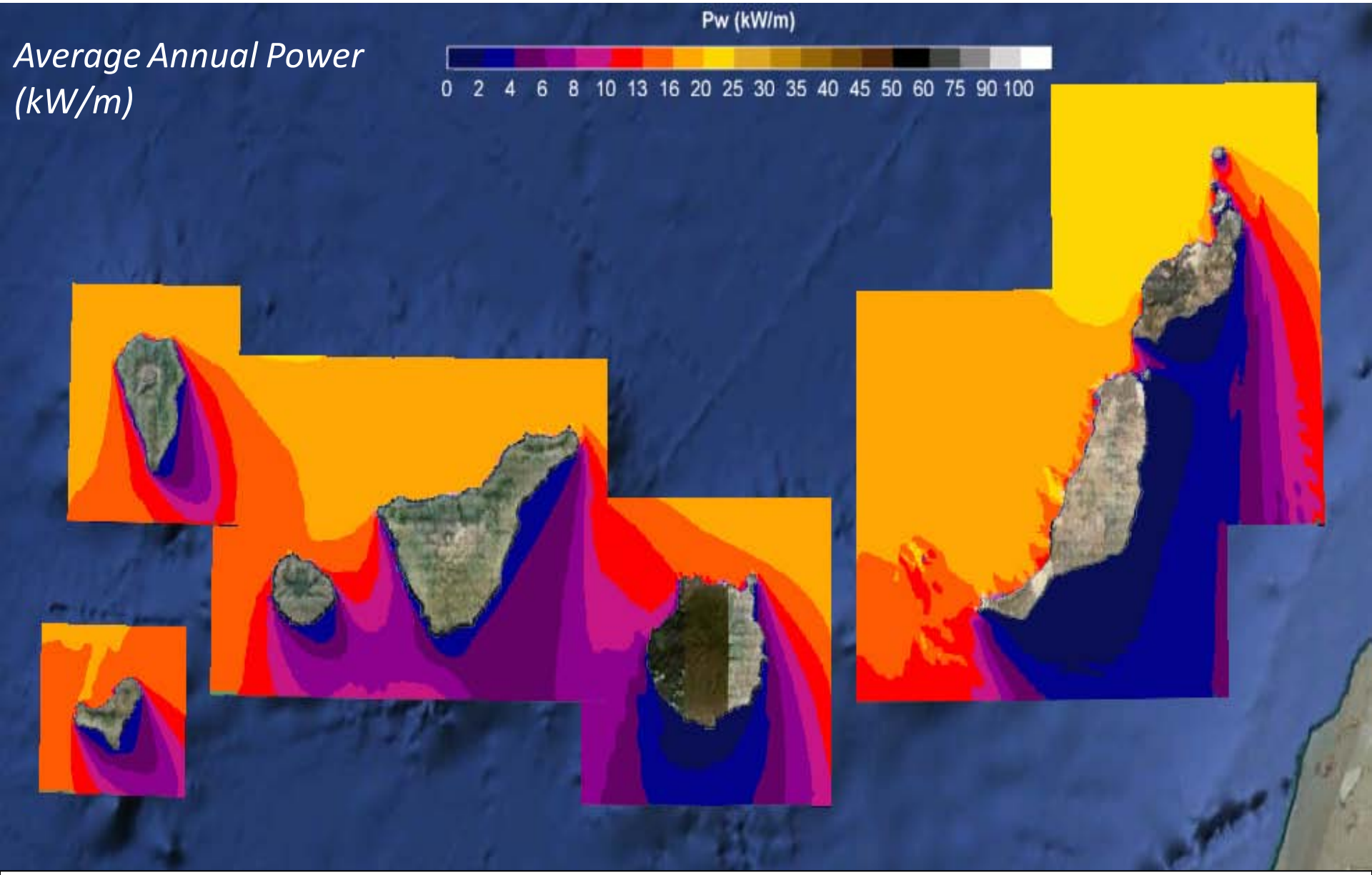
Canarias: Wind Energy

Annual average wind power density – height: 80 m



Canarias: Wind Energy

Canarias: Wave Energy



Average Annual Power (kW/m)

