



IEC and IECRE

UNECE - Group of Experts on Renewable Energy
Tenth Session

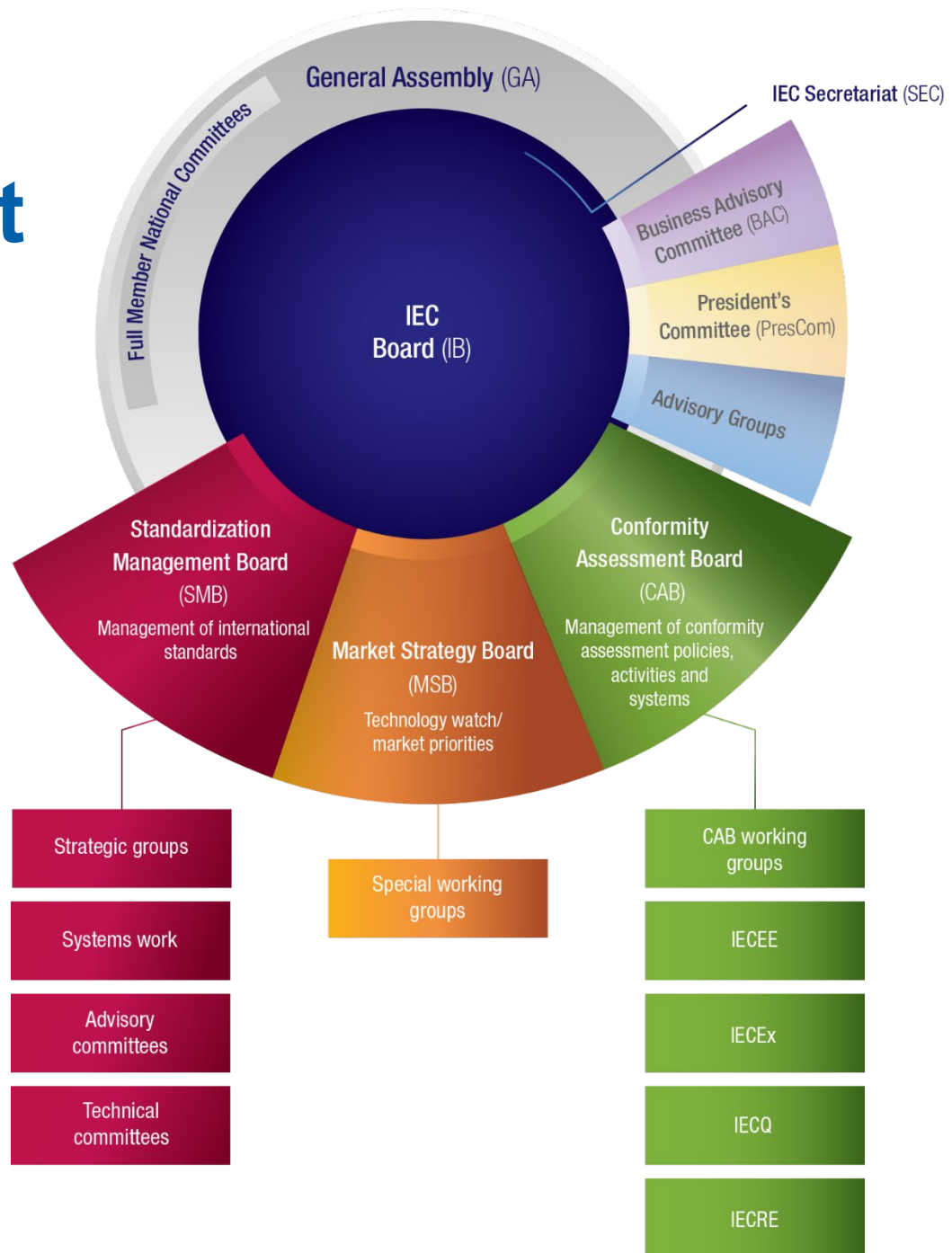
Tracking progress in the uptake of renewable energy

Wolfram Zeitz - Executive Secretary IECRE
Jonathan Colby – IEC TC114 Chair & IECRE
ME Sector Convenor
September 2023

