

## **ASX Announcement**

**15<sup>th</sup> October 2014**

Please find attached presentation from Carnegie Wave Energy Limited's Chief Executive Officer Dr Michael Ottaviano, which will be delivered at shareholder information sessions across Australia.

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## CWE Shareholder Update

15 October 2014

Dr Michael Ottaviano  
Chief Executive Officer



# Disclaimer

The information contained herein has been prepared solely for informational purposes and is not an offer to buy or sell or a solicitation of any offer to buy or sell any security or to participate in any trading strategy or to enter into any transaction. If any offer of securities is made, it shall be made pursuant to a definitive offering memorandum prepared by or on behalf of any fund or other issuer which would contain material information not contained herein and which would supersede this information in its entirety.

# 2014 – achievements to date

- 1MW CETO 6 design unveiled (March)
- \$20m CETO 6 CEFC debt facility for CETO 6 (March)
- \$9.5m CETO 6 capital raise (April)
- \$11m CETO 6 grant (June)
- CETO 5 Perth Wave Energy Project
  - Offshore foundations installed
  - Pipeline installed
  - CETO unit components delivered and assembled
  - Onshore power and desalination plants constructed
  - Unit & pod deployment phase now commenced





# Carnegie Overview

- Owner and developer of “CETO” wave energy technology
- 40 engineering, commercial, administration staff
- ASX listed, based in Fremantle, Western Australia
- Subsidiaries in UK, Ireland and Chile
- 120 Patents or patents pending globally
- \$100m spent to date on CETO
- EDF (Electricite de France) is a CETO power licensee



# Carnegie Trading Snapshot

- Financials(30/9/14)
  - \$9.5m cash
  - \$18m undrawn grants
  - \$20m undrawn five year loan facility
  - \$1m p.a. royalty



