



# Annual General Meeting

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November 2024

Carnegie Clean Energy Ltd

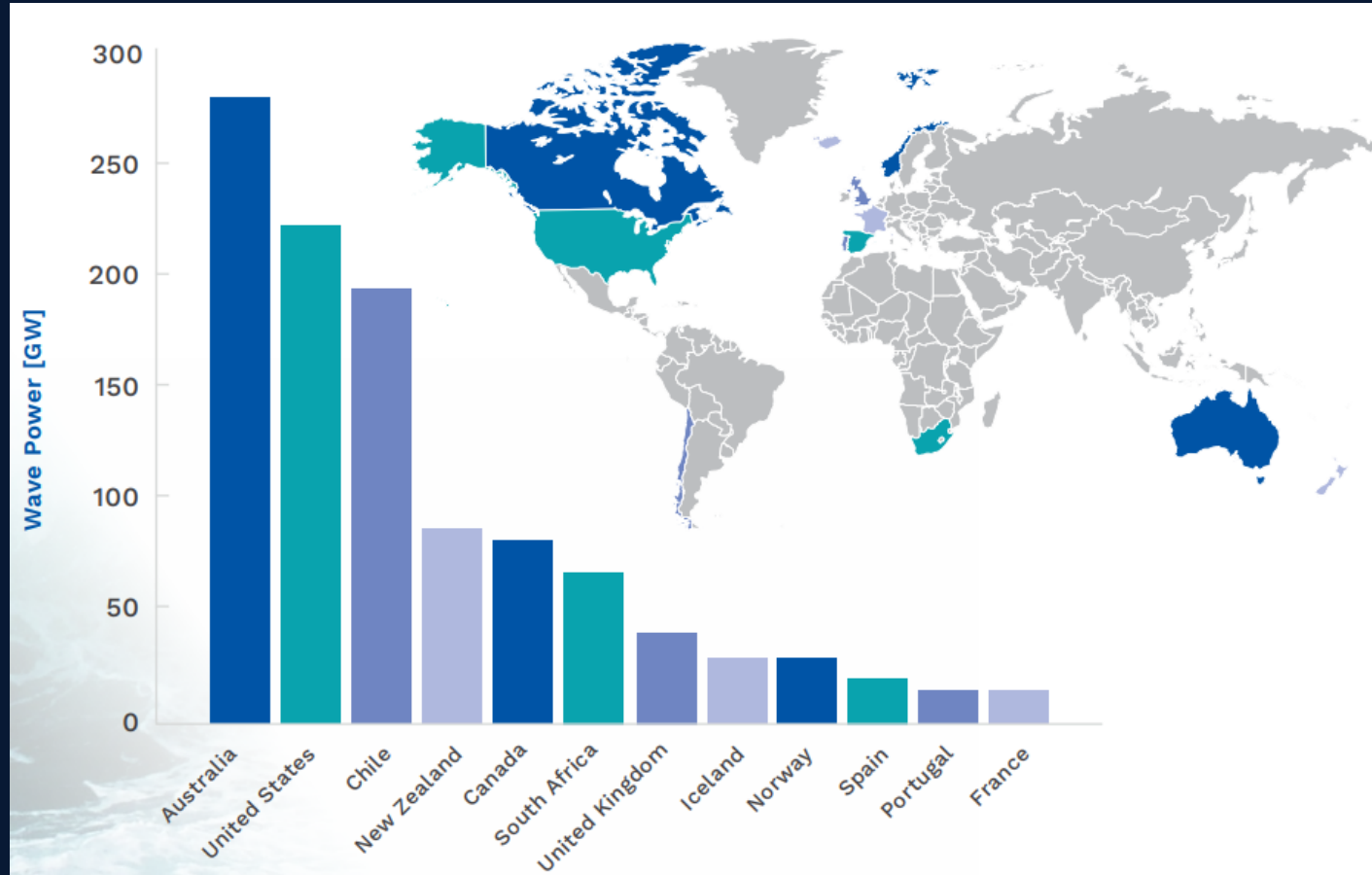
ASX: CCE  
OTC: CWGYF

“We harness ocean energy  
to make the world more  
sustainable”.