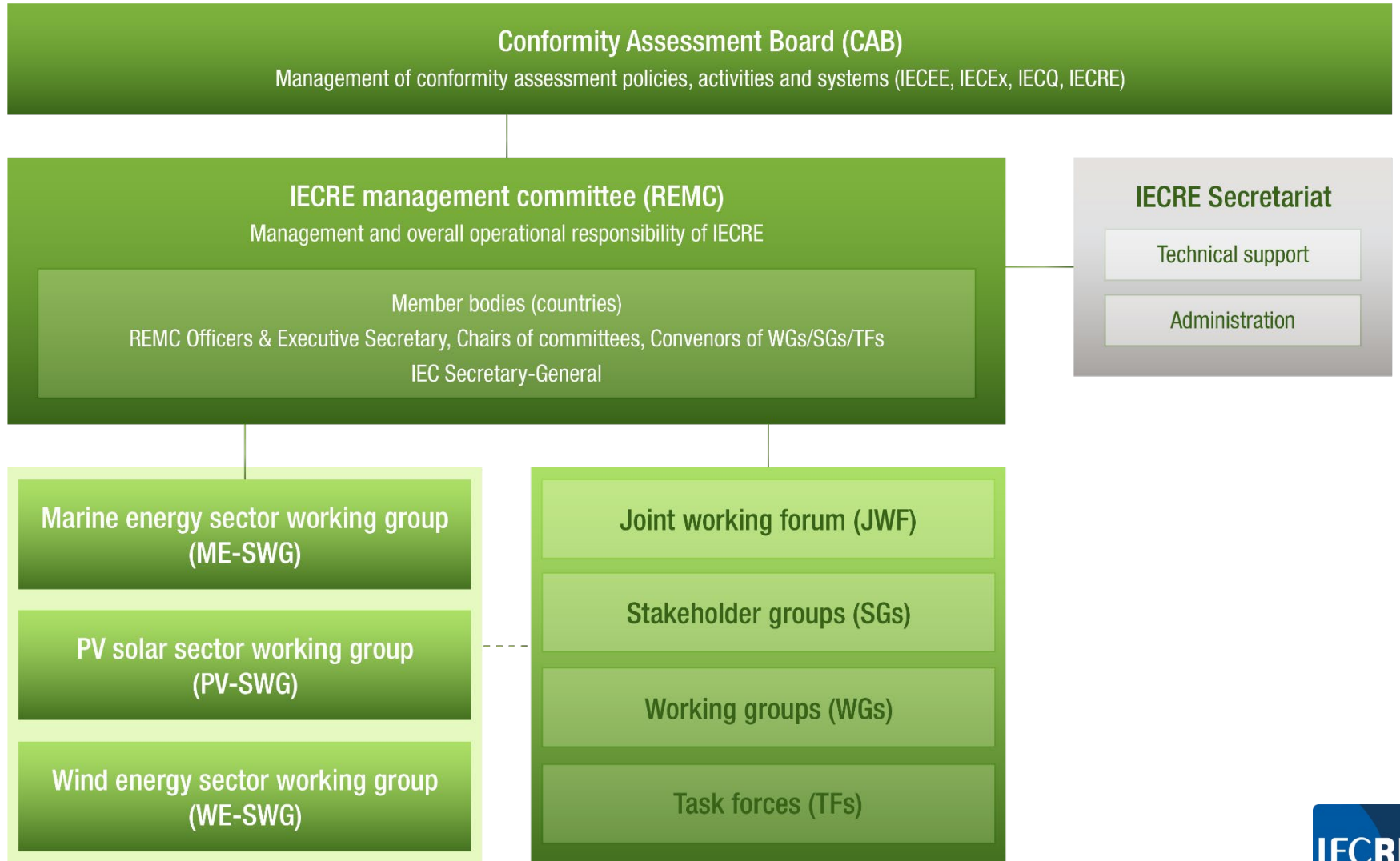


IEC System for Certification to
Standards Relating to Equipment for use
in Renewable Energy Applications

IEC management structure



IECRE structure



IECRE Deliverables

PV Solar sector certificates issued by end of 2022

Certificate Type	2016	2017	2018	2019	2020	2021	2022	Total
PV Quality Management (QC)			1	0	3	3	0	7
PV Commissioning Certificate (CC)				1	0	0	0	1
PV Design Certificate (DC)				1	0	0	0	1

Wind sector certificates issued by end of 2022

Certificate Type	2016	2017	2018	2019	2020	2021	2022	Total
WE Type Certificate (TC)	2	3	17	50	42	32	51	197
WE Provisional Type Certificate (TC)	0	0	2	8	14	4	19	47
WE Component Certificate (CC)	0	0	2	19	12	35	77	145
WE Provisional Component Certificate (CC)	0	0	0	4	3	5	10	22
WE Design Evaluation Conformity Statement (DECS)	0	0	0	33	49	77	133	292
WE Prototype Certificate (PTC)	0	0	0	0	1	0	0	1
WE Project Design (PD)	0	0	0	0	0	0	2	2

2023: IECRE issued the first „Feasibility Statement / Technology Qualification“ for a tidal energy converter!