Source: Instituto para la Diversificación y Ahorro de la Energía (IDEA) Universidad de Cantabria http://www.ihcantabria.com/enola/

Canarias: Wave Energy

WELCOME Project

Prototype
- Scale 1:5
- Maximum power: 70 kW
-Full scale: 1,6 MW / buoy

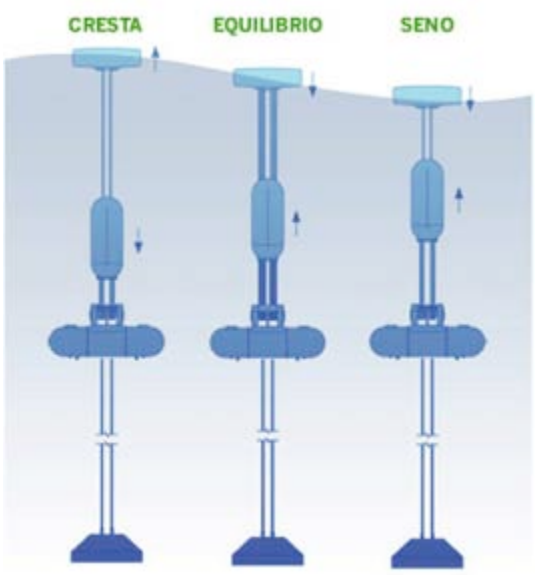
CEIB | ANORTEC | PIPO SYSTEMS | PLOCAN

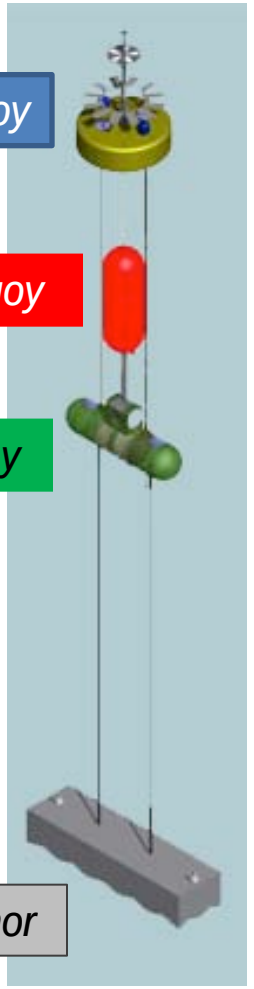
APC-PISYS

MINISTERIO DE CIENCIA E INNOVACIÓN

3 principles of working
- free surface movement (*surface buoy*)
- underwater pressure (*variable volumen buoy*)
- overtopping (not implemented yet)