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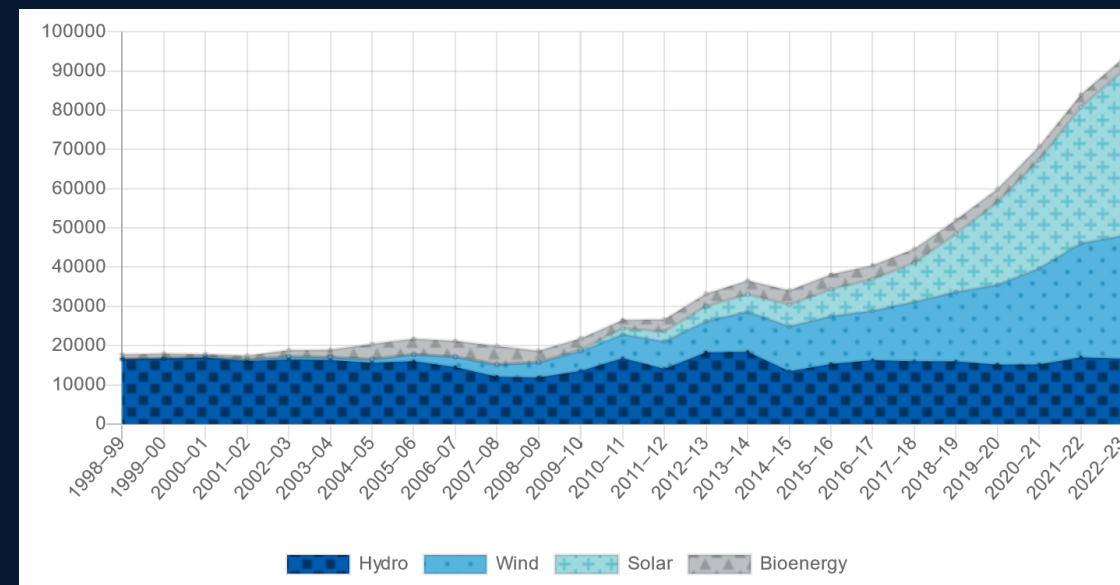
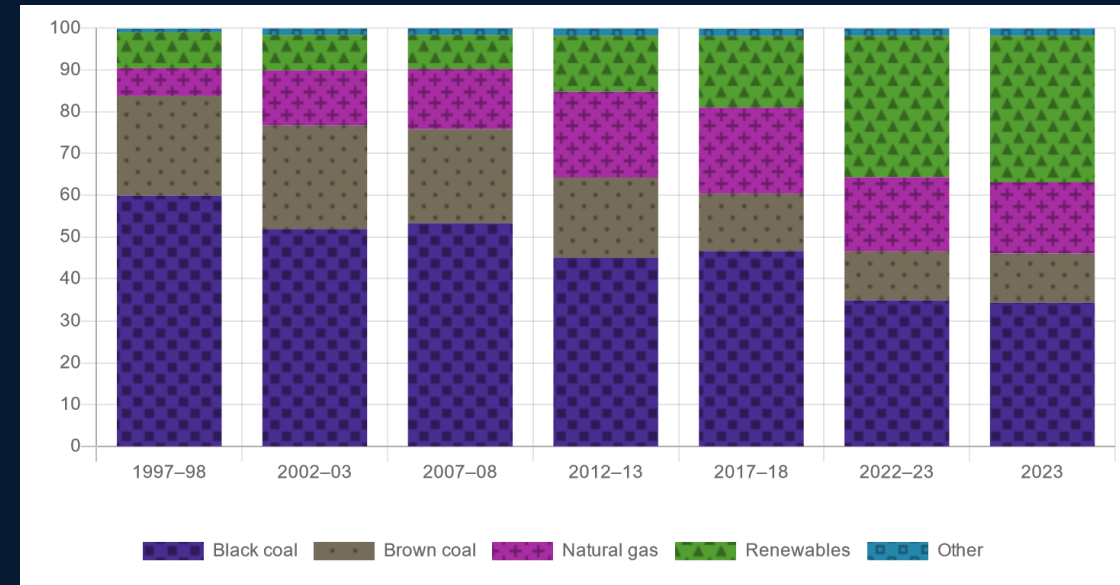
2024

# Wave power resource for selected countries



# Australian Targets

- 43% emissions reduction by 2030
- 82% renewable electricity by 2030
- Net zero by 2050
- Currently ~40% renewable electricity  
(~45% solar, ~35% wind, ~15% hydro)



# Australian Challenges - Wind Droughts!

- Wind Lull #1 (13th April to 20th April) - VIC, NSW, and parts of SA.
- Wind Lull #2 (13th May to 18th May): - SA and VIC.
- Wind Lull #3 (22nd May to 28th May): - VIC, SA, NSW, and parts of TAS.
- Wind Lull #4 (5th June to 11th June): - QLD, SA, and TAS.

“Worst week for wind:” But is that a reason to panic about transition to renewables?



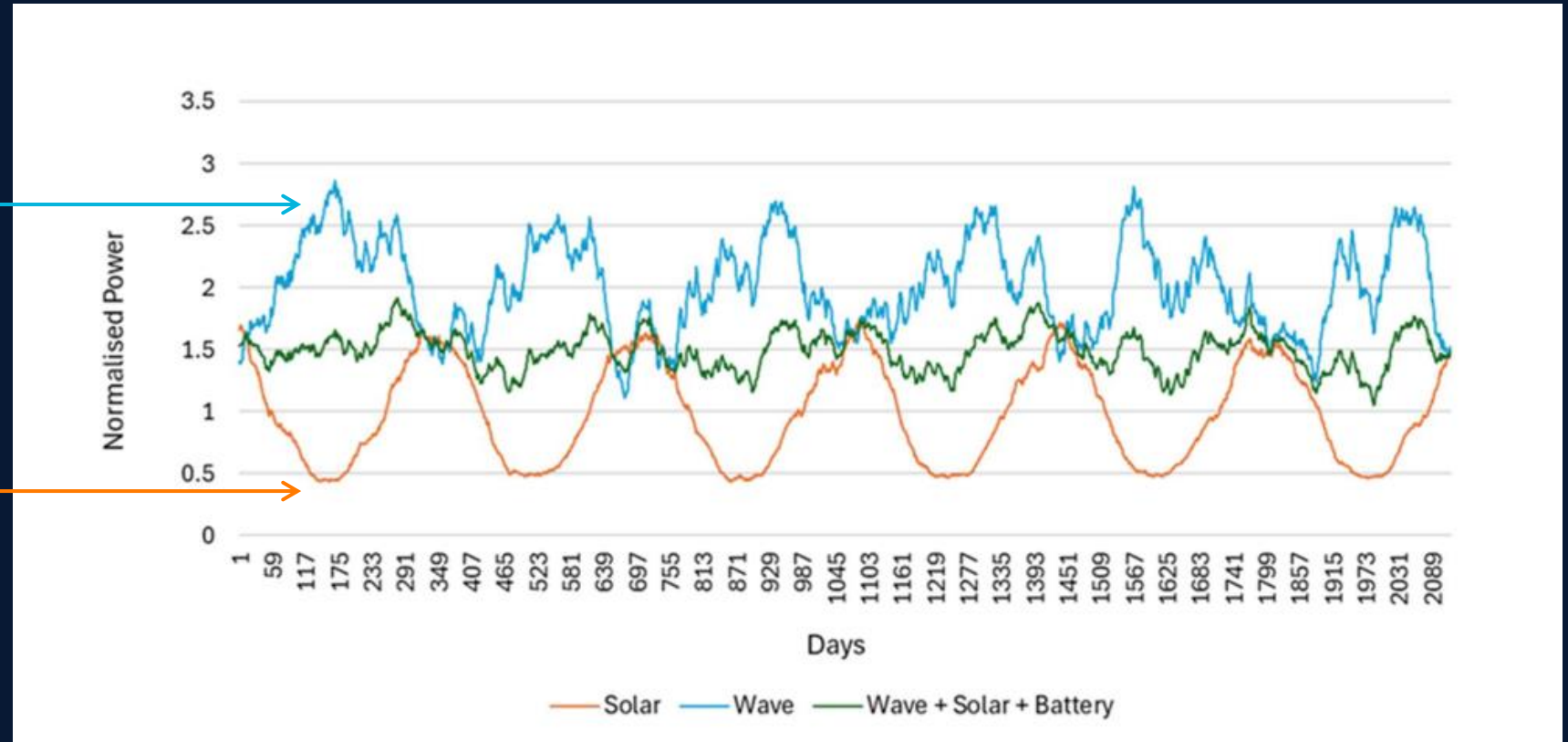
Giles Parkinson Apr 17, 2024

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# Wave energy is special – Seasonally inversely correlated with solar

