



BlueNewables

Innovating in Blue

PV-bos: OFFSHORE FLOATING SOLAR SOLUTION FOR GLOBAL ENERGY
ACCESS BY BLUENEWABLES

PV-bos (PhotoVoltaic – Bluenewables Offshore Solutions)


Bluenewables

Company in brief



21 - 24

Offshore Engineers



> 150 yr.

Cumulative Experience in Offshore Engineering



5

Technologies/patents under development

bos
BlueNewables
Offshore
Solutions



CT-bos



WIND-bos



S-bos



G-bos



PV-bos



- **BlueNewables** is an engineering consultancy at the cutting edge of the innovation within the blue economy
- We support the marine renewables energy sector with technical know-how, advice and holistic approach
- **Dual Business:** technology developer and services provider
- **Founded at Tenerife (Spain) in 2019**

Facts & Main Figures 2019 - 2023

Business Areas



Market potential, applications and competitors

*Understanding the Offshore
Solar Market*



Market Potential

OFFSHORE GLOBAL POTENTIAL

Floating solar potential: +650,000 TWh per year

Assuming 1500 full
equivalent
hours/year

≈ 430 TW capacity

Assuming sea
occupation of 0.1%

≈ 430 000 MW
≈ 430 000 M€
≈ 430 000 PV-bos units

Mediterranean and
Black Seas

Red and Arabian
Sea

Equatorial Africa

The Seas of
Southeast Asia

*Grey Lines. Tropical storm tracks

Market Potential

https://www.pv-magazine.com/2024/11/15/chn-energy-starts-connecting-1-gw-of-offshore-solar-in-china/?utm_source=chatgpt.com

CHN Energy starts connecting 1 GW of offshore solar in China

CHN Energy has connected the first phase of its 1 GW offshore solar project in China to the grid, marking progress on what it calls the world's largest open-sea solar array, capable of powering 2.67 million urban residents upon completion.

NOVEMBER 15, 2024 PATRICK JOWETT



<https://www.linkedin.com/pulse/offshore-solar-farms-market-may-see-big-move-major-giants-singh-cbtjf/>

Offshore Solar Farms Market Detailed Industry Report Analysis 2024-2030: Equinor, TotalEnergies, First Solar



Akash Kamlesh Singh

Web Analyst - Team Lead @ HTF Market Intelligence Pvt Ltd.,
SEO | Google Analytics | Energy & Resources | Speciality...



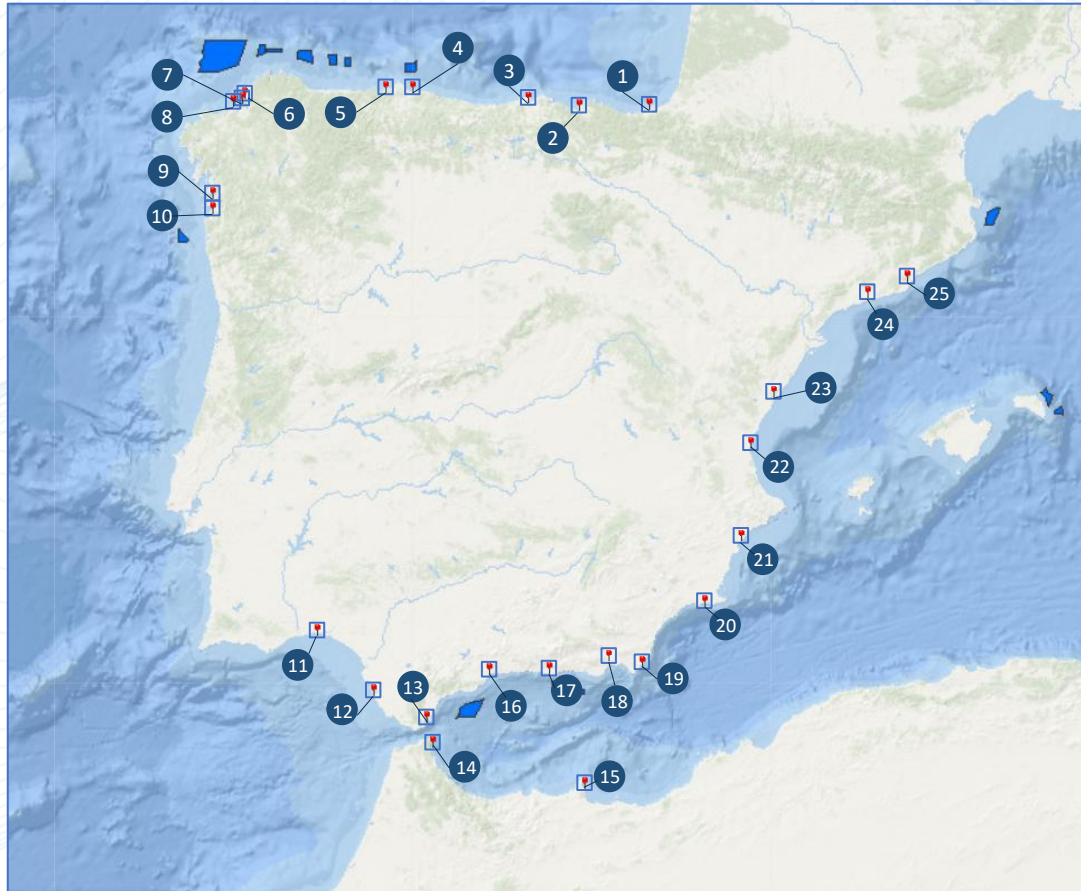
February 1, 2024



The market size is expected to increase by **245,000M€** with a compound annual growth rate (CAGR) of **17.6% by 2030**

Market 1: Spanish Harbour Market

Short Term market: Harbour Authorities and OPS



1. Pasajes Harbour
2. Bilbao Harbour
3. Santander Harbour
4. Gijón Harbour
5. Avilés Harbour
6. Navantia Ferrol Harbour
7. Ferrol outer Harbour
8. Langosteira Harbour
9. Marín Harbour
10. Vigo Harbour
11. Huelva Harbour
12. Cádiz Harbour
13. Bahía de Algeciras Harbour
14. Ceuta Harbour
15. Melilla Harbour
16. Málaga Harbour
17. Motril Harbour
18. Almería Harbour
19. Carboneras Harbour
20. Cartagena Harbour
21. Alicante Harbour
22. Valencia Harbour
23. Castellón de la Plana Harbour
24. Tarragona Harbour
25. Barcelona Harbour

Assumptions

- The energy consumption data published by the Spanish ports are considered
- The **market considered is conservative:**
 - The power required by the OPS (Onshore Power Supply) is not taken into account
 - Yacht marinas are not taken into account

Annual consumption	Total production equivalent hours	Minimum power to be installed to meet demand*
MWh/yr.	Hours	MW
100 000	78 000	82

Considering an industrial scale of 1 MW/PV-bos:
~ 80 PV-bos platform

Considering OPS (2-3 times):
~ 150 / 260 PV-bos platform

- Refers only to actual consumption of Harbour Authorities, which is approx. 10% of the overall electric consumption of a harbour
- OPS is 2-3 times the overall harbour consumption.