Marine sector test reports issued by end of 2022

The first Power performance test report in the Marine sector was issued in 2021.

Wind sector test reports issued by end of 2022

Test Reports	2018	2019	2020	2021	2022	Total
Acoustic Testing				2	1	3
Blade Test reports (BT)	3	12	50	50	144	259
Electrical Characteristics (EC)				3	9	12
Mechanical Loads Test reports (LT)	3	8	9	13	16	49
Power Performance Test reports (PP)	5	14	16	32	35	102
Anemometer reports		6000	10250	9500	8500	34250

Key thoughts - Bankability

- Revenue Mechanism
 - Contract for Difference (CfD) scheme in the UK
 - Feed in Tariff in Canada
 - Tax credits in US
 - Etc.
- Technology Qualification and Conformity Assessment
 - IEC TC 114 International Standards and Technical Specifications
 - IECRE Conformity Assessment System

While a reliable revenue mechanism allows financial predictability, technology qualification and conformity assessment foster trust in new technology and allow comparability. Both factors will also play a strong role in regarding „insurability“ of projects.

The successful implementation of the CfD in the UK is underlined by the below indicated examples and the amount of projects based in the UK.

Examples of ME Projects

- Europe
- United Kingdom
- Global

Europe – ME Projects (selected)

Revenue Mechanism == NONE YET

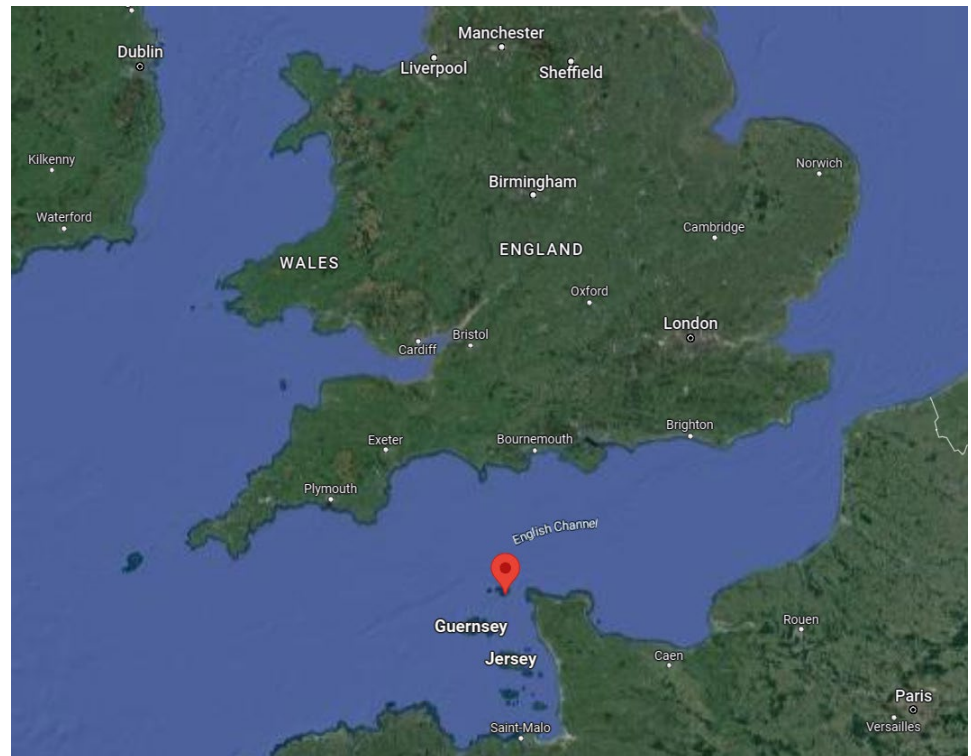
- Raz Blanchard (Alderney Race)
- TIGER Project

Le Raz Blanchard

France

- ~30 MW
- Multiple technologies
- TIGER Project
- More information available

[\[LINK\]](#)