Wave

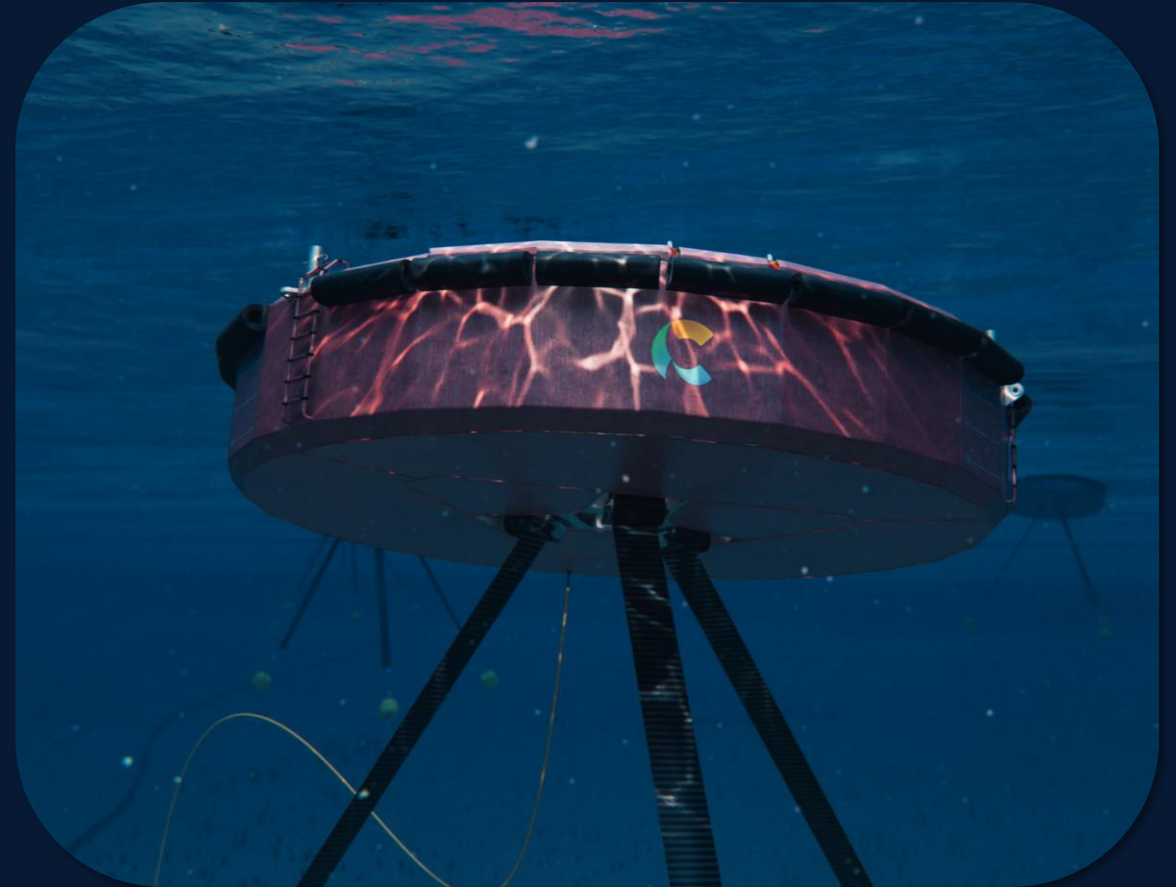
Solar



Inverse seasonal correlation between wave energy converter and solar PV power at Carpenter Rocks

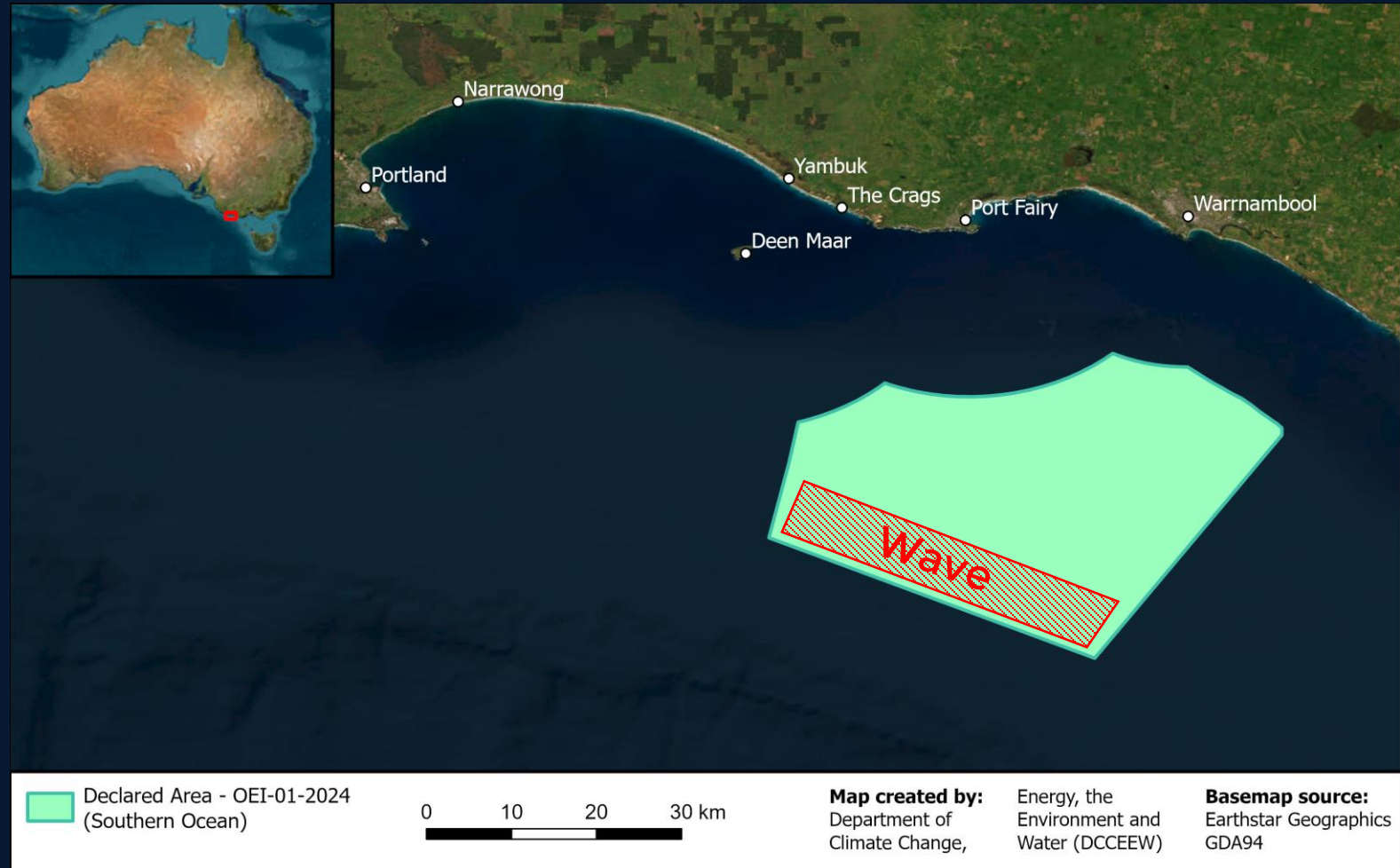
# Wave energy is special – but wait, there's more!