# Carnegie Board of Directors

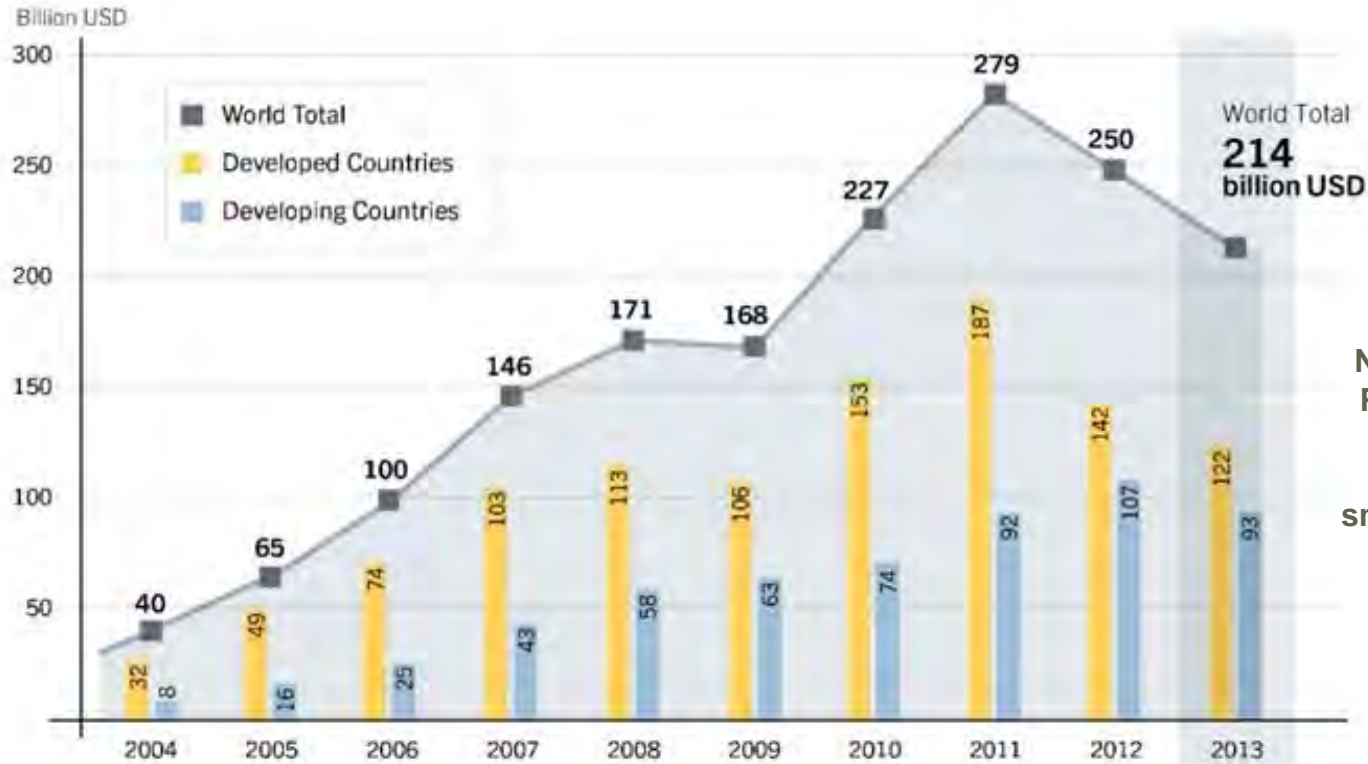


**L-R: Kieran O'Brien (ex ESB), Mike Fitzpatrick (ex Hastings), John Leggate (ex BP), Jeffrey Harding (ex Pacific Hydro), Michael Ottaviano (MD & CEO), Grant Mooney (Chairman)**



# Global Renewables Market Still High

## Global New Investment in Renewable Power and Fuels, Developed and Developing Countries, 2004–2013



Note: a record amount of PV capacity (39GW) was constructed in 2013 for less money than the smaller 2012 total of 31GW

Data Source: UNEP FS / BNEF Global Trends in Renewable Energy Investment 2014

REN21. 2014. *Renewables 2014 Global Status Report* (Paris: REN21 Secretariat).