TIGER Project

Site	Key partners	Location	Current status	Capacity to be installed	Technology to be installed	Timescale for deployment
Ramsey Sound	Cambrian Offshore SW	Pembrokeshire, UK	Recover turbine and install turbine	Up to 1MW	TBC	2021-22
Yarmouth Harbour	QED Naval	Isle of Wight, UK	Site to be consented and turbines installed	up to 300kW	Community scale SubHub with 3x Tocardo T1 turbines	2021-22
Perpetuus Tidal Energy Centre	Orbital Marine Power, EMEC	Isle of Wight, UK	New site, originally fully consented in 2016, currently going through re-consenting	30MW	Orbital O2 TBC	Deployment outside scope of TIGER (2025)
Le Raz Blanchard	Normandie Hydroliennes	Normandy, FR	Site consent variation in progress, FEED	12MW	TBC likely SIMEC AR2000 series variant	Deployment outside of scope of TIGER (2024-25)
	Hydroquest	Normandy, FR	Site consent variation in progress, FEED	17 MW	Oceanquest next generation turbine	Deployment outside of scope of TIGER (2024-25)
Paimpol-Bréhat	EDF, SEENEOH, Hydroquest & EMEC	Brittany, FR	Deployed for testing and demonstration	1MW	Oceanquest 1 MW	Deployed (retrieval summer 2021)
	EDF, SEENEOH, BDI & Minesto	Brittany, FR	Deployed for testing and demonstration	100kW	DG100	2022
	EDF, SEENEOH & BDI	Brittany, FR	Test site to be repurposed	Various	TBC	TBC
Morbihan Gulf	Morbihan Hydro Energies SAS	Brittany, FR	New site to be consented	500kW	Sabella turbines 2x D08 250kW	2022

TIGER is actively supporting design and or installation up to 31.9MW of tidal turbine capacity.

HydroWing



“UK Project Slides”

UN GERE

September, 2023

Jonathan Colby
President & Founder
Streamwise Development, LLC



TM

MeyGen

The Crown Estate awarded an agreement for lease to MeyGen PLC

- Stroma, Scotland
- 398 MW consented
 - Phased build out
 - 6 MW (operational) + 28 MW (CfD) + 52 MW (under development) + 312 MW (planned)
- 28 MW allocated to MeyGen PLC under CfD Auction Round (AR) 4
- Developer agnostic (SIMEC Atlantis & Andritz Hydro to date)
- 50 GWh generated to date [\[LINK\]](#)



MeyGen – SIMEC Atlantis



MeyGen – Andritz Hydro

MK1 – 5+ YEARS OF OPERATION



EMEC

European Marine Energy Centre (EMEC)

- Orkney Islands, Scotland
- 4 test sites (2 tidal, 2 wave)
- Hydrogen generation & grid-connected infrastructure
- 7.2 MW allocated to Orbital Marine Power under CfD AR4
- More information available at <https://www.emec.org.uk/>



EMEC



Westray

Orbital Marine Power

- Westray Firth, Orkney Islands, Scotland
- 30 MW project
- Grid-connected infrastructure
- Adjacent to EMEC
- 6 MW allocated in CfD AR 4 (Eday 1 and Eday 2)
- More information available [[LINK](#)]