- Doesn't have the visual amenity impacts that are plaguing the introduction of offshore wind in Australia
- Wave energy can offer some coastal protection
- Doesn't consume any significant land area, which is at a premium in Europe and many coastal locations
- Wave energy consumes 3 to 5 times less space than offshore wind



# Southern Ocean Offshore Energy Declared Area

- Declared area max size: 1,030km<sup>2</sup>
- Potential power generation: 2.9GW
- Wave farm would be invisible from land

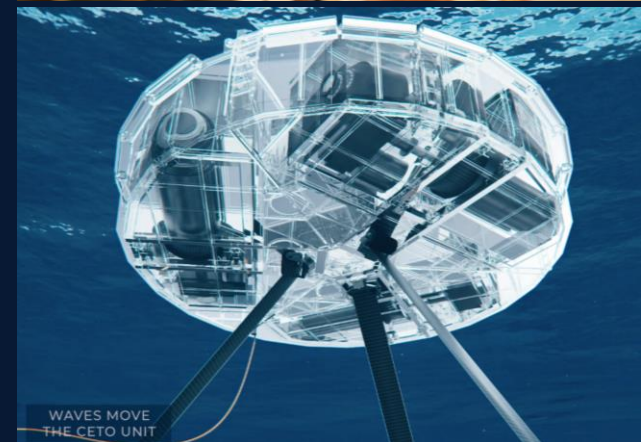


# What could Australia gain from supporting wave energy

**Challenge:** transition to clean energy system able to meet future demand for sustainable, reliable and affordable energy

## **Opportunity:**

- Wave energy is an immense and untapped source of renewable energy that is consistent and predictable
- Complementarity with wind and solar brings reliability and savings
- 100% RE is extremely difficult without wave energy
- Local content - stop being a tech importer
- Build sovereign capability through natural advantage
- Large grids + isolated towns along Southern and western coasts





# Wave Energy – Global Momentum Building

**€195M**

Europe saw €195M public funding for ocean energy in 2023. (Ocean Energy Europe)

**£19bn**

Wave energy could be worth £19bn to the UK economy by 2050. (University of Edinburgh)

**€65M**

France provided a financial package including at least €65M for the 17.5 MW FloWatt tidal stream project. (Ocean Energy Europe)

**137MW**

Europe leads in ocean energy with a 137 MW project pipeline. (Ocean Energy Europe, 2024)

**€32M**

The largest single investment into competitor CorPower's technology to date and likely the largest ever in the wave energy sector

**\$112.5M**

The US announced \$112.5M funding for wave energy commercialisation. (US Department of Energy)