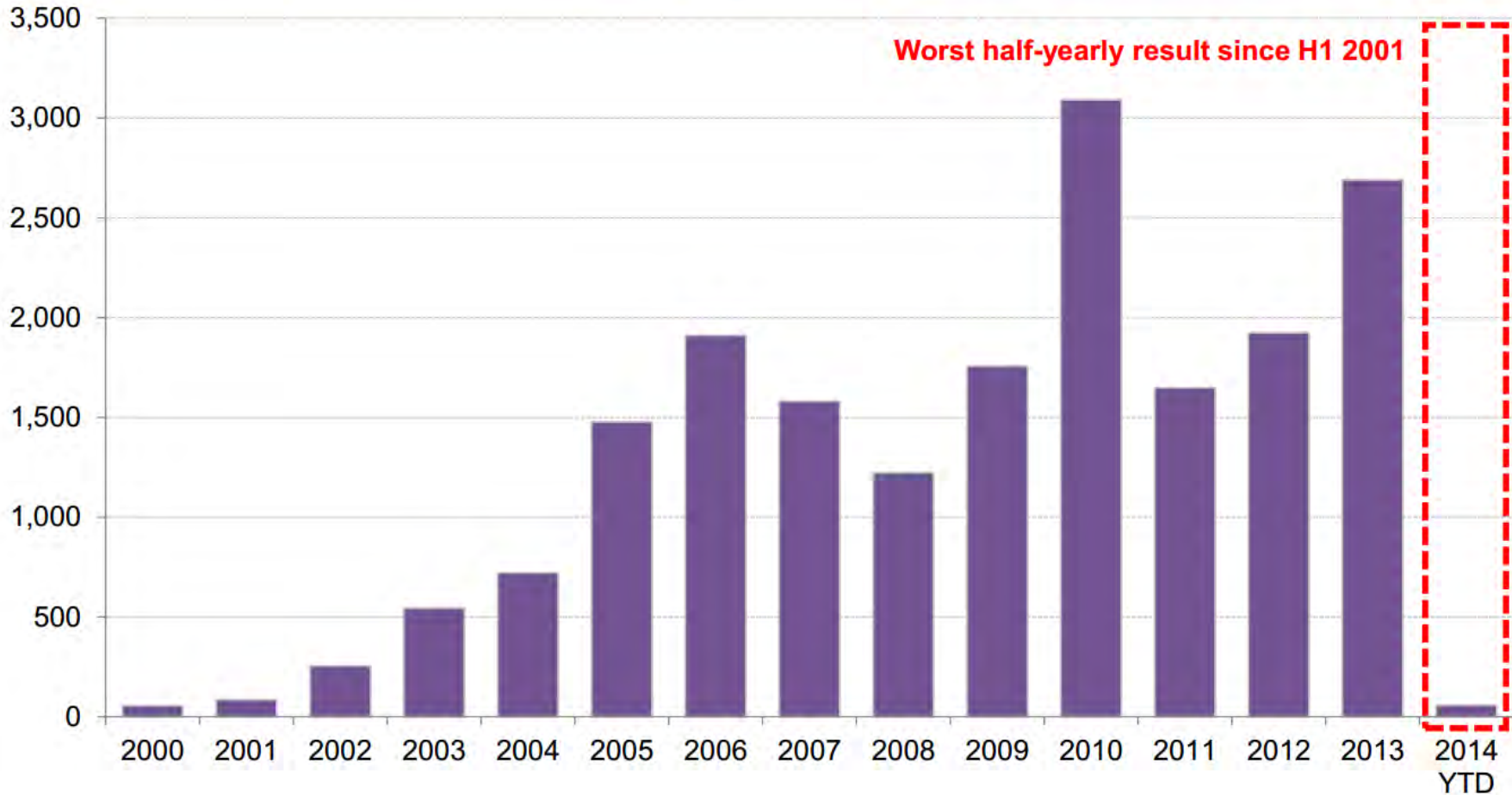


- International Energy Agency (IEA) forecast \$10 trillion of new energy generation investment over the next 20 years, 60% to come from renewables



# While Australia's Halts

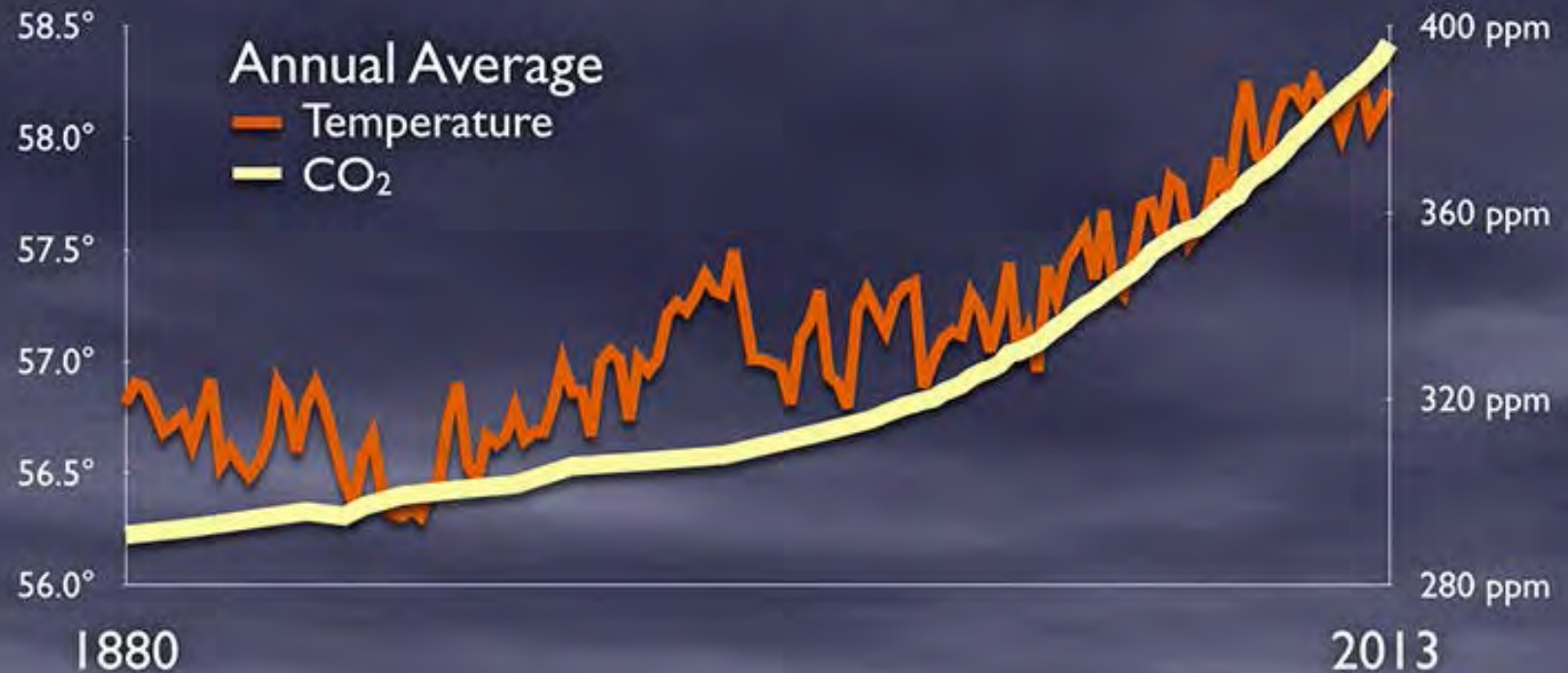
## Large-scale investment in clean energy, 2000-14



