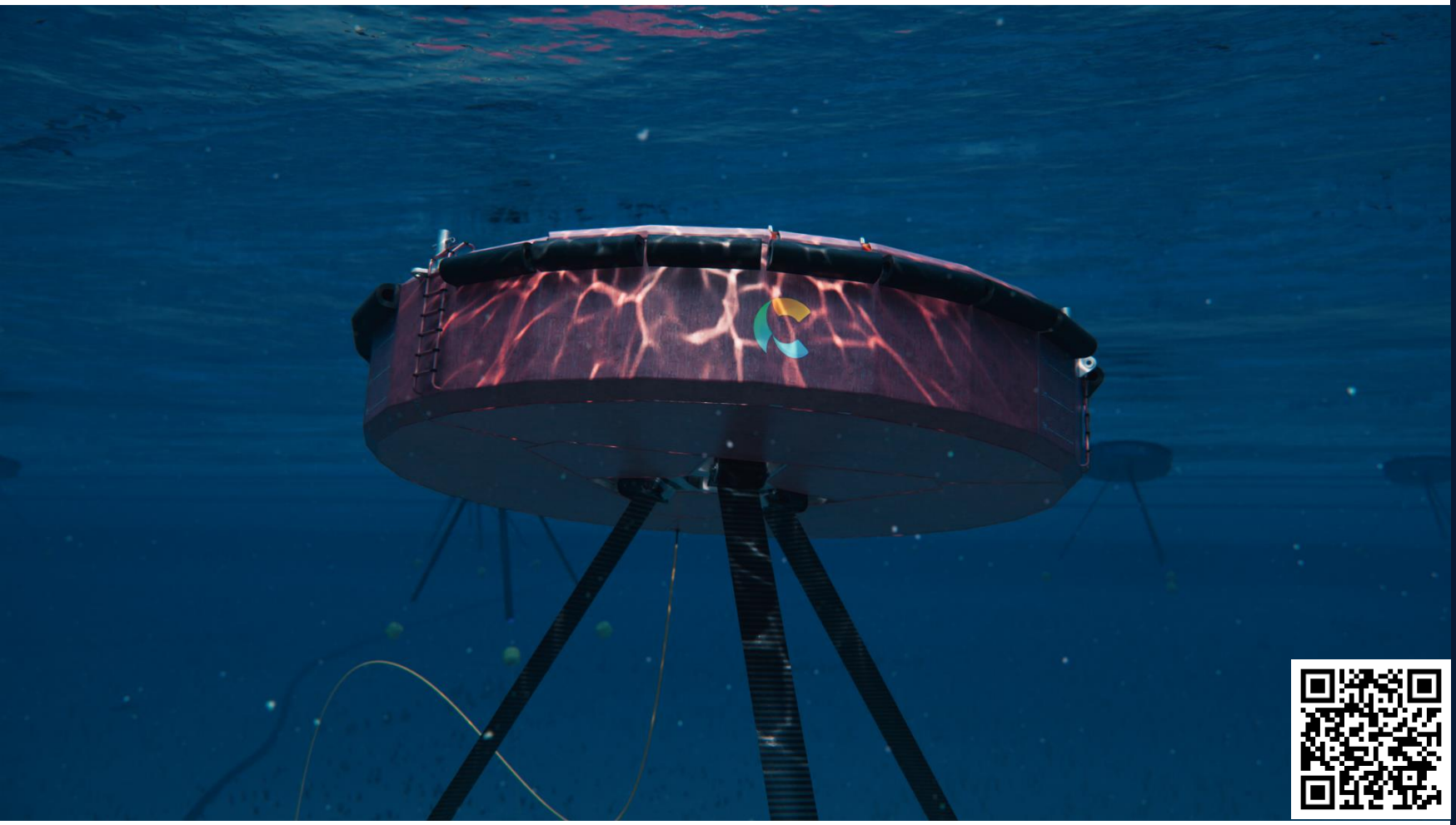
Carnegie
CLEAN ENERGY

Investor Webinar

7th June

2024

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

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We are unlocking the vast power of the ocean

"The history of humanity has been shaped by how it has harnessed energy.