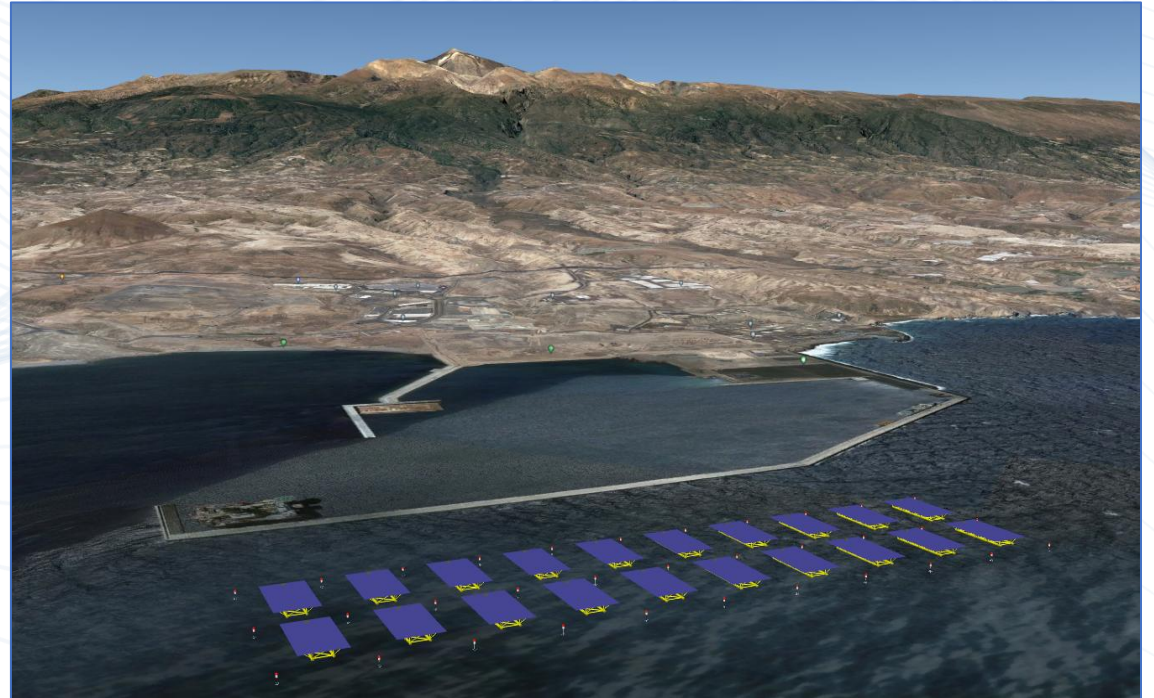
Market 1: Spanish Harbour Market

Short Term market: Harbour Authorities and OPS

10 MW – Valencia Harbour Proposal



15 MW – Granadilla Harbour Proposal

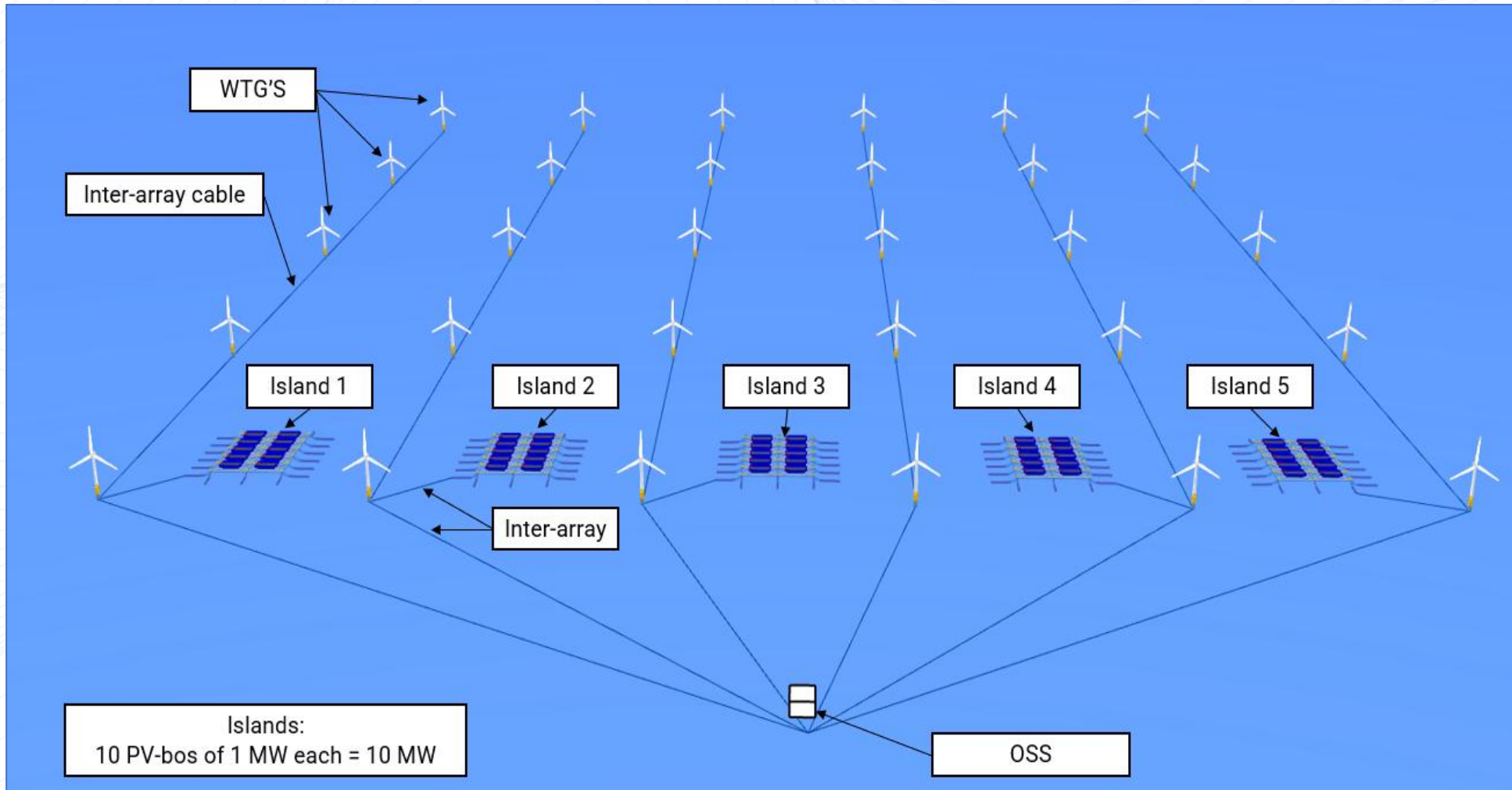


According to [RD 150/2023, of February 28](#), which approves the [Maritime Space Management Plans \(POEM\)](#) in Spain, the scope of these plans **excludes** zones I and II of ports of general interest of the State.