Source: Bloomberg New Energy Finance

# Other trends continue

## Global Temperature and CO<sub>2</sub>



Source: National Climate Assessment 2014

# Fossil fuel divestment – fad or trend?

## FTSE develops “ex Fossil Fuel Index Series”

April 2014

### Media Information

**FTSE**

### FTSE Group Develops Ground-breaking Global ex Fossil Fuels Index Series

- Indices will omit companies linked to ownership and/or extraction of carbon based fossil fuel reserves
- BlackRock to launch investment solution that tracks benchmark
- Natural Resources Defense Council (NRDC) providing seed investment

**Global, [29] April 2014:** FTSE Group (“FTSE”), the global index provider, today announces the launch of the FTSE Developed ex Fossil Fuels Index Series, an innovative set of benchmark indices that excludes companies linked to exploration, ownership or extraction of (carbon reserves) fossil fuels. This ground-breaking launch is leading the way to implementation of a total exclusion model for fossil fuel-linked stocks, so that excluded enterprises are removed entirely from the Index Series.

BlackRock, the world’s largest fund manager, intends to launch a solution that tracks FTSE’s new benchmark utilizing seed capital from Natural Resources Defense Council (NRDC), a not-for profit organization with 1.4 million members that works to protect the world’s natural resources, public health and environment. The Index Series has been designed with the close co-operation of BlackRock and NRDC.

### Investor tracking the index

**BLACKROCK®** 7,000+ portfolios  
\$4.32 trillion assets under management

### Finance hub

From Guardian Sustainable Business

## Organisations controlling £30bn are divesting from fossil fuels

From Stanford University and the British Medical Association the Quakers – organisations and wealthy individuals are shunning investments in dirty energy

### FTSE Managing Director:

“This is one of the fastest-moving debates I think I’ve seen in my 30 years in markets”



**ClimateSpectator**

HOME SPECTATORS DATAROOM ECONOMY MARKETS POLITICS TECHNOLOGY

So

## Fossil-free superannuation is an idea that's going to snowball

DANIELLE LOGUE | 15 SEP, 9:46 AM | 7  
CLIMATE | POLICY & POLITICS

### The Conversation

The launch of Future Super, which claims to be the first super fund in Australia to exclude fossil fuels and their major supporting companies from its investment portfolio, has drawn significant attention. It raises two important questions: do strategies to divest from fossil fuels work? And can such a fund deliver financial performance as well as social and environmental impact?