"It's impossible that humans would not harness such a vast and consistent energy resource as the waves"

Jonathan Fiévez, Carnegie CEO

Our global challenge is to deliver a transition to clean energy with the ability meet future demand for sustainable, reliable and affordable energy.

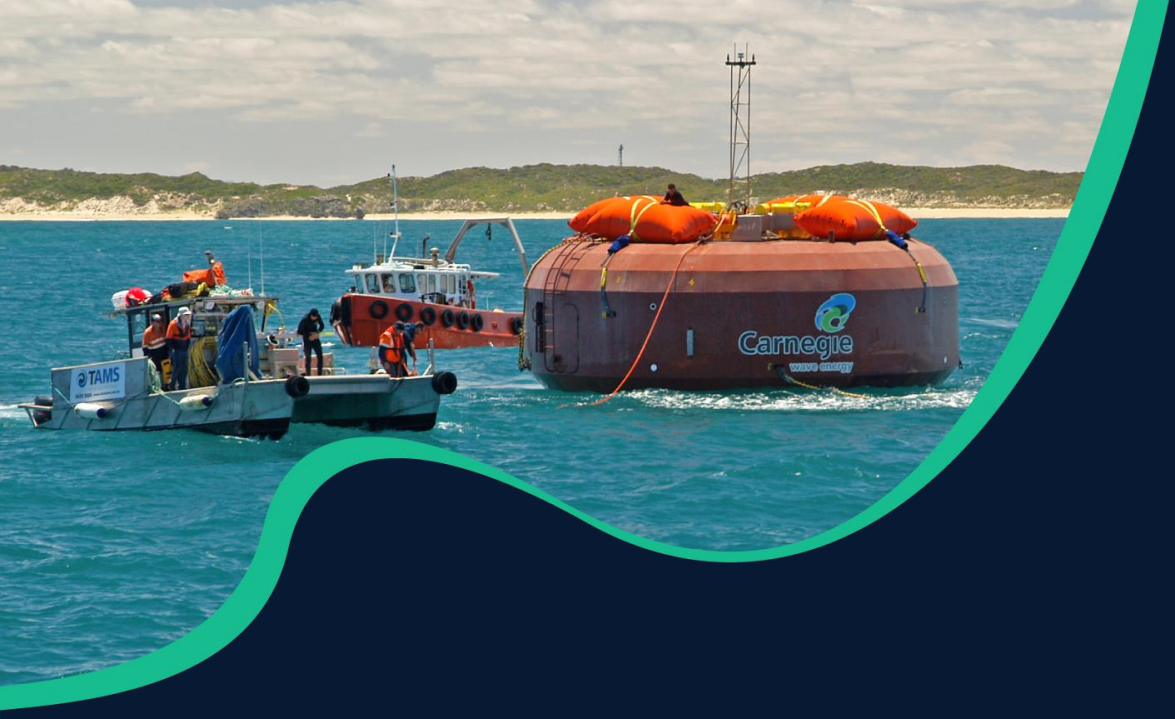
Wave energy is unique. Unlocking its potential will change the world.

It is a source of renewable energy that is consistent and predictable.

Wave energy produces zero emissions and can provide 24/7 power at scale. It's the world largest battery

Carnegie Clean Energy is a global leader in wave energy technology. We are committed to harnessing the power of the ocean.

From Fremantle in Western Australia, our technology is ready to change the world.



Our wave energy technology recognised as a world leader

- ✓ Out of 36 international technologies that entered the EuropeWave PCP competitive programme, **CETO was ultimately ranked number one.** The technology was judged on criteria including LCOE, performance, reliability, availability and survivability
- ✓ We have attracted more than **€7.05m ($11.5m AUD) in European funding** in the second half of 2023
- ✓ Our **LCOE** is expected to be competitive with offshore wind and solar PV at the same stage of its development and scale
- ✓ Commercial scale CETO has a capacity of 1 MW, one of the **largest in the industy**
- ✓ Social license issues are minimised as CETO is fully submerged and **uses negligible onshore real estate**
- ✓ Uniquely, our technology is a flexible, scalable design, **driven by AI** to maximise its effectiveness in real time

Global potential of the wave energy market

40 GW

Ocean energy is coming. The European Commission has set clear targets of 100MW of installed ocean energy capacity by 2025, 1GW by 2030 and 40GW by 2050. With the right support, this could happen sooner

€53bn p.a.