Therefore, any consideration regarding the installation of energy infrastructures of up to **20 MW** in **zone II** of the ports is not regulated by the **POEM** and must be assessed according to the specific regulations applicable to port areas.

Market 2: Offshore Wind Hybridation

Medium Term market

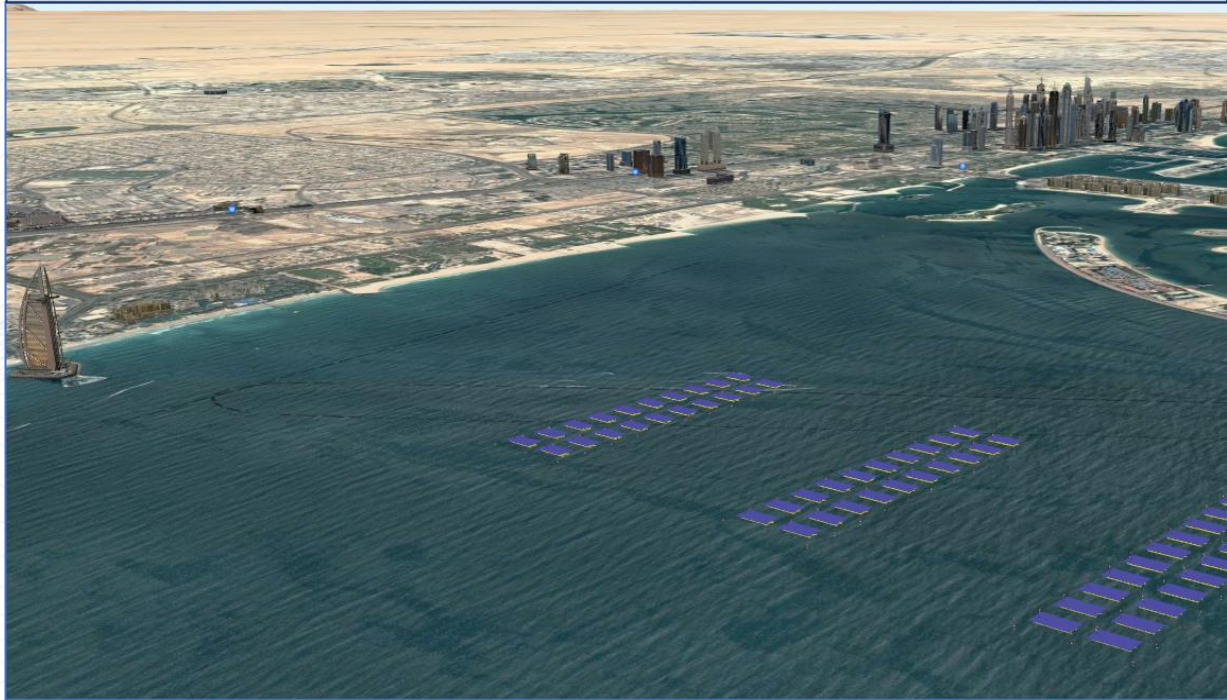


1. Greater utilization of marine space
2. More stable and complementary generation
3. Better economic performance and shared infrastructure