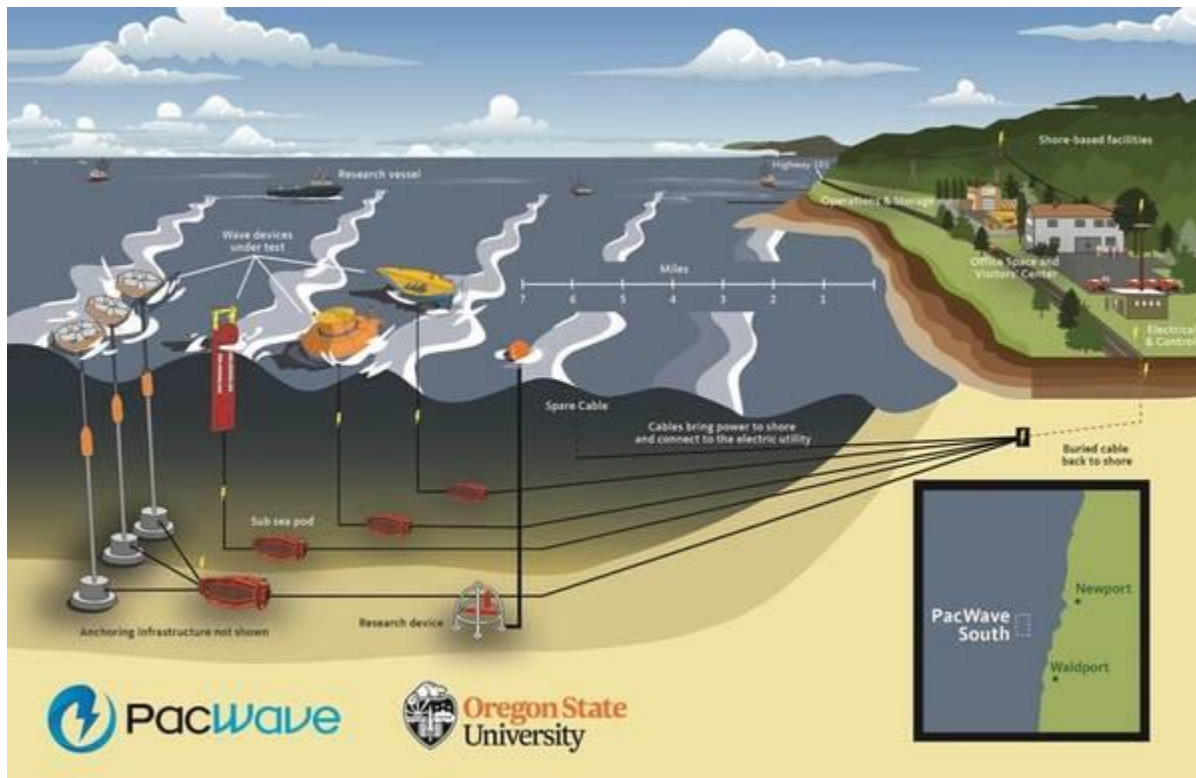
**29,500TWh**

Global wave energy potential exceeds 29,500TWh. (IRENA and OEE, 2023)

**€240M**

Spain's 'RENMARINAS DEMOS' Program awarded €240M to marine renewables, including €12.2M to wave energy. (IDAE)

# United States



(Credit: Oregon State University)

- Funding Increase: \$112 million USD committed to advancing wave energy technologies in the US.
- New legislation in California supports wave energy deployments, fostering growth in the sector.
- 1 MW of new wave energy capacity added in 2023
- PacWave South test site coming soon: Operational in 2025, facilitating testing and development of wave energy converters.
- Vast wave energy potential: The US has the potential to generate 2.64 trillion kWh/year from wave energy, equivalent to ~64% of 2023 utility-scale generation.

# Carnegie Clean Energy – Our Opportunity



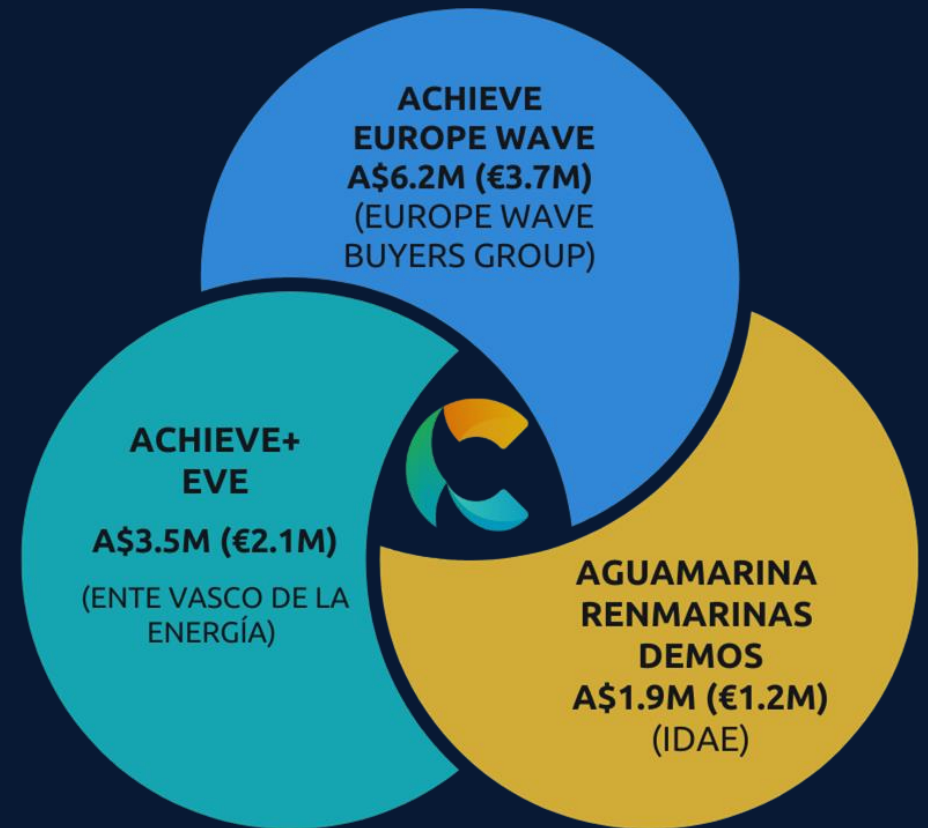
- Carnegie is a global leader in wave energy technology
- Globally, support and funding for wave energy increases: funding through Horizon Europe, the United States government and private investment continue to increase.
- The ACHIEVE Programme has attracted €7.05m (\$11.66m) in support to facilitate the deployment of CETO at the Biscay Marine Energy Platform (BiMEP) in the Basque Country (Spain)
- Our LCOE continues to be competitive with offshore wind and solar PV at the equivalent stage of its development and scale.
- The global challenge is to deliver a transition to clean energy with the ability meet future demand for sustainable, reliable and affordable energy