Ocean Energy Europe forecast ocean energy to be a €53bn per annum industry, supporting 50,000 jobs

70 %

The amount of the world's surface covered by our oceans. Absorbing energy from wind, it's known as the world's biggest battery

350 GW

The International Renewable Energy Agency's current estimate of ocean energy installed capacity by 2050

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Source: https://www.oceanenergy-europe.eu/ocean-energy/

Carnegie Commercial Model

What Carnegie Does

- Technology developer of ocean energy products and services
  - CETO Wave Energy Generator
  - MoorPower
  - Mooring Tensioner
  - Wave Prediction & AI Control System
- Integrator and supplier of ocean energy devices
  - Assembly
  - Installation
  - Technology and software upgrades
- Engineering services
  - Project feasibility and design
  - Design, construction, development and commissioning
  - Operational management, repairs and maintenance

Carnegie Revenue Model

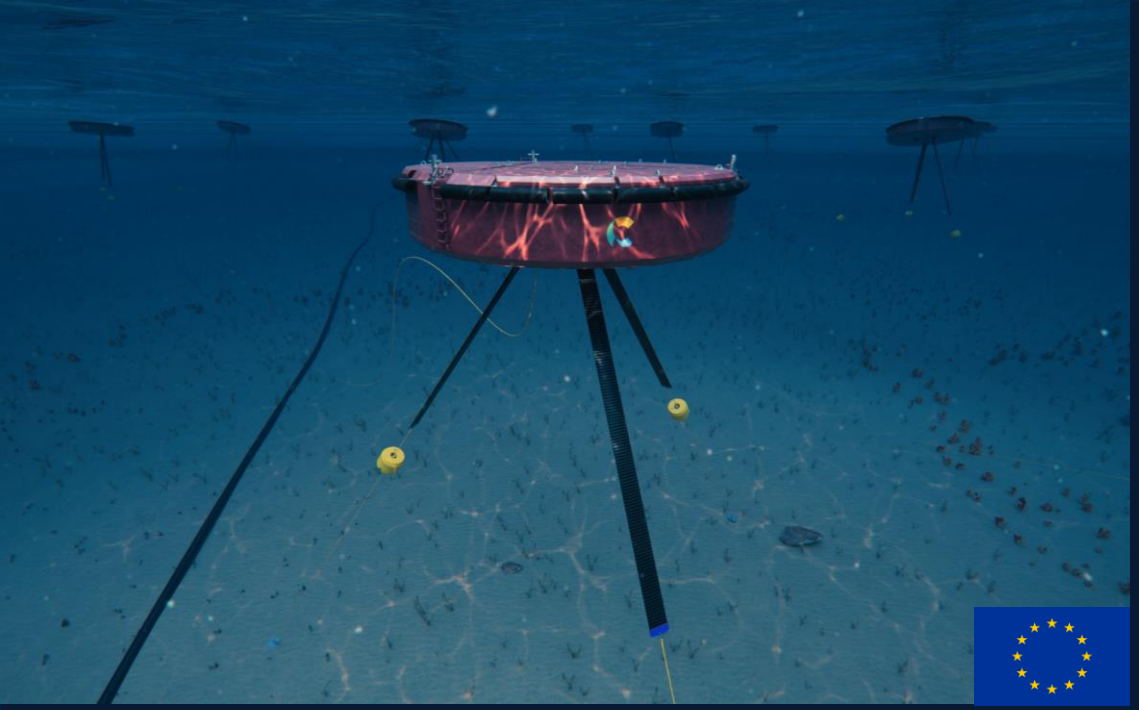
How Carnegie Generates Revenue

- Technology royalties for the use of CETO - annual recurring contracted revenue over 20+ year life of clean energy projects
- Margin on OEM revenue
  - Carnegie is the head contractor for all CETO components and manages the assembly and installation process
  - Contracted revenue based on value and timing of CETO units installed in projects
- Margin on engineering services
  - Feasibility, design, construction and development revenue based on value of renewable energy projects
  - Operational, repairs and maintenance revenue is annual recurring contracted revenue over 20+ year life of renewable energy projects
- Independent modelling estimates Carnegie revenues commence up to 4 years prior to commissioning of wave energy projects that employ CETO technology
- CETO units are estimated to be [75%] of the construction capex of wave energy projects (ex feasibility, permitting, design, etc costs)

Addressable Market

How Large is the Market?