Market 3 and 4: Stand alone & H2 production

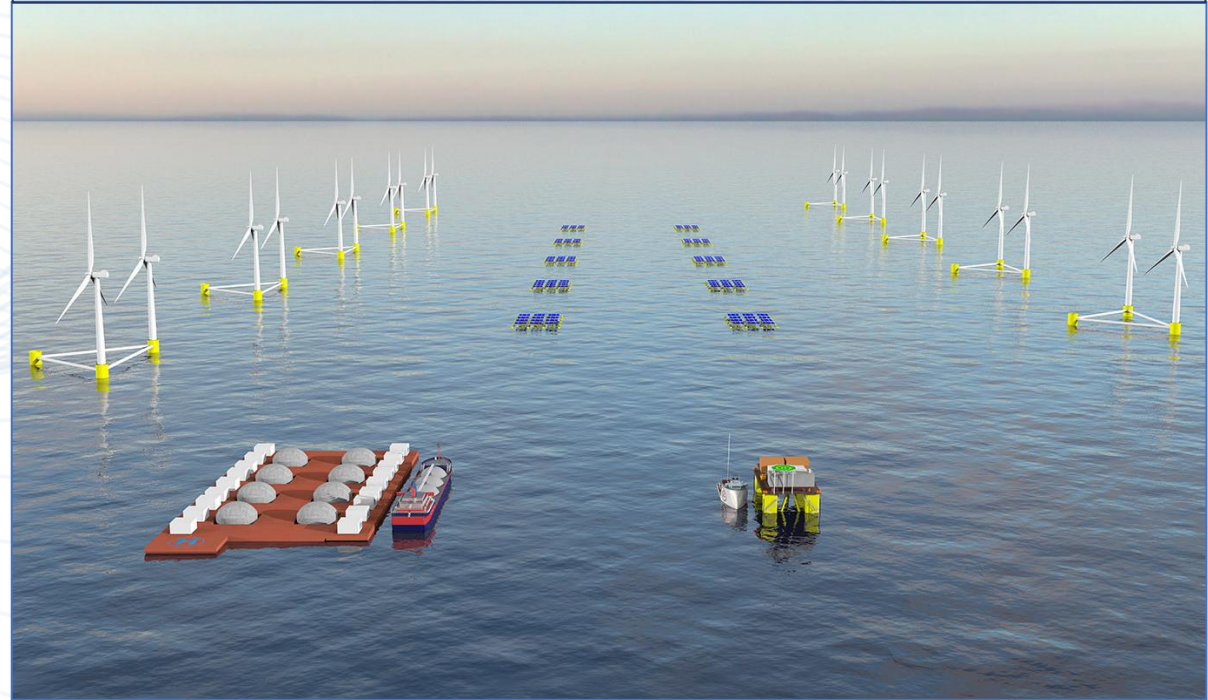
Large Term market

100 MW – Abu Dabi Proposal



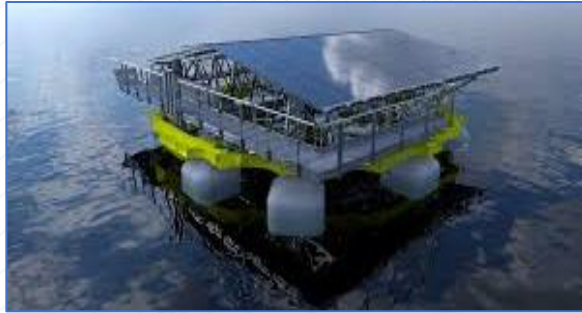
1. Scarcity of land for onshore wind / solar such as islands or high energy demand costal areas
2. Offshore Microgrids for decarbonization of Offshore Industries (Oil & Gas, aquaculture or desalinization plants)
3. Low offshore wind energy resource areas

100 – 200 MW – MISIONES CDTI PROJECT: OFFSHORE H2 PRODUCTION

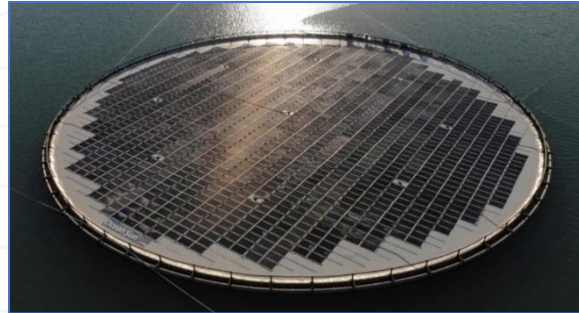


1. Large scale offshore green hydrogen production
2. Use of energy exceedance for hydrogen production

Offshore Solar Competitors



XolarSurf (Saipem & Moss Maritime)
Norway 2020
40 kWp per floater



OceanSun
Norway 2014
650 kWp per floater



CIMC Raffles
China 2024
50 kWp per floater



Swinsol
Austria 2012
15 kWp per floater



SolarinBlue
France 2020
50 kWp per floater



SeaVolt: Tractebel, DEME, and Jan De Nul
Belgium 2019
250 kWp per floater



Solar Duck
Netherlands 2020
65 kWp per floater

Other players:

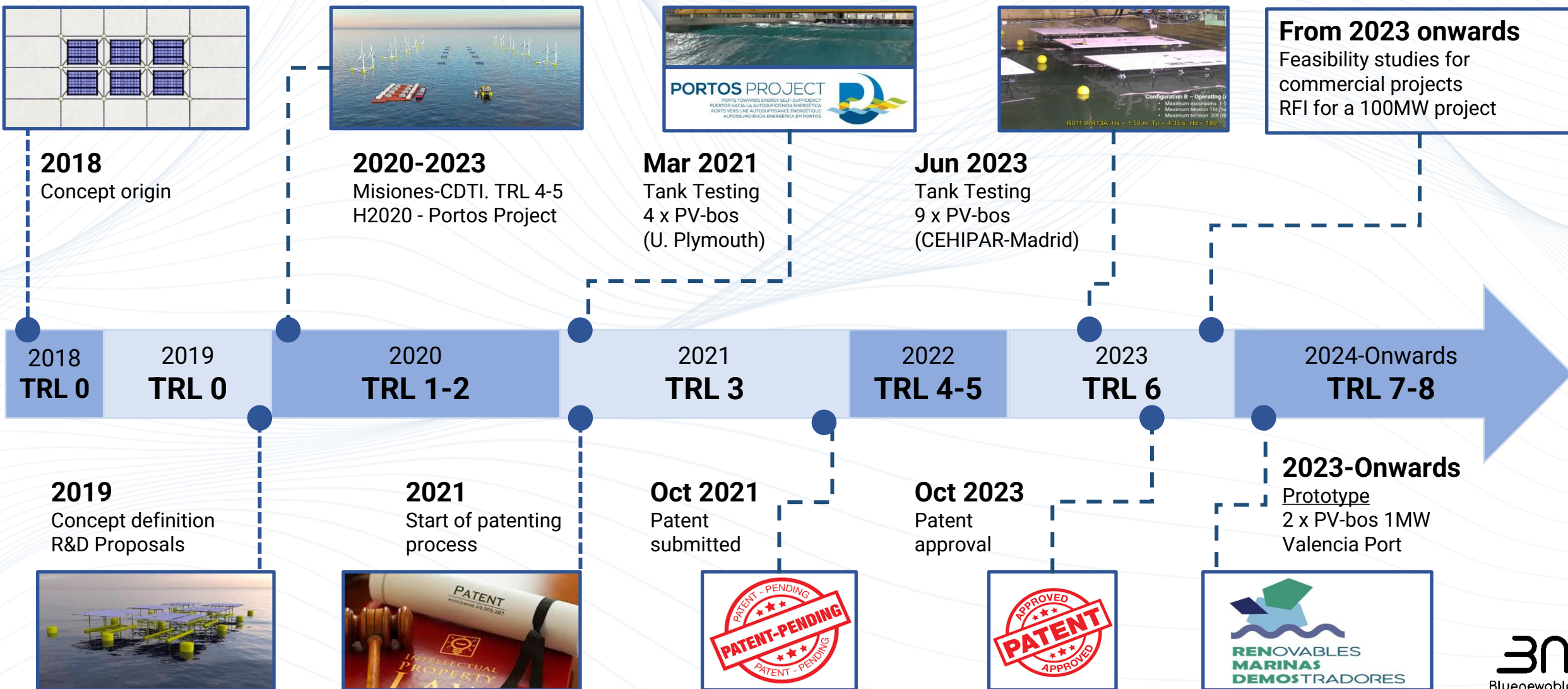
- HelioSea
- Oceans of Energy
- Agnes
- Suseap Group