http://www.piposystems.com/





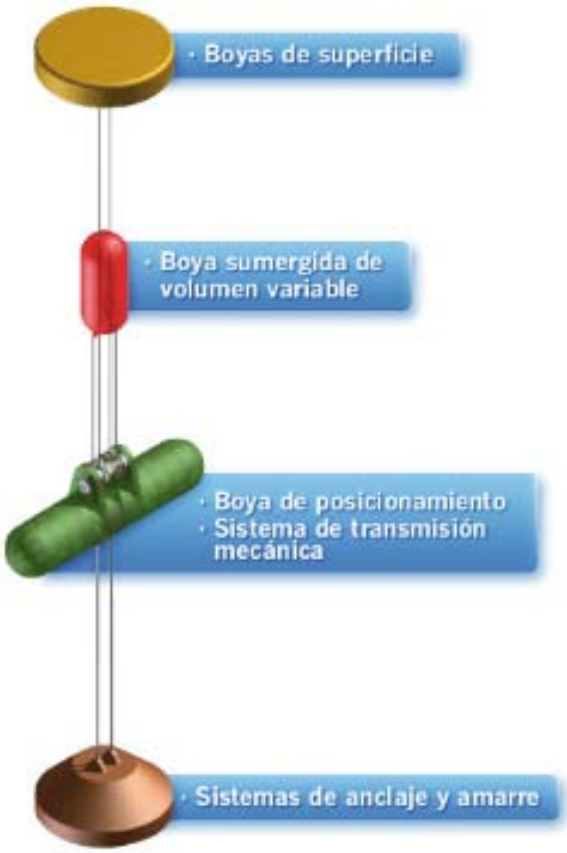
WELCOME Project


systems.com

INNPACTO Wave Energy coverter

2 technological applications APC-PISYS

- ✓ Autonomous device
  - ✓ Monitoring and surveillance
  - ✓ Prototype (5 KW)
- ✓ Energy Buoy (200 KW)