- The European Commission (EC) has set a target of 1GW installed ocean energy capacity by 2030
- This represents up to €5bn ($8.2b AUD) of capex on ocean energy projects by 2030 in the EU alone
- A market share of 10% to Carnegie would represent €500m ($820m AUD) in aggregate revenue
- The EC is targeting €100 per MWh by 2035 and the CETO LCOE model shows we are on track to achieve it
- The International Renewable Energy Agency has identified 350 GW as the global ocean energy potential by 2050



ACHIEVE Project – Basque Country Deployment

EuropeWave Contracted Deployment

- ✓ From initial 36 applicants, Carnegie's ACHIEVE project ranked **number one**
- ✓ Judged on criteria including LCOE, performance, reliability, availability and survivability
- ✓ €3.75m deployment contract awarded in September 2023
- ✓ Design/procurement contracts currently being awarded
- ✓ Target deployment at BiMEP in summer 2025 with 2 years operation
- ✓ Growing team in Spain (Bilbao) to execute the project

Additional National Recognition to Support and Enhance Project

- ✓ Spanish Government (IDAE - Renmarinas) awarded €1.2m in December 2023
- ✓ Basque energy agency EVE awarded €2.1m in March 2024

Total funding pool of €7.05m

Our complementary technology suite

MoorPower

- CETO derived technology to power moored offshore vessels (such as barges in the aquaculture sector) through wave power.
- Can reduce or eliminate offshore diesel usage.
- Validated via $3.4m AUD MoorPower Scaled Demonstrator Project.

Wave Predictor

- Product able to predict upcoming waves using AI up to minutes into the future, before they impact the shore, a structure or a wave energy converter.
- Increases the safety and performance of activities including critical offshore operations and rock fishing.

Mooring Tensioner

- Provides passive tension for CETO and MoorPower products.
- Can be a standalone offering that improves station-keeping for vessels.
- Prototype and test rig built and testing is underway.

MoorPower: Wave Energy for Aquaculture and Offshore Demand

Aquaculture Needs Driving Development

- ✓ Product developed based on requirements and characteristics of offshore aquaculture
- ✓ BE CRC Supported Project
- ✓ Consortium of partners including leading aquaculture companies Huon (JBS owned) and Tassal (Cooke Aquaculture owned)

Demonstrator Deployed

- ✓ Scaled Demonstrator deployed at Carnegie's offshore test site in WA in January 2024
- ✓ Operations commenced

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Current Carnegie Projects

ACHIEVE Programme

CETO Deployment in Europe

€7.05m (A$11.6m) funding secured:

- EuropeWave Contract €3.75m
- Spanish Government Support €1.2m
- Basque Energy Agency support €2.1m

Garden Island Microgrid

A$2.2m Valuation

Conservative Valuation

MoorPower Demonstrator

MoorPower Deployment in Australia

A$3.4m Funding secured with support from the Blue Economy CRC

Our partners

Carnegie has built a strong partner ecosystem

Our partners include:

Hewlett Packard Enterprise

EUROPEWAVE

NREL Transforming ENERGY

tassal

HUON AQUACULTURE

BLUE ECONOMY COOPERATIVE RESEARCH CENTRE

Our announcements are capturing public attention, building pride in what is being achieved

THE AUSTRALIAN

20 THE AUSTRALIAN, WEDNESDAY, SEPTEMBER 6, 2023 theaustralian.com.au/businessreview

Australia must ride the wave of ocean power

JONATHAN FIEVEZ

The power of the sea should never be ignored.

It's a lesson most Australians learn as young children while wading in the shallows; turning your back on even small waves is rarely a good idea.

Yet as adults, it seems this is a lesson we may need to relearn.

As coal retires from our power system we need at least 90 per cent of the world's electricity to come from renewable sources.