PV-bos road map

*Understanding the
development of the
technology*



PV-bos: 2018 - 2024

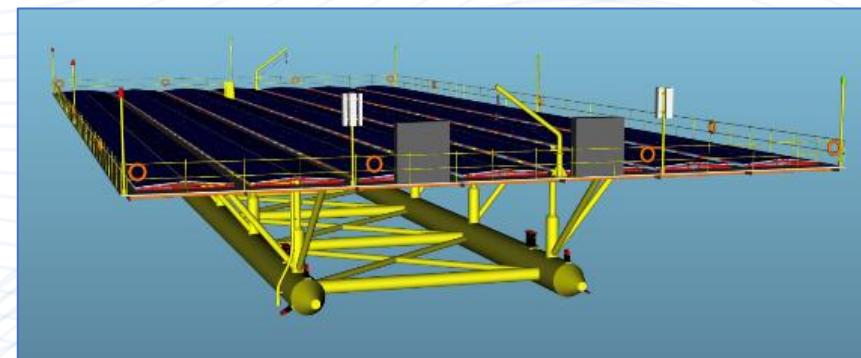


PV-bos: 2024 - 2030



2023-2028 (Flat Panel Design DEMO)

- Technology demonstration for global commercial deployment
- Industrialization plan and scalability



2025
TRL 6

2026
TRL 7

2027
TRL 7

2028
TRL 8

2029
TRL 9

2030
COMMERCIAL

2024-2027 (Modular Design)

- KSSP Project (Spain-Korea Consortium)

2025-2028 (Concrete Design)

- BN Internal R&D

2026-2030

New research lines:

- Digitalization
- Asset management Machine Learning and AI
- Design optimization and cost reduction