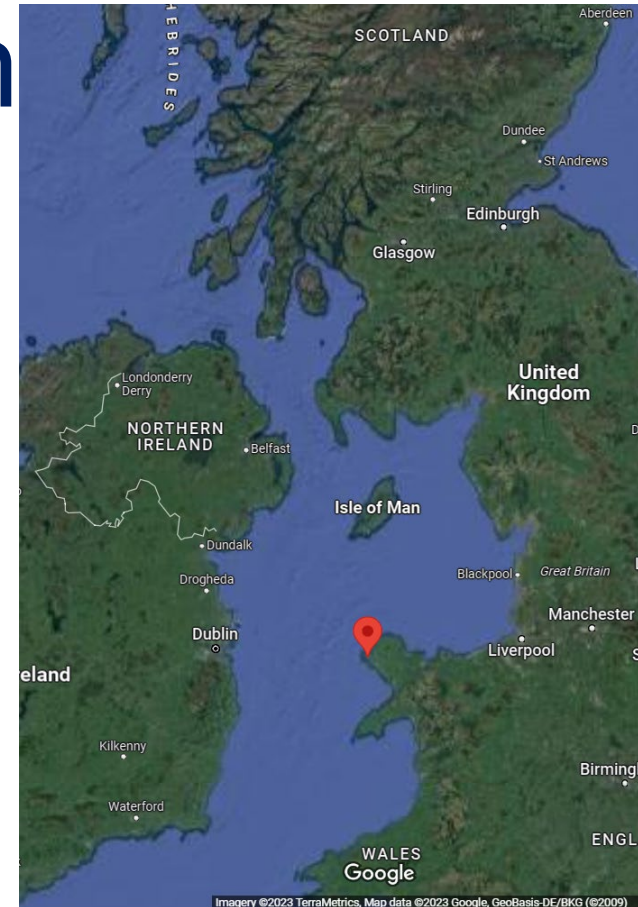
Westray – Orbital Marine Power



Morlais Demonstration

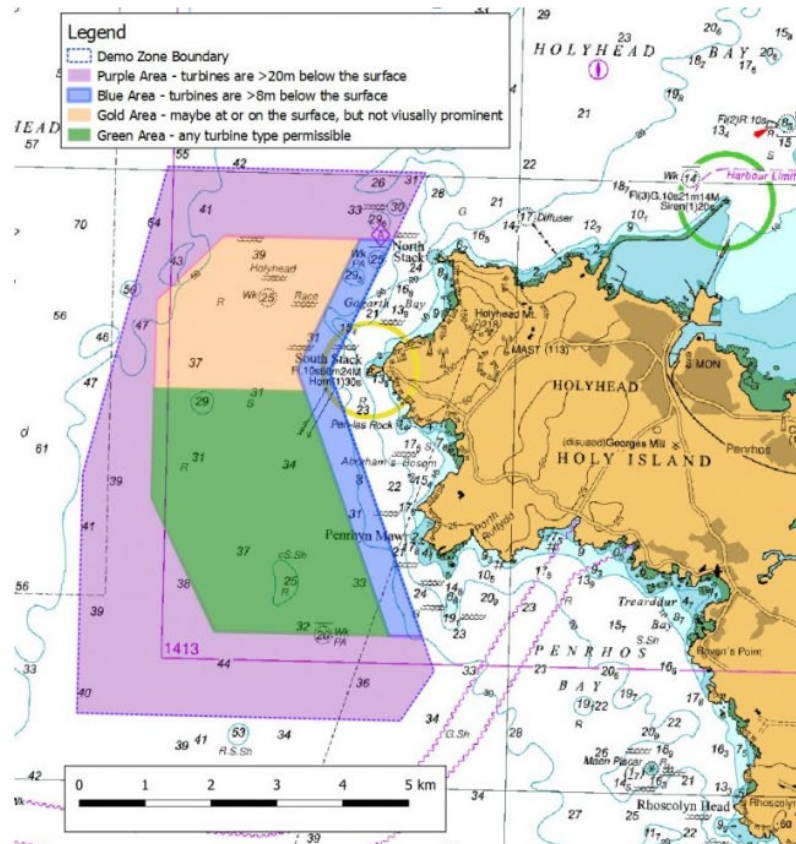
Consent from Welsh Government and Natural Resources Wales was awarded in December 2021

- Holyhead, Wales
- 240 MW Consented (8 x 30 MW berths)
 - Phased build out
 - 7 berths allocated to individual developers to date
- 5.62 MW allocated to Magallanes Renovables under AR 4
- Utilizing the Rochedale Envelope
- More information available [[LINK](#)]



Morlais Demonstration Zone

Coloured areas showing restrictions on the types of turbine permitted and showing operational exclusion zones