Wind and solar farms, once controversial, are now commonplace and an essential part of the energy mix. Yet the question of what happens when the wind doesn't blow and the sun doesn't shine still needs answers.

Wave energy provides one of those answers.

What happens on a still night when solar stops producing and the wind is calm?

Look out to sea, the waves keep rolling in.

It is variable, but consistent and highly predictable – a unique feature among other renewables.

This is why Australia's dramatic coastline isn't just beautiful, it also has the potential to accelerate the country's rise into a clean energy superpower. In fact, the CSIRO says we possess the world's largest wave energy resource.

It is generation with near zero emissions and enormous potential. But wave energy technology still requires more development.

We are currently at a similar

It will eventually supply cities, remote communities, offshore aquaculture and other offshore commercial facilities with affordable, reliable and sustainable energy.

Many countries, including Australia, China, Britain, France, Spain and the US, are currently developing wave energy.

Our Australian technology is grabbing the attention of these countries and many more. What we've developed and tested in the waves in Western Australia and overseas has the potential to harness the power of the ocean right around the world.

At the moment, governments abroad are leading the way when it comes to supporting the development of this technology.

Ironically, most of these countries have coastlines smaller than Australia's with lower wave energy potential, but they recognise the opportunity ar want to capture a leadership in order to deliver the value t the environment and their economy.

As fossil fuels leave the system over the next decade will need all the tools in our toolbox to ensure a resilient cost-effective grid.

The reasoning behind rec declaration of offshore wind zones in Gippsland and the Hunter makes similar arguments.

It isn't one form of generc or another, it's about acting all of the renewable energy opportunities in our portfoli get to where we need to be ir time to make a difference.

Will it hap

OFFSHORE ENERGY

Spain backs Carnegie with €1.2M for CETO wave energy device deployment

OE OFFSHORE ENGINEER

THE FUTURE OF OFFSHORE ENERGY & TECHNOLOGY.

REGIONS ENERGY GEOSCIENCE ENGINEERING TECHNOLOGY VESSELS SUBSEA DRI

Carnegie Launches Wave Energy Device to Power Moored Vessels

Oct 20, 2021

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Which ASX stocks are protecting their IP with a green technology patent?

Green tech innovation is essential to achieve climate change goals and many countries have fast-tracking schemes in place for green tech patents.

Emma Davies

7 min read September 11, 2023 - 12:27PM Stockhead 0 comments

THE SYDNEY MORNING HERALD FRIDAY, JANUARY 5, 2024

32 Business

Gold (spot) $US2044.09 +1.25 | Iron ore $US142.2 -1.40 | WTI Crude $US73.01 +2.63

S&P/ASX 200 Thursday -0.39%

BEST WORST

Insignia Fin +0.94 | Arcadium Lithium

Tuas +5.33 | Bellevue Gold

Mirvac +4.39 | Block Inc

Johns Lyng Grp +3.90 | Genesis Minerals

AMP +3.78 | Perseus Mining

New wave of high-tech to fix nation's energy storage

RENEWABLES Simon Johansson

When Jonathan Fievez, chief executive of Carnegie Clean Energy, had his first child he'd just finished a long stint with

degrees, vanadium flow batteries, and compressed air generators.

COMPRESSED AIR

A decade ago, engineer Curtis VanWalleghem co-founded Canadian energy innovator Hydrostor, a company specialising in storing energy as compressed air.

VanWalleghem previously worked in the nuclear and wind

Carnegie Clean Energy CEO Jonathan Fievez. Photo: Trevor Collens

The plant takes electricity from the grid when it's cheap, converts it to compressed air underground, and sells it back when demand and prices are higher, using a technique that's surprisingly simple.

Electric-powered compressors force air down a narrow underground shaft, displacing water from a subterranean cavern through a different, larger gooseneck shaft where the liquid rises to the surface. When power is needed, gravity does the work. A valve releases water in the other direction, pushing the stored compressed air back up through electricity turbines on the surface.

Hydrostor will fashion its generator from a disused section of Broken Hill's Potosi zinc and silver mine, allowing it to build a smaller and cheaper version.

"We've leased from Perilya [the mine's owner] that space which allowed us to do a smaller project as our first project in Australia," VanWalleghem said.