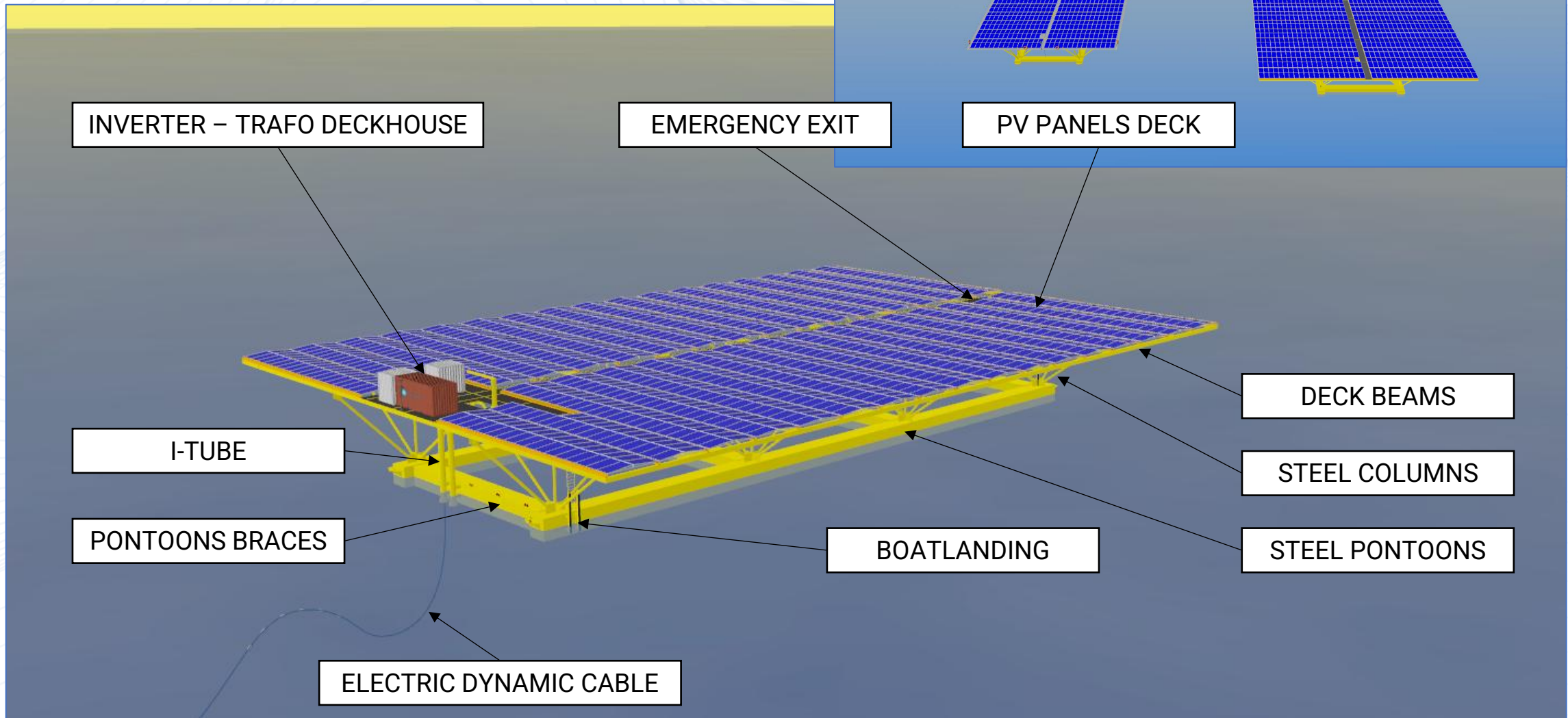
PV-bos technology description

Understanding the technology



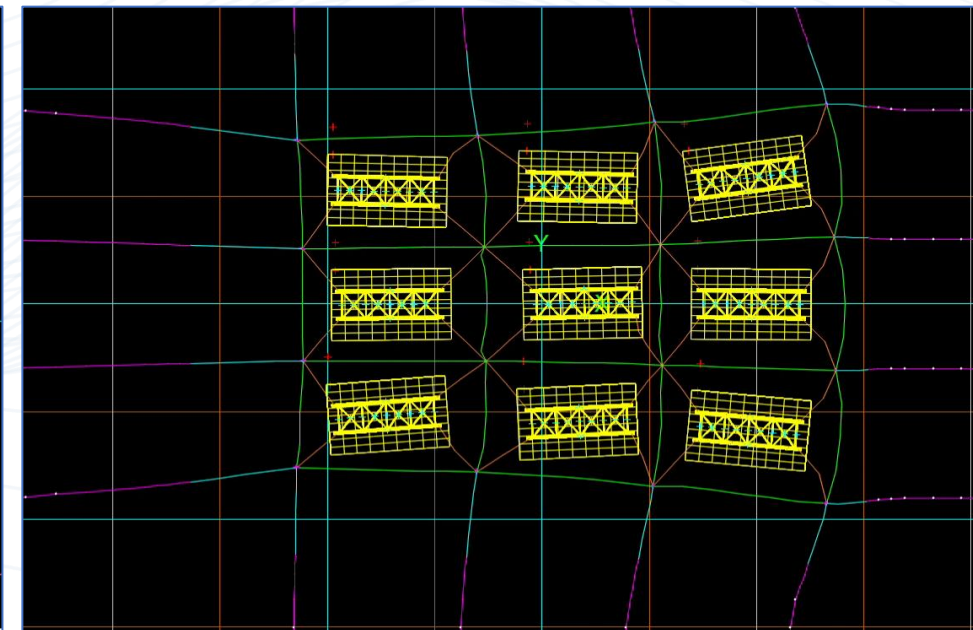
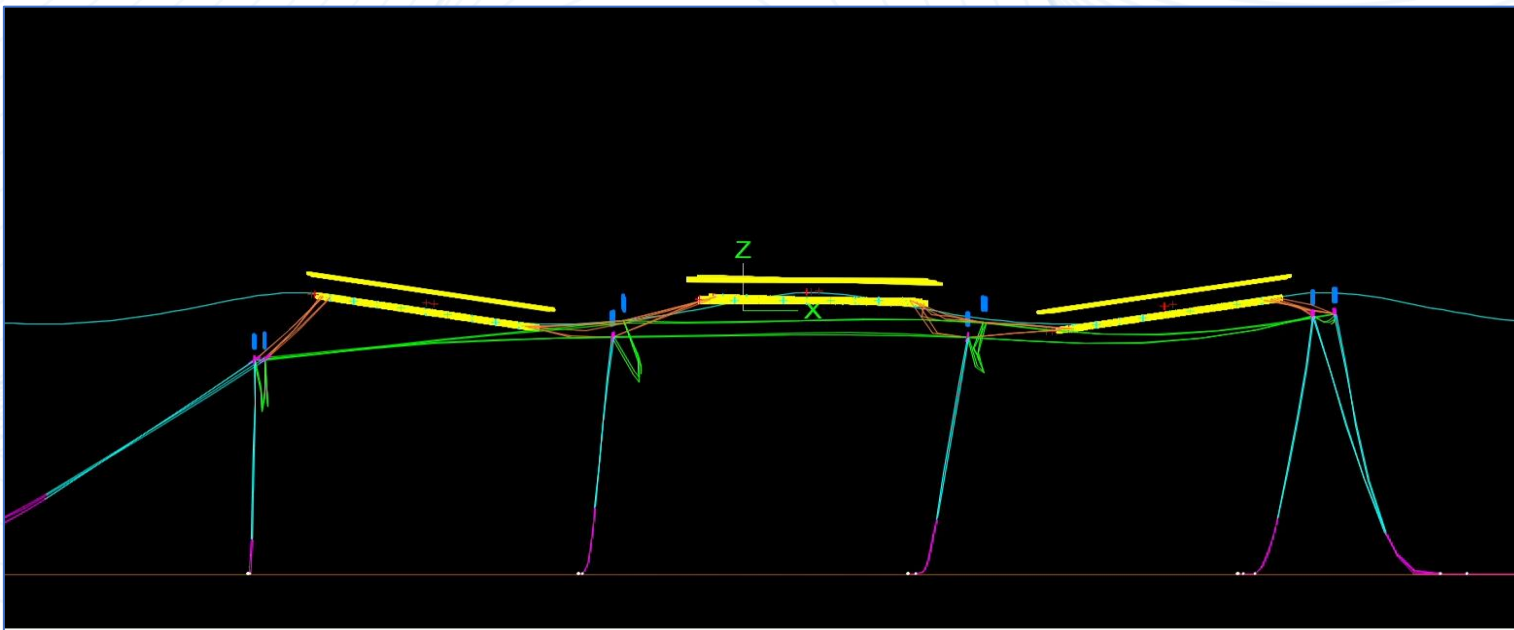
PV-bos: Overview

Designs: 0.5 MW – 1.0 MW
(More energy per platform than our competitors)



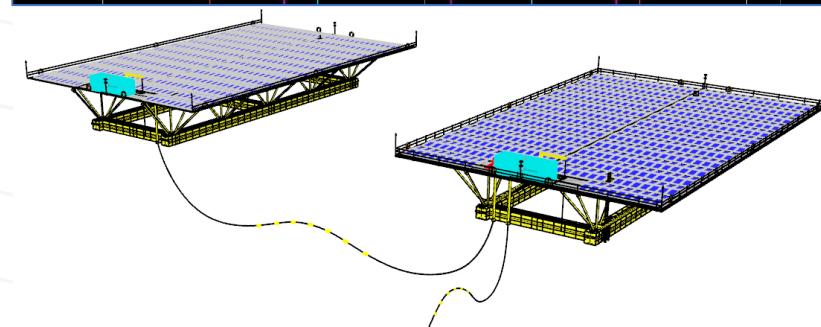
PV-bos: Mooring system and power cable

- Regular Wave $H=11\text{m}$ $T=10\text{s}$



Metocean conditions	Design values for PV-bos from 0.5 MW to 1.0 MW (min – max Range)	Unit
Design Wave Height ($H_s, 50\text{yr}$)	≤ 14.0	[m]
Associated Peak Period (T_p)	≤ 15.0	[s]
Max. Wind Speed ($v_{10,10}$)	≤ 45.0	[m/s]
Max. Current Speed	≤ 3.0	[m/s]
Water Depth	10.0 – 150.0 / 250.0	[m]