Let's start with the first question. Future Super has divested of fossil fuels, directing its investments into renewables instead. And while it may be the first Australian super fund to do this on a blanket basis, similar steps are being taken around the world.

CTIONS HOME SEARCH

U.S.

The New York Times

## Rockefellers, Heirs to an Oil Fortune, Will Divest Charity of Fossil Fuels

By JOHN SCHWARTZ SEPT. 21, 2014

John D. Rockefeller built a vast fortune on oil. Now his heirs are abandoning fossil fuels.

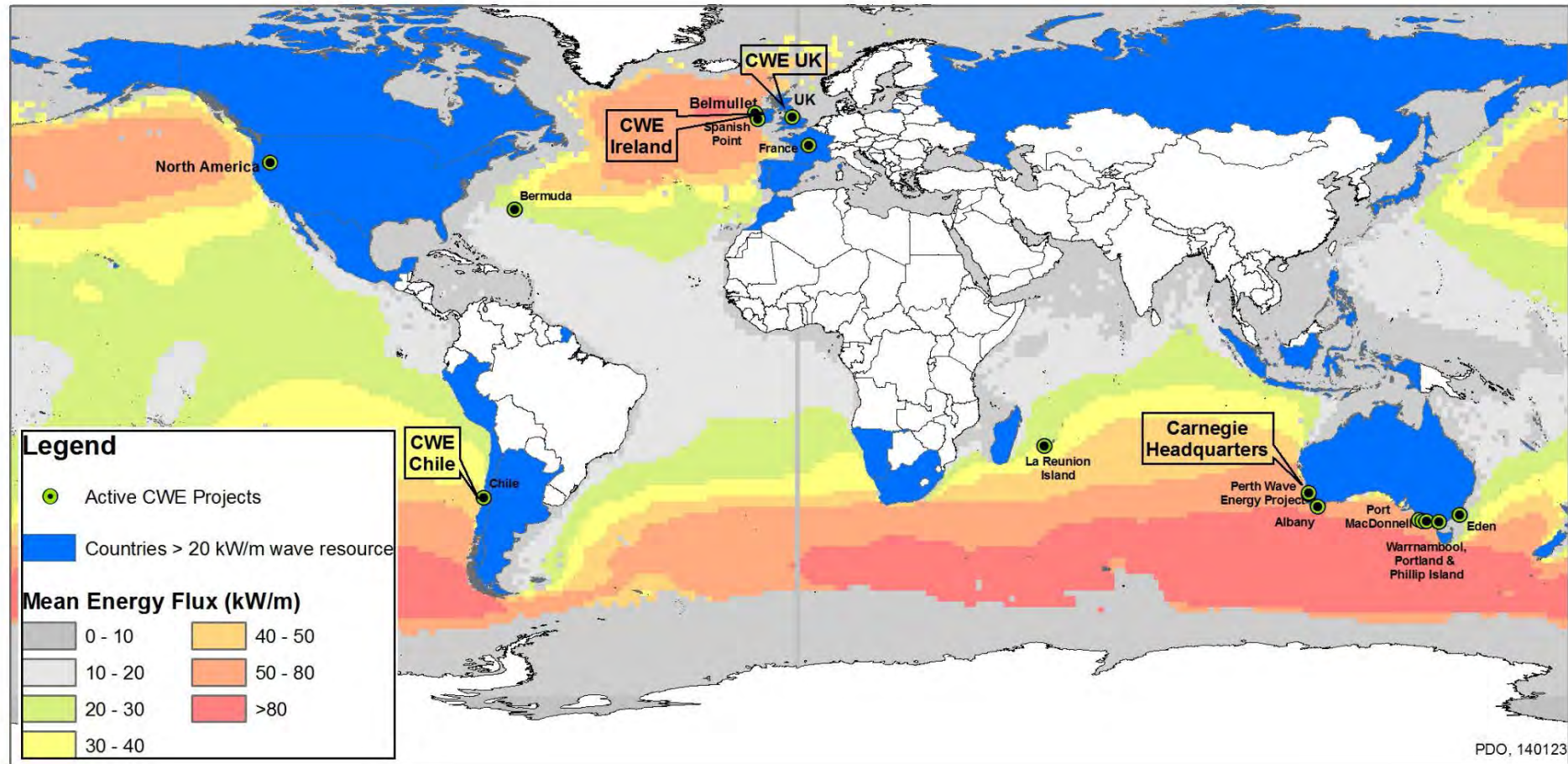
The family whose legendary wealth flowed from Standard Oil is planning to announce on Monday that its \$860 million philanthropic organization, the Rockefeller Brothers Fund, is joining the divestment movement that began a couple years ago on college campuses.