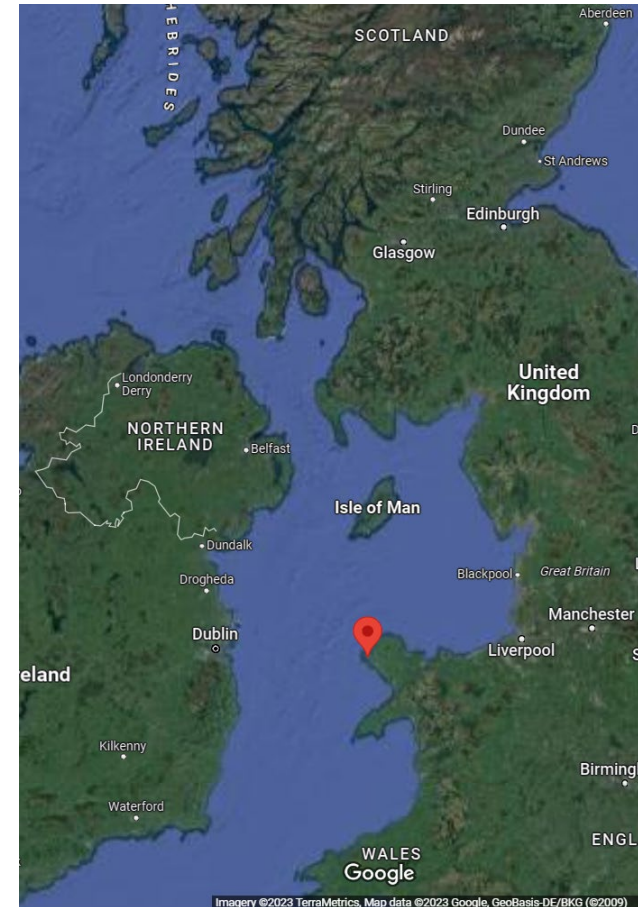
Morlais Demonstration Zone – Magallanes



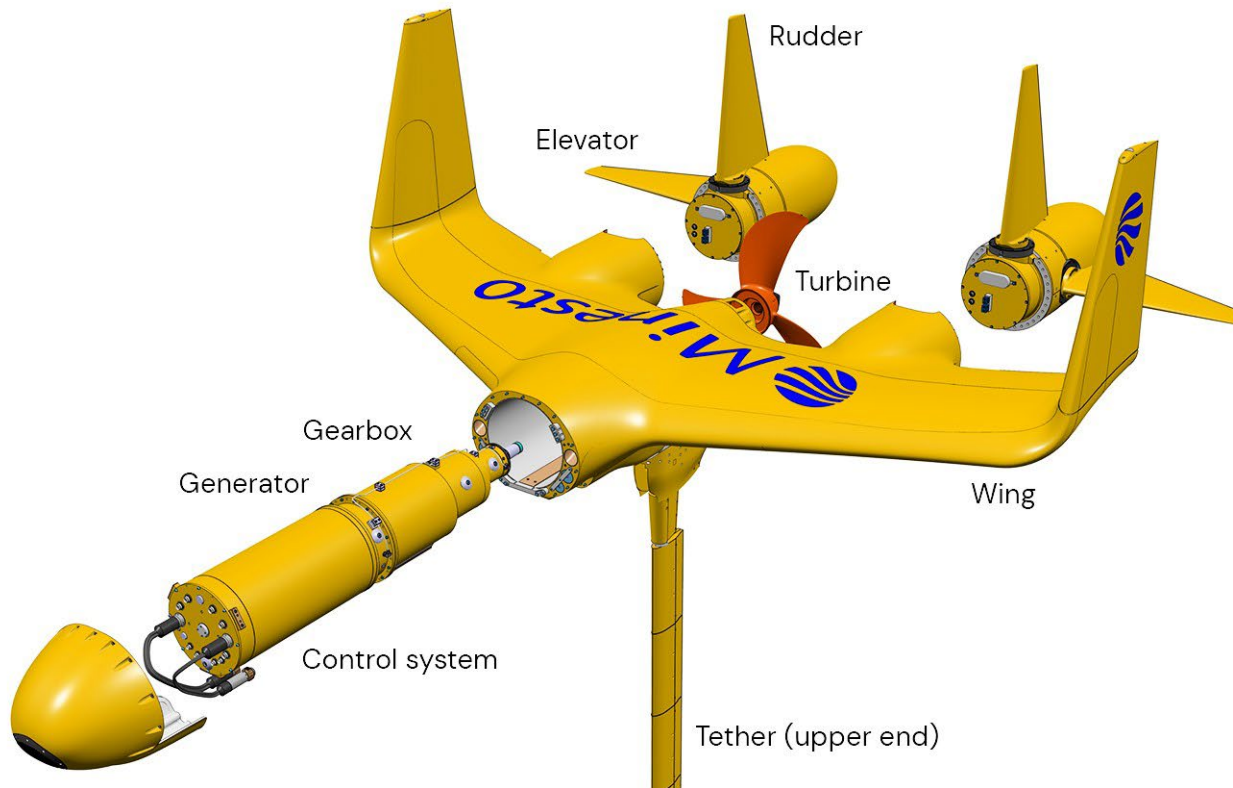
Holyhead Deep

Minesto UK

- Holyhead, Wales
- 80 MW maximum
- 10 MW initial installation
- European Union (EU) + Welsh European Funding Office (WEFO) funding
- Adjacent to Morlais
- More information available [[LINK](#)]