Líder

PIPO Systems

Otros participantes

TECHNOFLEX
is part of the International Group

FICOSA

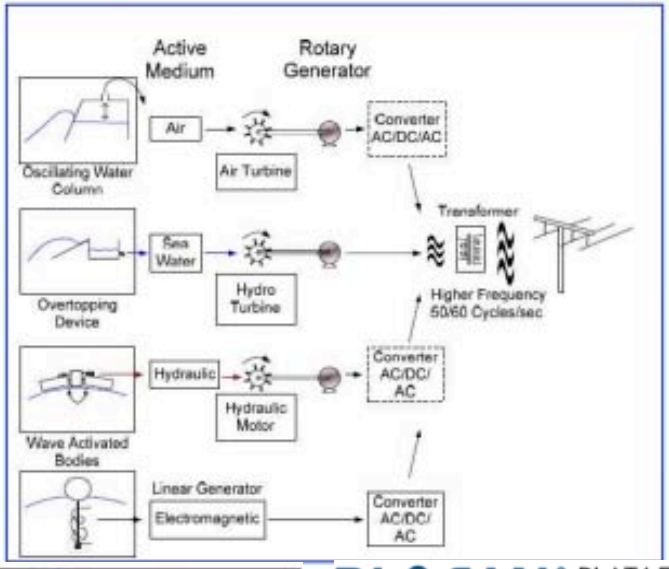
Consorci Escola Industrial de Barcelona

UPC

EI

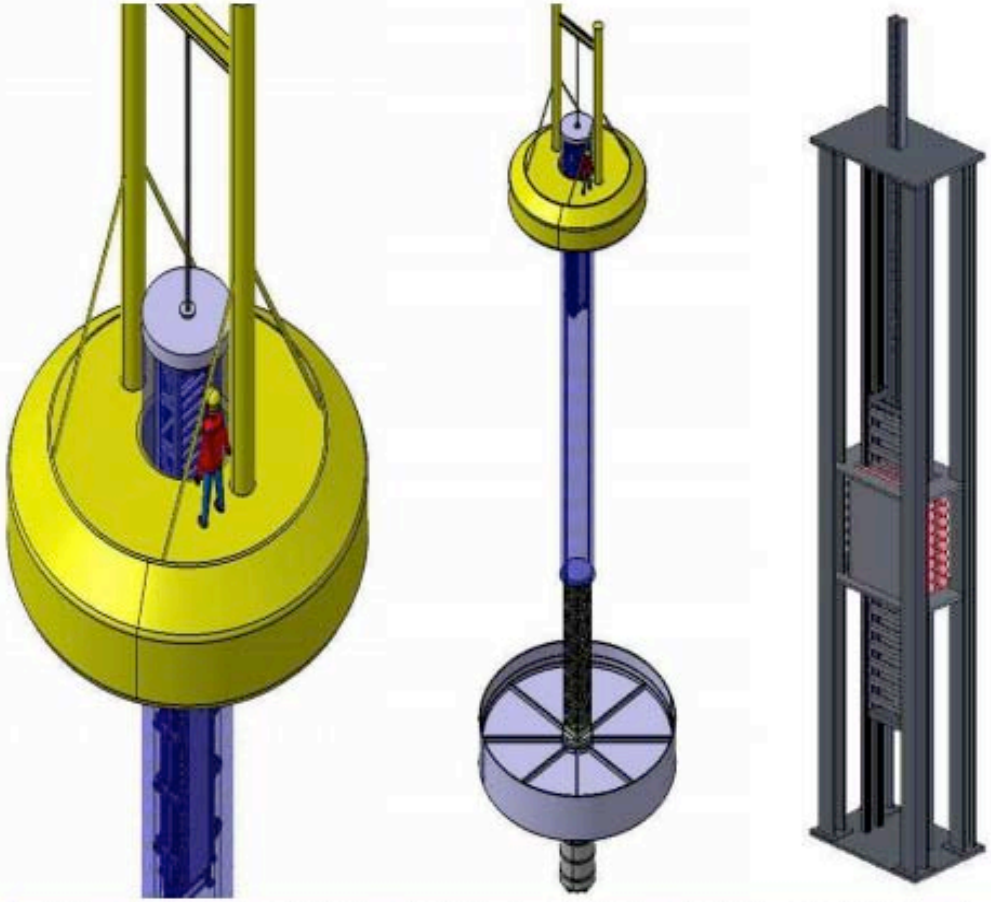
UNDIGEN PROJECT : Wave Energy Converter

Linear Switched Reluctance Generator



Generador Lineal de Reluctancia Conmutada

wedge



REALISMO- SIMPLICICIDAD- ESCALABILIDAD- EXPERIENCIA

wedge

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Ciemat Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas

FCC

Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources.