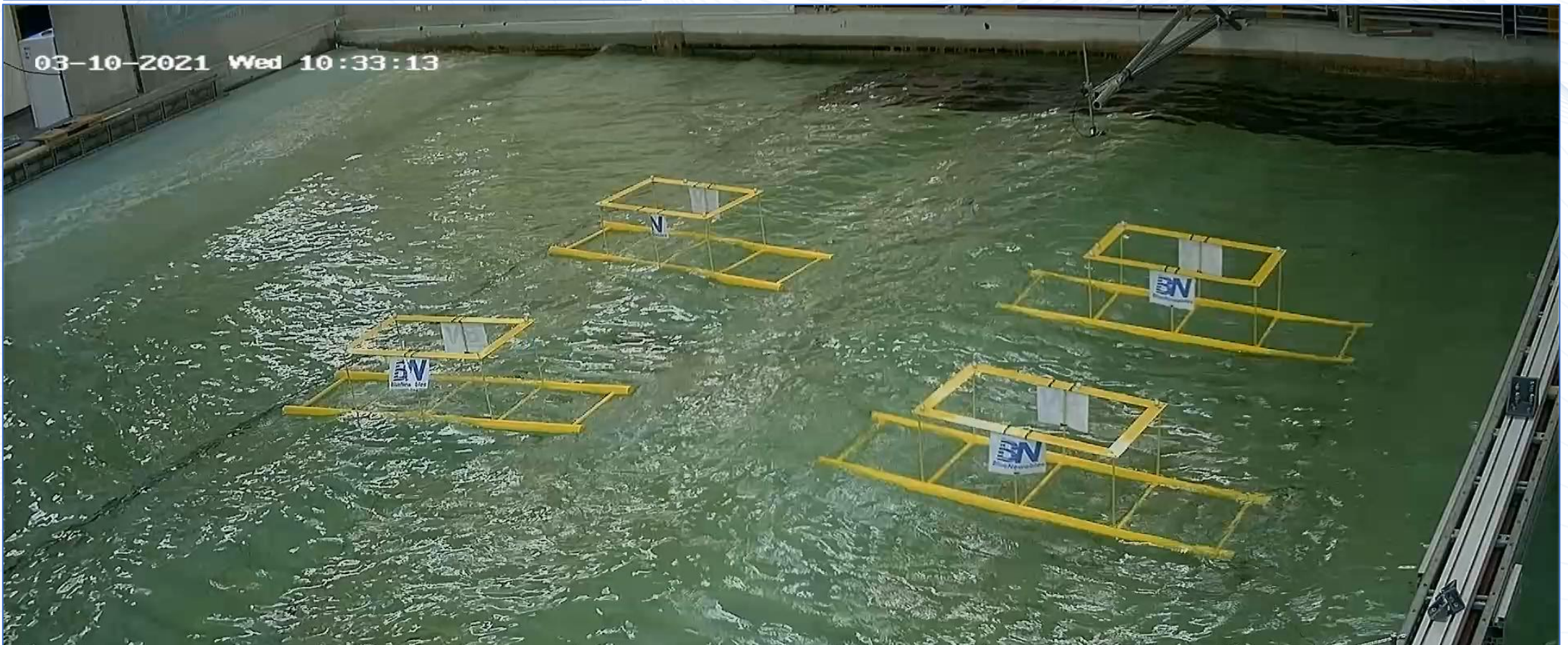
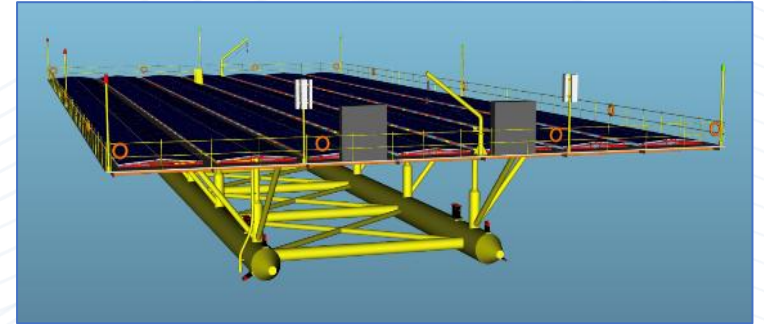
OFFSHORE & SITE-SPECIFIC DESIGN!



INTERARRAY AND EXPORT CABLE

PV-bos: Tank Testing I

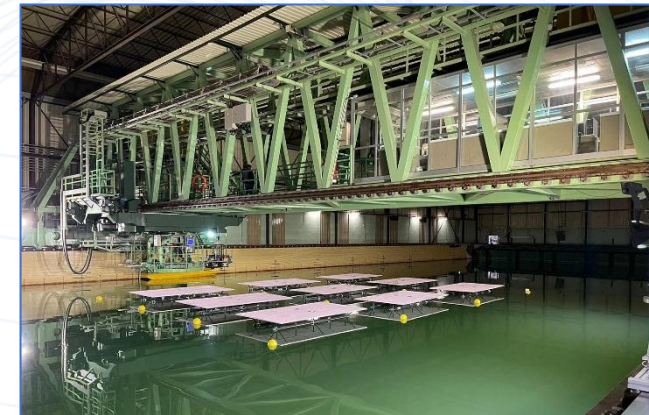
2 x 2 Mooring Array
(Plymouth – March 2021)
TRL3: Proof of concept