Holyhead Deep – Minesto



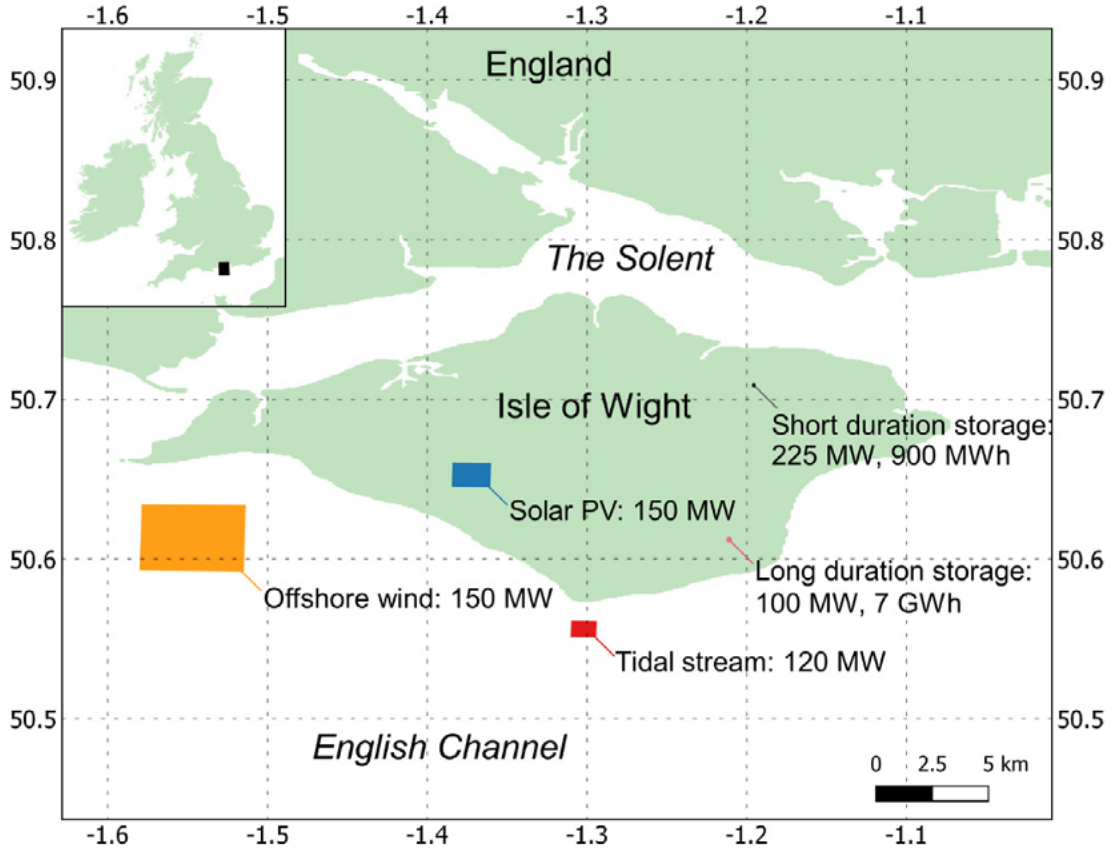
PTEC

Perpetuus Tidal Energy Center (PTEC)

- Isle of Wight, England
- 30 MW maximum
- 20-year seabed lease from the Crown Estate
- Impacts of tidal stream power on energy system security: An Isle of Wight case study [[LINK](#)]



PTEC



Global Industry

TIDAL CURRENT ENERGY | Progress in recent years



- Approaching design convergence
- **Approaching commercialisation**, with deployment of full-scale devices and first arrays
- **Progress demonstrated** by operating hours accumulated and electricity generated
- **Need for further technology investigation** and demonstration for long periods of time



Global Industry

WAVE ENERGY | Successful deployments



- Several **full-scale devices** in the manufacturing phase or preparing for deployment
- **Continuous evolution** along the TRL scale and first farms are being designed
- A number of **potential breakthroughs** have been developed
- A **wide variety** of wave energy technologies
- **Extensive testing** programmes are still required