Contract 288192

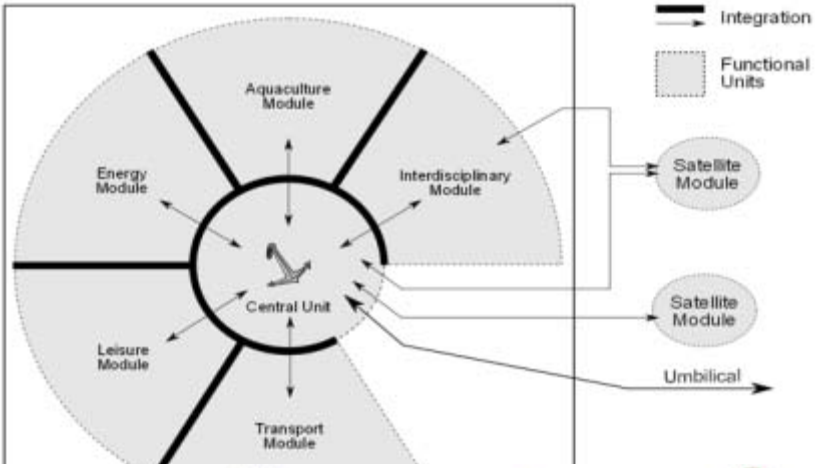
SEVENTH FRAMEWORK PROGRAMME

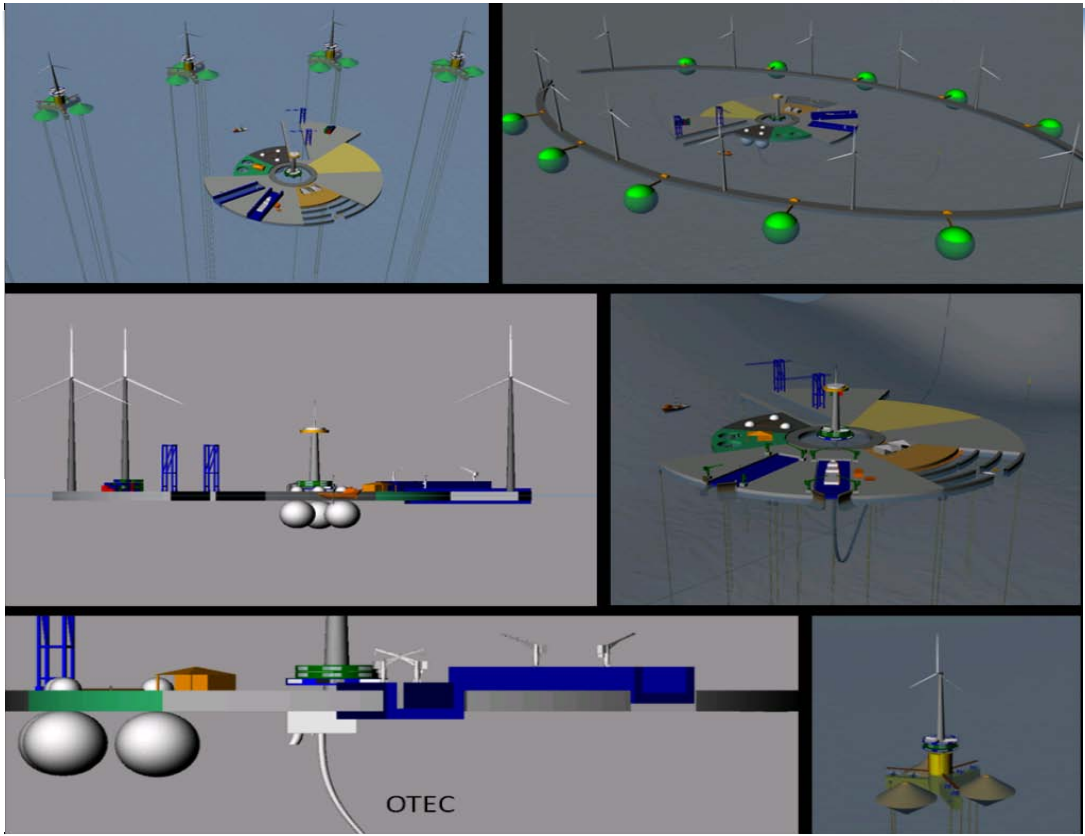
Proyectos concretos

Modular Multi-use Deep Water Offshore Platform Harnessing and Servicing Mediterranean, Subtropical and Tropical Marine and Maritime Resources.