PV-bos: Tank Testing II



3 x 3 Mooring Array
CEHIPAR – June 2023
TRL6: testing in a relevant environment

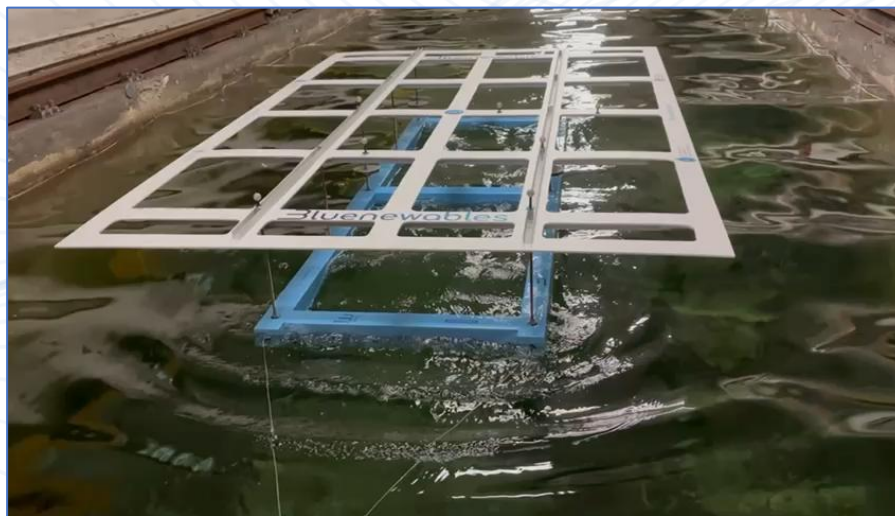


PV-bos: Tank Testing III



Hs 3m ; Tp 10s ; V 3kn

Towing Test
CEHINAV (UPM) – March 2025
TRL6: testing in a relevant environment



Hs 1.3m ; Tp 8s ; V 7kn



Hs 4m ; Tp 8s ; V 0kn

1 MW PV-bos DEMO

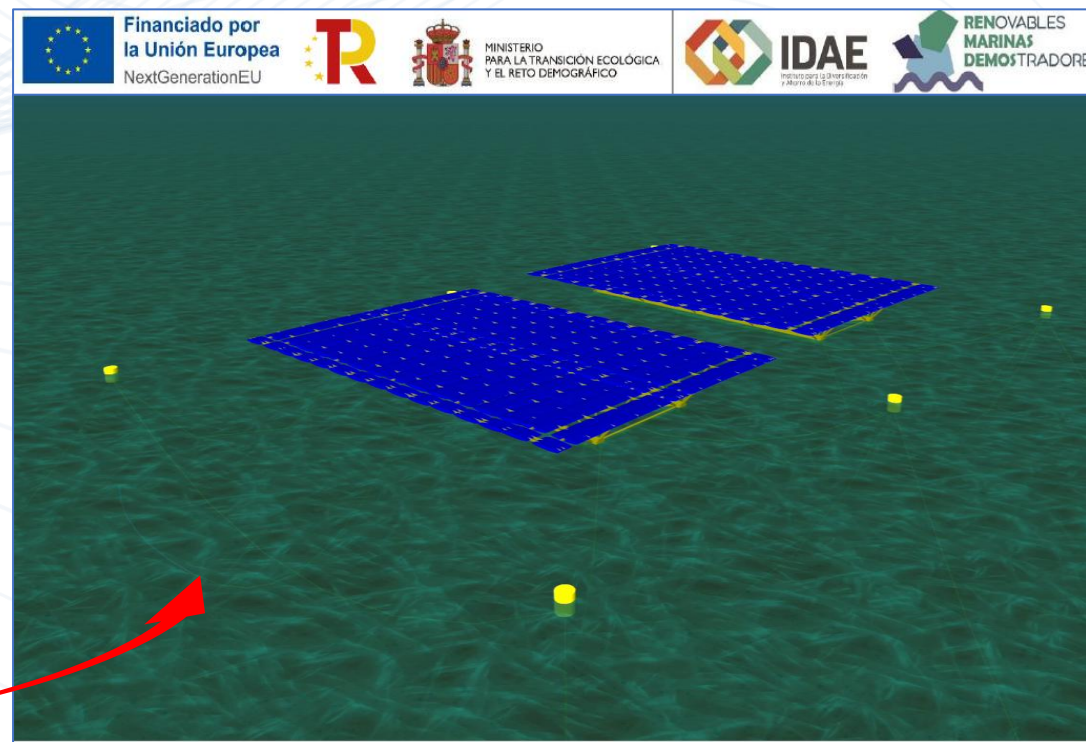
Understanding the project



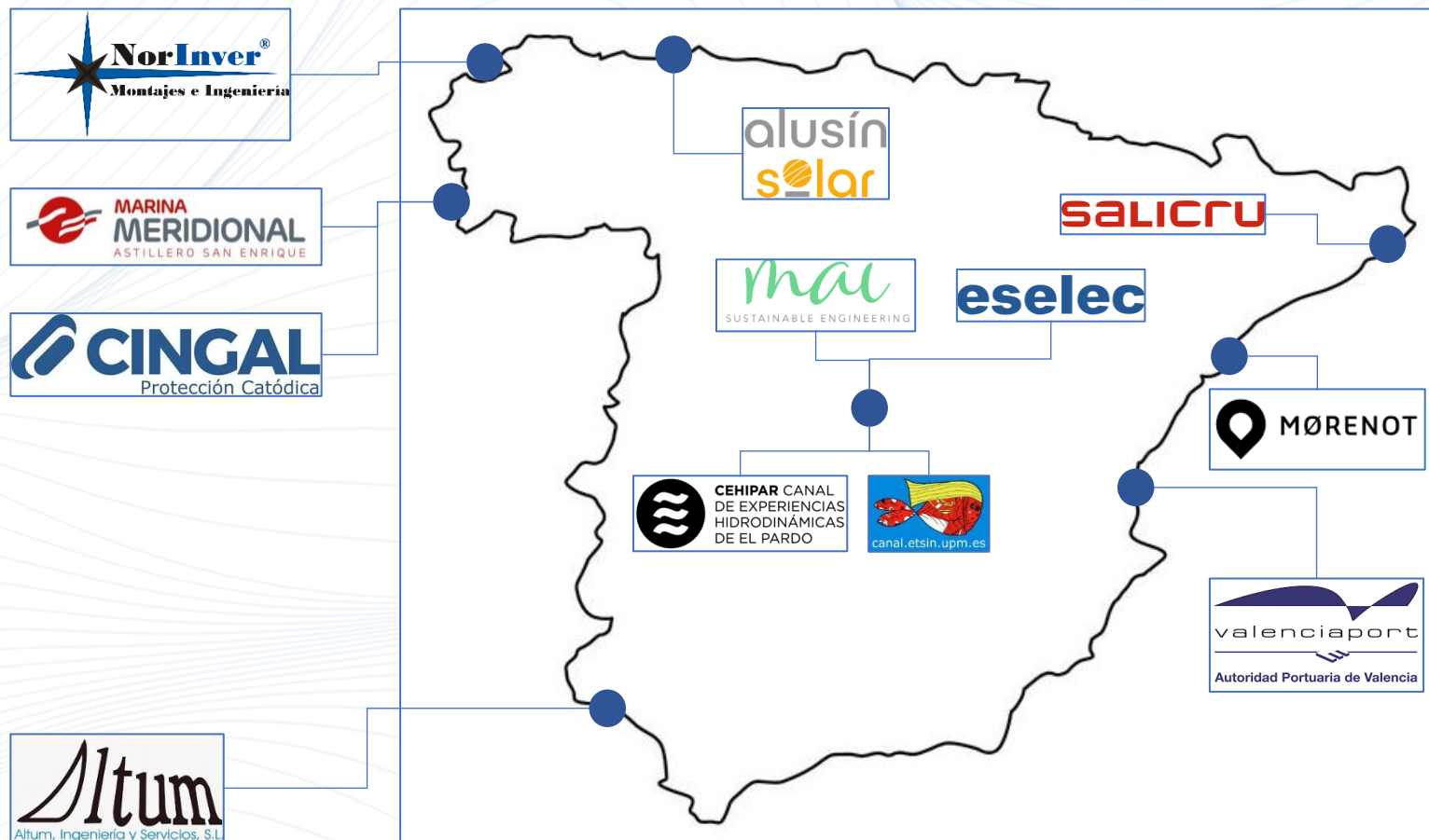
PV-bos Valencia Demo: TRL7 - TRL8

- Engineering , construction and installation of 2 Floating PV-bos units of 0.5MW each
 - Construction: **Vigo 2025-2026**
 - Deployment at sea : **3Q-2025 & 2Q-2026**
 - Operation : **2025-2027 → TRL8**

Metoccean conditions	Value for 0.5 MW (Valencia Demo)	Unit
Design Wave Height ($H_s, 50yr$)	4.6	[m]
Associated Peak Period (T_p)	≤ 11.0	[s]
Max. Wind Speed ($v_{10,10}$)	30.3	[m/s]
Max. Current Speed	0.4	[m/s]
Water Depth	12.0 – 14.0	[m]



PV-bos Valencia Demo: TRL7 - TRL8



Other Spanish suppliers under consideration and in ongoing discussions with an open tender

- Engineering, Construction and Installation with Spanish strategic partners
 - Promoting local industry and technical excellence
- More than 85% of the project is carried out with Spanish companies



Thank you!

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