The announcement, timed to precede Tuesday's opening of the United Nations climate change summit meeting in New York City, is part of a





# Global Wave Resource > Current Global Power Use

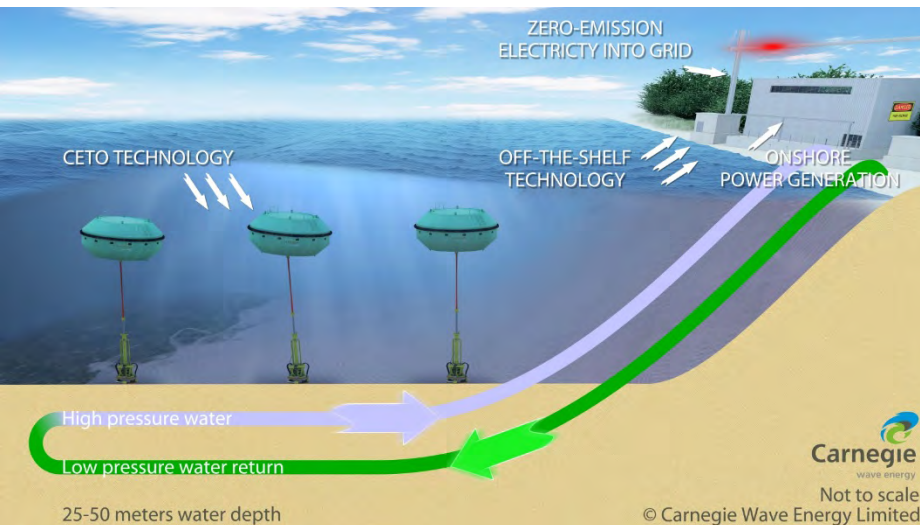


- Market is global, large and co-located with demand centres
- Resource is more predictable, consistent and available than wind or solar
- Total resource potential = >200TW (200 million MW)

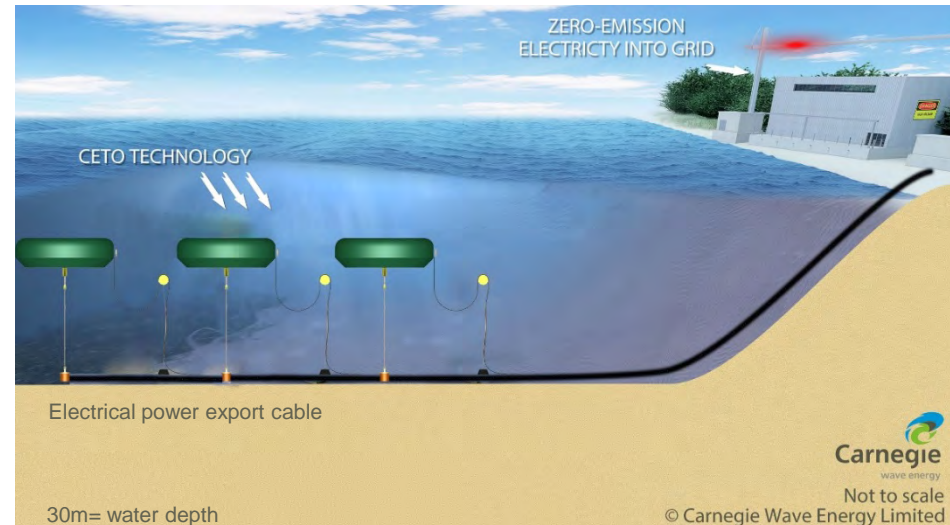


# CETO Technology

- Fully submerged, point absorber
- Near-shore location or deepwater location
- Onshore or offshore power generation
- Power & water production with onshore production
- Modular design largely using proven subsea components