# Carnegie Current Projects

**Garden Island  
Microgrid**  
A\$2.2m Valuation  
Conservative Valuation

**MoorPower  
& MoTWECC**  
projects reaching  
completion

## ACHIEVE PROGRAMME



# CETO - Harnessing Ocean Waves



Our core technology is unique and avoids known issues

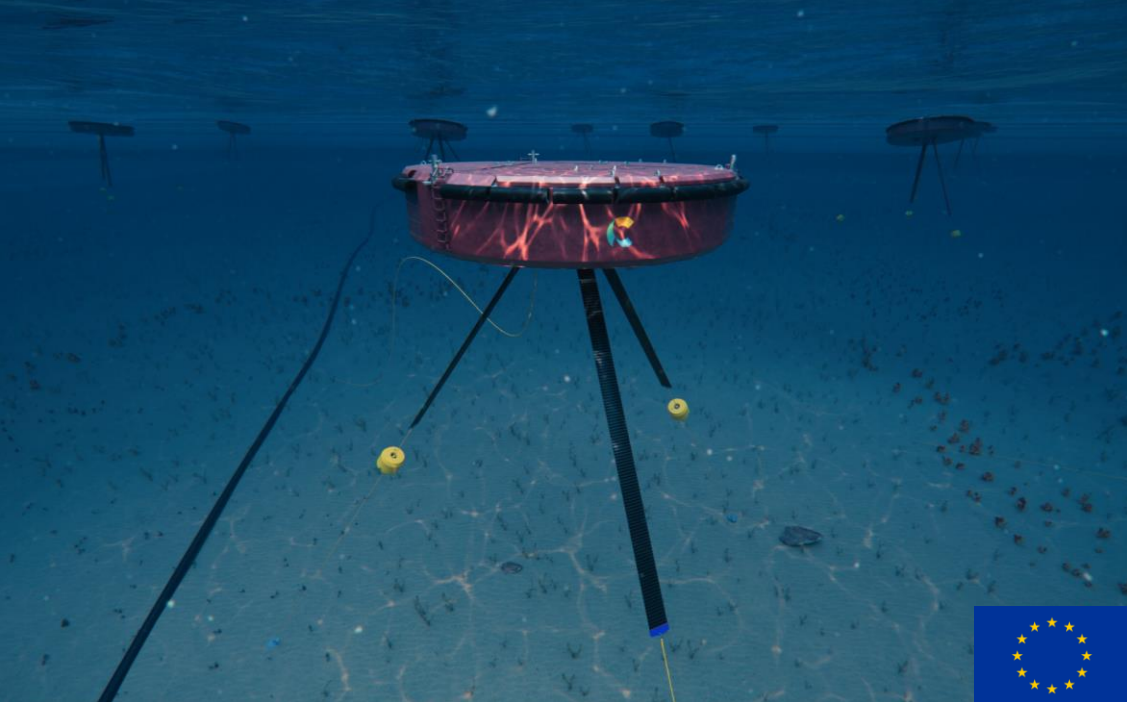
- Water in waves move in an orbit. The buoy is forced to move in the same motion



- This kinetic energy is transformed by the three Power Take-Offs within the buoy
- CETO operates fully submerged, avoiding issues of visual amenity and damaging forces from breaking storm waves
- Artificial intelligence helps us capture more by adapting to every individual wave that passes
- [CLICK TO SEE ANIMATION](#)



Carnegie CETO wave energy technology



# ACHIEVE Programme – Basque Country Deployment



# Year in Review – ACHIEVE Programme

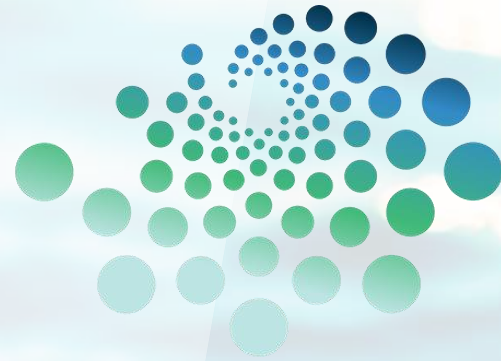


*“The past year has been one of immense progress, marked by significant strategic accomplishments that maintain Carnegie’s position as a leader in the rapidly evolving field of wave energy.”*

- **EuropeWave PCP Contract:** Awarded a €3.75 million Phase 3 contract, securing the deployment of a CETO device at the Biscay Marine Energy Platform (BIMEP) in the Basque Country.
- **CETO Berth Secured:** Successfully secured a berth reservation at BIMEP and awarded contracts for critical CETO component design and manufacture.
- **Authority to Proceed (ATP) Milestone:** Achieved the crucial ATP milestone, reinforcing the EuropeWave Buyer's group's confidence in Carnegie's ability to deliver a successful deployment.
- **Additional Funding:** Secured two additional funding sources for an enhanced CETO deployment at BIMEP through the Spanish Government and regional Basque Energy Agency.
  - **RENMARINAS DEMOS Grant:** A €1.2 million grant is enabling the company to extend the CETO deployment's operational period, improve wave prediction capabilities, develop local infrastructure, and foster collaboration with BIMEP.
  - **Basque Energy Agency Grant:** A €2.1 million grant is providing targeted support for crucial CETO components, bolstering local manufacture, and reducing technical and financial risks.



# ACHIEVE PROGRAMME



## EUROPEWAVE



ENERGIAREN  
EUSKAL  
ERAKUNDEA

ENTE VASCO  
DE LA  
ENERGÍA



Funded by  
the European Union  
NextGenerationEU



This is part of the EuropeWave project that has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 883751'

# HPE DISCOVER – LAS VEGAS 2024



# MoTWEC: Mooring Tensioner for Wave Energy Converters



# MoorPower Scaled Demonstrator

Built, deployed and operated



# MoorPower Scaled Demonstrator

•**Manufacture, Assembly, and Onshore Testing:** The team successfully completed these crucial steps for the MoorPower scaled demonstrator