7M€ Contract

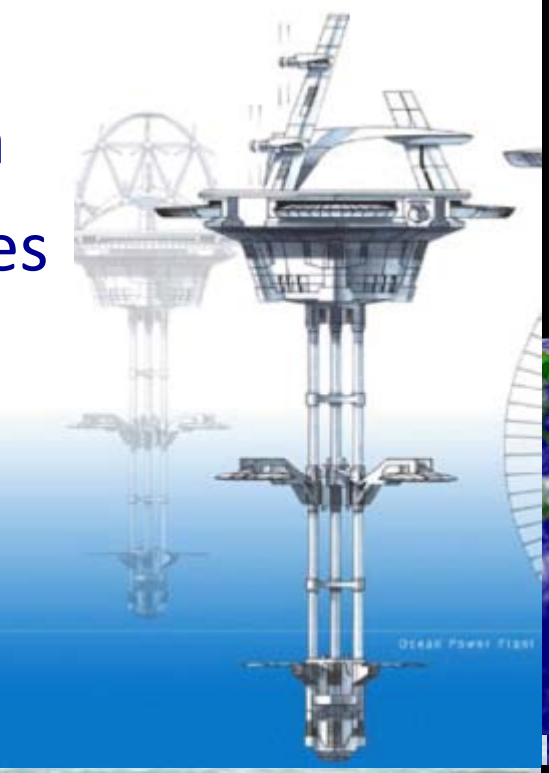
SEVENTH FRAMEWORK PROGRAMME

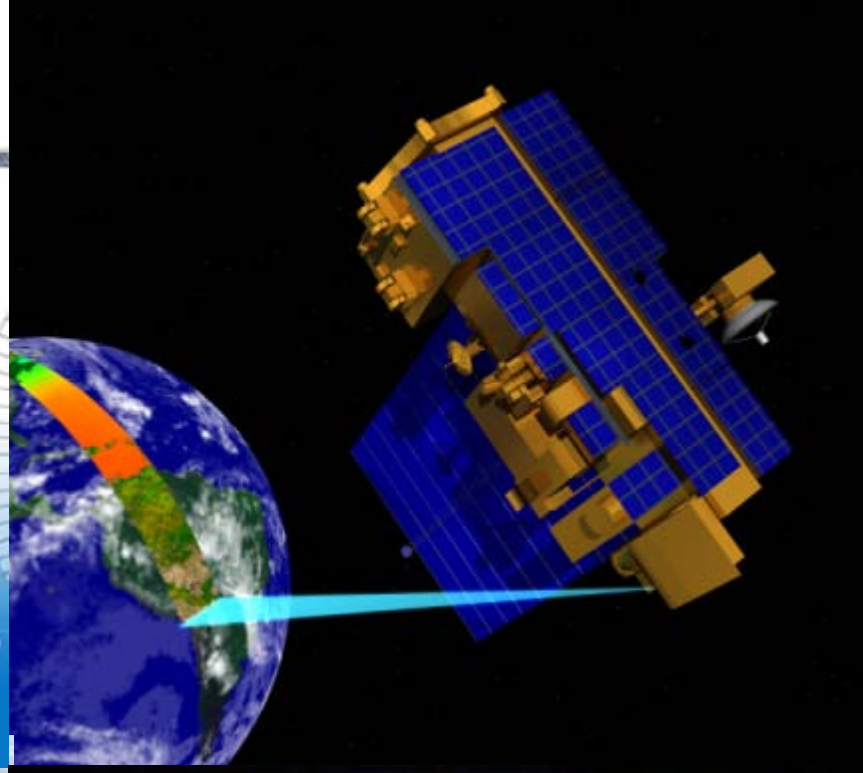




Multi-use oceanic Platform

Hybrids, synergies





Why not?

Business model

Projects

TROPOS

AQUA EXCEL

SEVENTH FRAMEWORK PROGRAMME

ORECCA

European leadership

Aquainnova

Sustainable Surface Transport

Star-Net Transport

PLATFORM MARINA

hyperwind

HiPRWind

High Power,

EquiMar

SUPERGEN

DeepWind

Big projects, bigger profits

Building the future

MERMAID

H2ocean

HORIZON 2020

THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

An Action Plan for Europe2020

Strategic Advice for the Post-Crisis World

The Atlantic Forum

Current energy risks & impacts

Our existing energy systems have lead to:

- Sea temperature rise
- Seawater acidification
- Polar ice melt
- Changing species distributions
- Increase in species extinctions
- Oil spills
- Oily water and chemicals discharges
- Radionuclide contamination
- Thermal pollution
- Water filtration
- Water abstraction
- Underwater noise
- Light pollution
- Flare mortality for birds
- Obstruction to shipping and fishing
- Seabed disturbance
- Seabed subsidence

The starting point is not without existing issues!!

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Benefits

- ✓ New Business opportunities
- ✓ Cost reductions
- ✓ Efficiency
- ✓ Local Industry
- ✓ Educational opportunities
- ✓ Employment
- ✓ Synergies
- ✓ Environmental benefits
- ✓ European Strategy for Marine and Maritime Research
- ✓ Security: Energy, food, etc.
- ✓ Growth of aquaculture industry
- ✓ New green technologies
- ✓ Low carbon economy
- ✓ Strengthen role of European maritime sector
- ✓ Support the Europe 2020 strategy
- ✓ Tourism
- ✓ Eco-friendly

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MINISTERIO DE CIENCIA E INNOVACIÓN

Gobierno de Canarias

FEDER

Thank you !

Plocan Team at

www.plocan.eu joaquin@brito.com