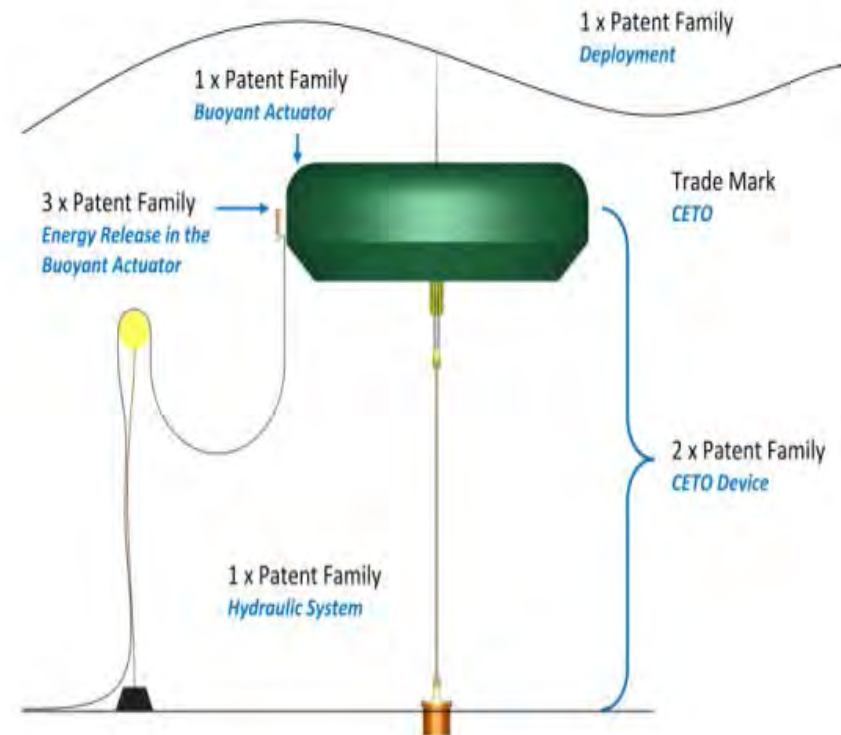
**Near-shore location & onshore power & water  
(CETO 5 configuration)**



**Deepwater location & offshore power production  
(CETO 6 configuration)**

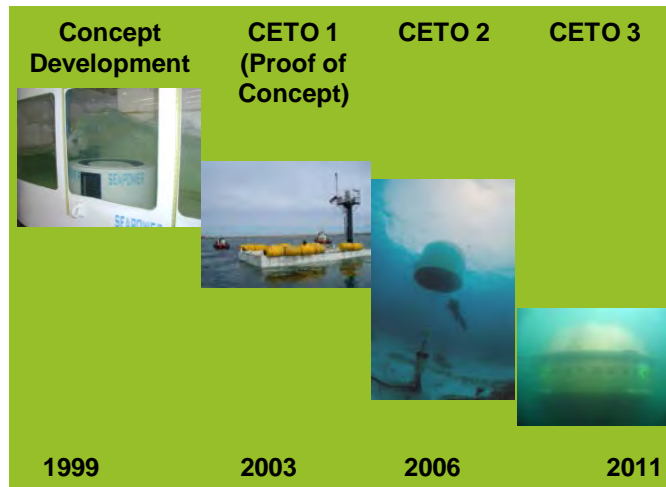
# CETO Intellectual Property Management

- CWE invests up to **\$1m per annum** in the management and maintenance of its intellectual property portfolio
- An Independent Expert's Report described the investment in CETO as having “...**created significant IP barriers to entry**...”.
- CWE's patent portfolio consists of **8 patent families** covering the strategic elements of the CETO technology. There are more than **120 patents and patents pending**.
- Carnegie has also developed significant “**soft**” IP e.g. know-how, modelling, process design, control algorithms etc that is essential to successful technology design and operation