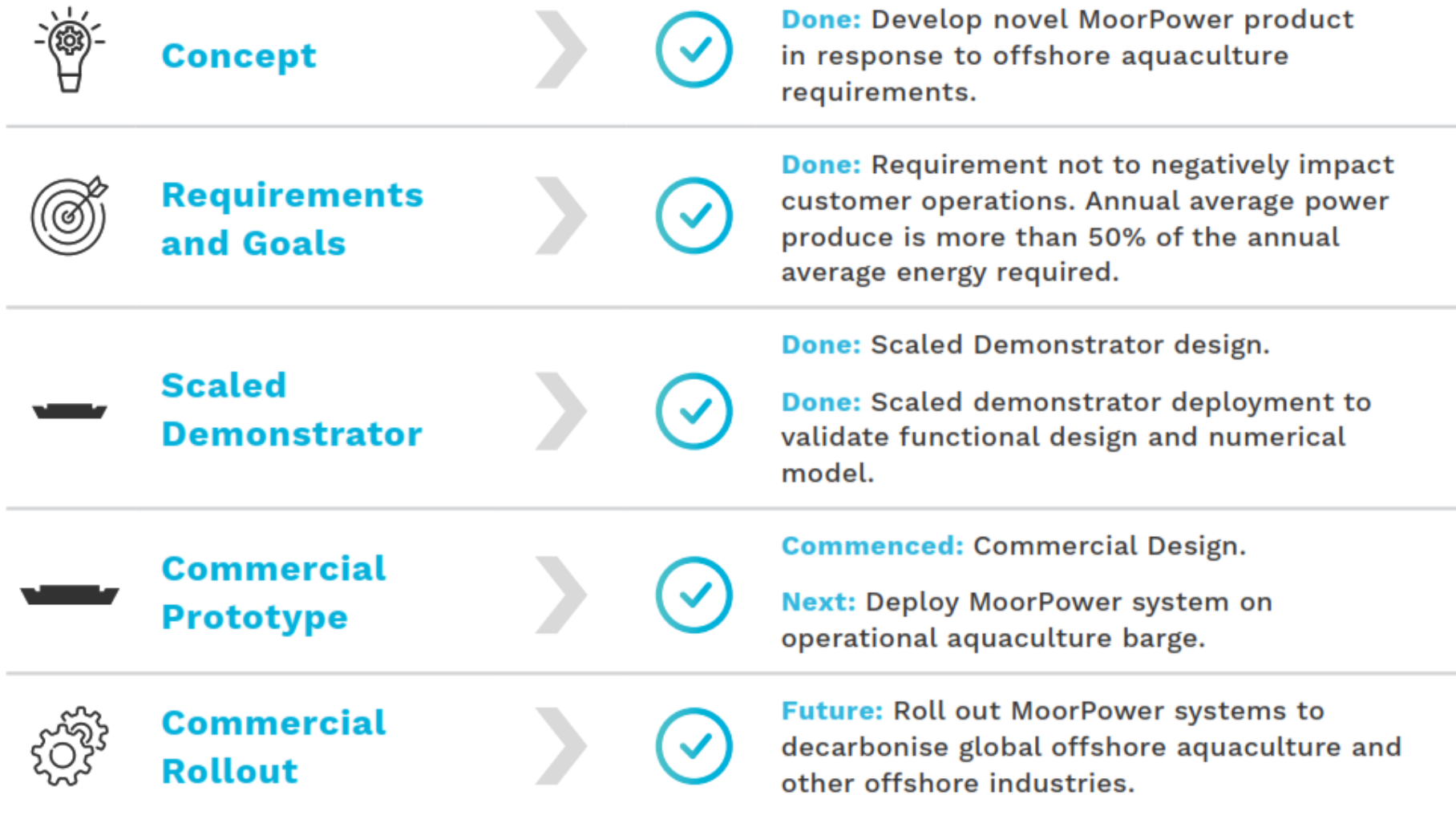
•**Deployment:** In January 2024, the demonstrator was deployed at Carnegie's offshore test site in North Fremantle, Western Australia. This marked an important step in the technology's commercialisation pathway.

•**Data Collection and Validation:** The deployments provided critical data that validated the functional design and numerical modeling of the system in various sea conditions.

•**Core Design Proof:** The MoorPower modules functioned as predicted, proving the core design.

•**Model Validation:** Numerical models were validated using demonstrator performance data and commercial feeding barge motion data. This provided confidence in Carnegie's ability to forecast the performance of commercial MoorPower systems globally.

# MoorPower Commercialisation Pathway



# The Future of MoorPower

Carnegie is actively working towards a commercial scale deployment of the MoorPower modules onboard a working aquaculture barge



# Garden Island – A year in review

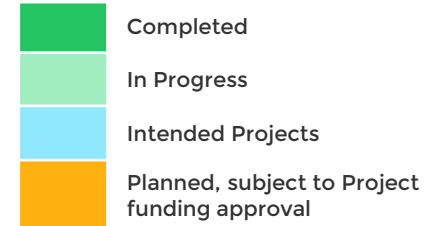
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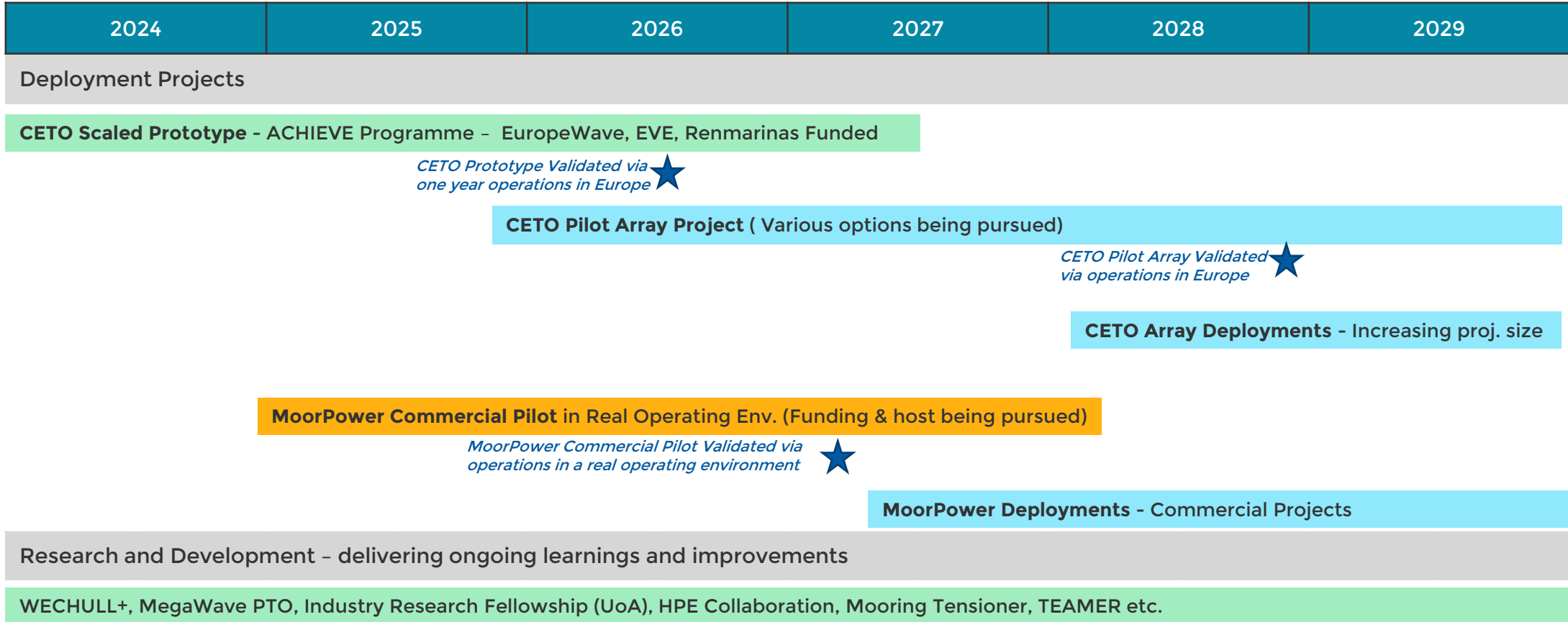
- Carbon Emission Milestone:** electricity generated by the system now avoided over 5,000 tonnes of carbon emissions.
- Revenue Generation:** Generated \$117,616 in revenue from the sale of Large-Scale Generation Certificates (LGCs) during the year.
- Clean Energy Sales:** Through an ongoing arrangement with the Department of Defense, electricity generated was sold under an Electricity Supply Agreement.
- Future Wave Energy Potential:** The existing infrastructure and ability to sell power make the microgrid suitable for future wave energy projects.