FLOW BATTERIES

About 10 per cent of energy flowing into the national electricity market now comes from renewables, with coal

generating 56 per cent and gas around 6 per cent. The Australian Energy Market Operator says it will soon face times when the grid is powered almost entirely by renewables, whose variability has implications for the system's security and strength.

Another company wanting to smooth the load during peaks built Australia's first commercial

Invinity's two-megawatt-flow battery is connected to a solar farm at Yadlamalka Energy's Spencer Energy Project. Unlike solid state lithium-ion batteries, it relies on a liquid electrolyte infused with vanadium, a relatively abundant, conductive metal that can hold electrons, has a long life cycle, and doesn't degrade over time.

"We will be extracting energy from waves on a large scale. It's just a question of when."

Jonathan Fievez, Carnegie Clean Energy

vanadium-flow battery earlier this year in Bungama, outside Port Pirie in South Australia.

Vanadium-flow batteries were invented at the University of New South Wales in the mid-1980s. Their main advantage over their grid-scale lithium counterparts is their longevity, large storage capacity, and ability to charge and discharge without limitation, says Michael Butt, the regional director for UK-based Invinity Energy Systems.

"We use a 20-foot container footprint. Multiples of those are interconnected to create an energy storage system," Butt said. Inside each container sit two tanks – one positive, the other negative – stacked with cell membranes through which the electrolyte circulates, charging or discharging electric current.

The system stores energy from its nearby solar network and dispatches into the grid.

"We're looking at the

Australian market and seeing a very bright future," Butt said.

WAVE ENERGY

To successfully transition the grid, Australia needs to triple its renewable-energy output by 2030 and increase it seven-fold by 2050, AEMO says in its latest *Draft 2024 Integrated System Plan*.

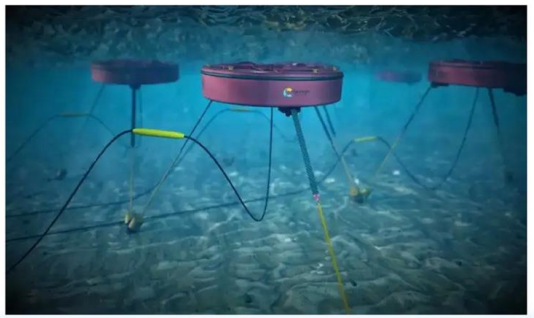
About 6 gigawatts, enough to power 540,000 homes, of extra capacity is needed each year, compared to 4 gigawatts currently being built. Many other countries face similar energy dilemmas and Europe, in particular, is keen to tap into the latent power of the oceans.

"Waves are incredibly powerful. They can lift a cruise or container ship up and down effortlessly," Fievez said.

Carnegie has developed a 20-metre wide, hockey puck shaped, submersible buoy that hovers a few metres under the ocean's surface. Each unit is capable of generating 1 megawatt of energy. As the wave passes, the buoy lifts and three belts attached to the seabed drive electric winches in the buoy, passing the current generated through cables back to the shore.

"Remarkable:" Australian wave energy pioneer wins major tender to build first unit in Spain

Sophie Vorrath 6 September 2023 10



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Wave energy can complement solar and wind, Carnegie Clean Energy CEO Jonathan Fievez said. (PR HANDOUT IMAGE PHOTO) Credit: AAP

Europe selects Aussie wave technology for ocean energy

Carnegie CLEAN ENERGY

Our wave energy technology generates clean electricity at competitive costs at commercial scale

- This innovation has the potential to bolster energy security, reliability and affordability globally
- Levelised cost of energy for Carnegie's CETO technology is dropping on a trajectory that is meeting or exceeding the maturity pathway of the renewable technologies that came before it (such as wind and solar PV)
- OEE currently forecasts 100MW installed ocean energy by 2025 and 1GW by 2030 in Europe alone. This represents a large and near-term addressable market for CETO
- Carnegie Clean Energy as a business has evolved. The technology has been independently verified and is being deployed, and the business model has been developed with multiple sources of annualised recurring revenue in a rapidly growing market
- We are engaging with strategic partners who share our vision and understand that scale is the key to unlocking potential for the planet

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