GIEC Wanshan, RCP, 2x500 kW



Mocean BlueX, UK for subsea O&G



NIOT navigation buoy, Chennai port, India



Corpower, pilot farm of 4, Sweden & PT



GEPSTechno Wavegem hybrid platform, France



Crestwing Tordenskiold, 14 month test, DK



Ocean Energy Buoy, Ireland 500 kW in Hawaii

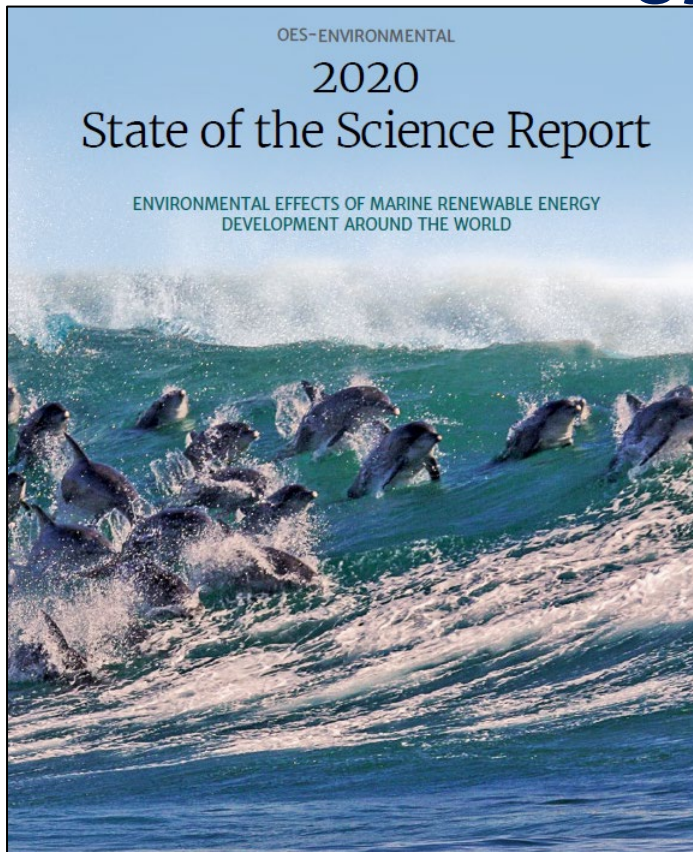


Wavepiston, PLOCAN test, DK and SP



WSE Uniwave 200, Australia, 200 kW

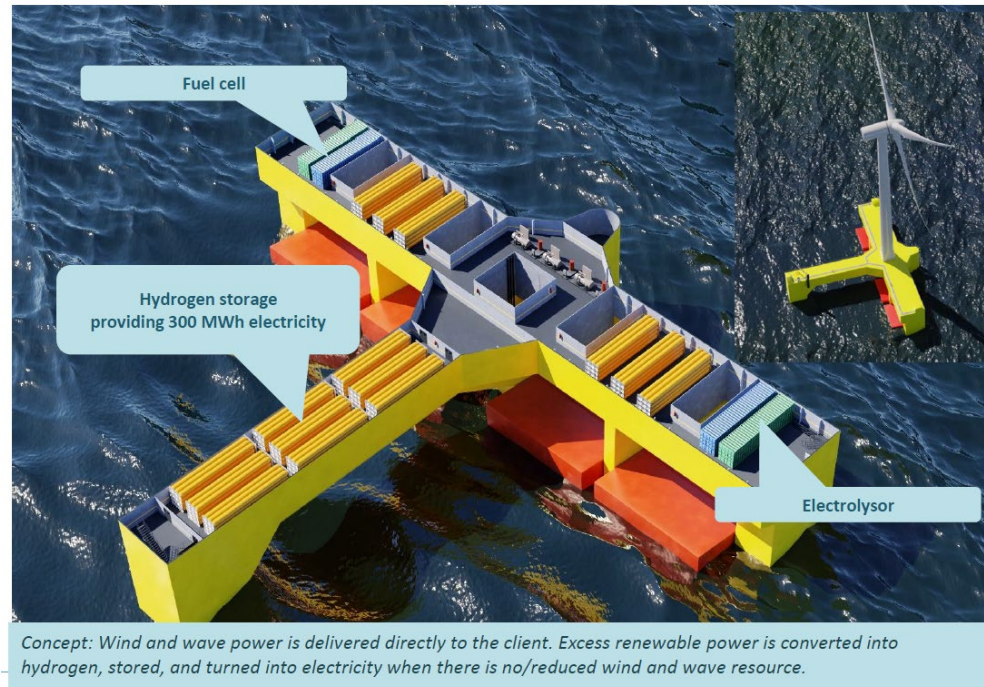
IEA Ocean Energy System (IEA-OES)



Hybrid Systems

Wind-Wave-Hydrogen

- Floating Power Plant (DK)
- 4 – 15 MW Wind Turbine
- 1 – 4 MW WEC
- Hydrogen
- UK Innovation Fund (July 2023)





Thank you!



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Imprint

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