# Product Validation Roadmap (Next 5 years)



## Carnegie Products Product Validation Roadmap Summary



# News and Media

## Lloyd's Register to start certification process of Carnegie's CETO wave energy converter

2 September 2024

Business Developments & Projects, Certification & Classification, Collaboration, Outlook & Strategy, Project & Tenders, Regulation & Policy, Research & Development

Marine classification society, Lloyd's Register, has been contracted by Australian wave energy developer, Carnegie Clean Energy, to begin the certification process for CETO, a fully submerged point absorber wave energy converter (WEC). Lloyd's Register will assess Carnegie's CETO WEC 62600-4 and the International Commission's Renewable Energy Operational document, [...]



HOME > NEWS > SPANISH COMPANY RECEIVES €7 MILLION TO



ocean energy

## ACHIEVE passes EuropeWave Authorization to Proceed

Friday, 19 April 2024

REM

Carnegie Clean Energy announced that its wholly owned subsidiary, CETO Wave Energy Ireland (CWEI), has successfully passed the EuropeWave Authorization to Proceed milestone as part of its EuropeWave ACHIEVE Contract.



Courtesy of CETO Wave Energy

The ACHIEVE Project deploys a CETO prototype which integrates new innovative technologies focus on optimizing performance. Work to date provides step change improvements while retaining compelling features such as fully submerged operation which minimizes visual impact and offers inherent protection from breaking waves and extreme storms.

The CETO prototype will capture nearly twice as much energy as the previously deployed design. Three taught connections to seabed. CETO captures energy from all primary wave forces. Active control, including AI, further optimizes capture and survivability through dynamic adjustment of l position and angle in the water column.

Converting the linear motion of the CETO buoy into electricity is the new electric rotary Power T. Operating like a futuristic wind, this system resists the motion of the buoy and in doing so, generates clean, renewable electricity at higher efficiencies than...



## EuropeWave's payment to support Carnegie's CETO deployment progress

30 August 2024

Business & Finance, Business Developments & Projects, Project & Tenders

Carnegie Clean Energy, through its wholly owned subsidiary CETO Wave Energy Ireland (CWEI), has received a progress payment of €251,100 under the EuropeWave Phase 3 contract. The EuropeWave contract is part of the ACHIEVE E...

## EU project adds 'missing brick' with innovative approach to WEC testing

28 June 2024

Business Developments & Projects, Innovation, Operations & Maintenance, Project & Tenders

The European project IMPACT has created an "innovative approach" for testing wave energy converter (WEC) reliability, performance, and destructivity with the dual hardware-in-the-loop (Dual HiL) platform which tests different parts of the WEC s...



## CETO Wave Energy Ireland wins EU-backing for wave energy project

30 July 2024

Business & Finance, Business Developments & Projects, Collaboration, Innovation, Project & Tenders, Vision

CETO Wave Energy Ireland (CWEI), a wholly-owned subsidiary of Carnegie Clean Energy, has secured funding to participate as an industry partner/wave...



Home > Marine Energy >

## Spain awards €2.1M for Carnegie's CETO wave energy device deployment

BUSINESS & FINANCE

March 11, 2024, by Nadja Skopljak

Carnegie Clean Energy's wholly-owned subsidiary Carnegie Technologies Spain has secured a €2.1 million grant from the Basque Energy Agency to support the deployment of its CETO wave energy Platform (BiMEP) in the E...

Related news



Carnegie reserves site for CETO wave energy device deployment in Spain 3 days ago

Spain backs Carnegie with €1.2M for CETO wave energy



Las unidades de CETO6 operan sumergidas bajo el mar Carnegie Clean Energy - Omicrono

TECNOLOGÍA

## Energía ilimitada con las olas del mar en el País Vasco: el prometedor invento que estará operativo el próximo año

CETO, uno de los prototipos más prometedores para la generación de energía undimotriz, empezará su actividad el próximo año cerca de Bilbao

## MoorPower demonstrator achieves initial goals, signaling ability for commercialization

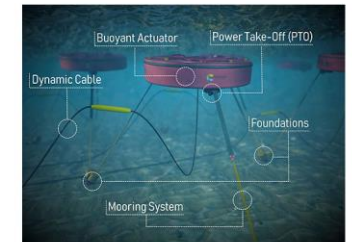
水中波力発電システム「CETO」、設置計画の審査に合格—スペインの海域で運用へ

2024.5.24 | 再生エネルギー 建設業 海洋エネルギー

Energy of the Future: MoorPower Demonstrator Achieves Initial Goals, Signaling Ability for Commercialization

再生エネルギーの未来: MoorPower Demonstratorが初期目標を達成し、商業化の可能性を示唆

Post 17 0 いいね! 10 フォロー



海洋エネルギー技術を開発するCarnegie Clean Energy (CCE)は、2024年4月17日、子会社のCETO Wave Energy Irelandが、欧州の波力発電技術開発プログラム「EuropeWave PCP」において、推進を許可するマイルストーン「ATP: Authorisation to Proceed」に合格したと発表した。



**Be part of the innovation that will unlock the power  
of the world's oceans**