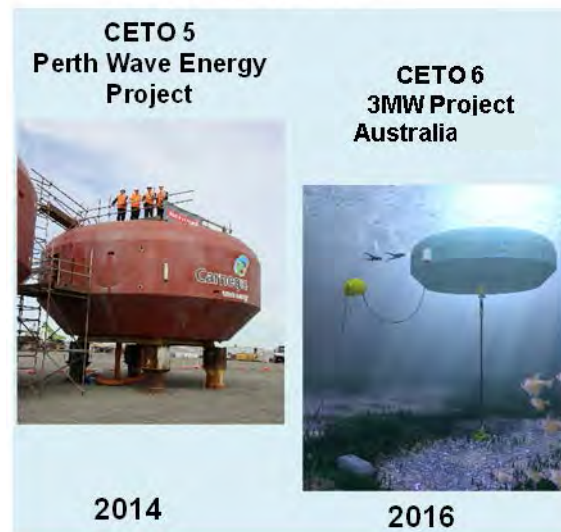


# Development Pathway

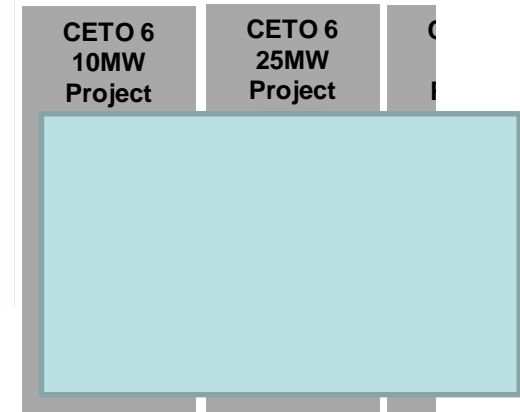
## Completed



## In Progress



## Commercial Projects



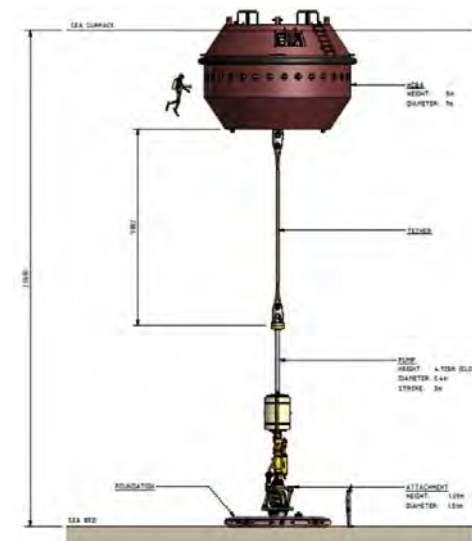
Development capital

3<sup>rd</sup> party project funding/finance

Revenues



# Track Record of Ocean Testing – 80kW unit





# Perth Wave Energy Project

- 3 x 240kW CETO 5 units
- 100NB, 3000psi flexible pipeline 3.2km ashore
- Onshore power plant and grid connection
- Onshore reverse osmosis desalination pilot plant
- \$22m in Government grant funding. \$18m in CWE funding.
- Power & Water Offtake to Australian Department of Defence (HMAS Stirling)
- Location: Onshore & 3km offshore from Garden Island, Western Australia



*Australian Industry Minister, Hon Ian Macfarlane*

**Captain Angela Bond, CO HMAS Stirling**



# Perth Wave Energy Project - desalination

- Integrates off-the-shelf reverse osmosis desalination technology with the CETO infrastructure.
- The Perth Project will be the first wave project to produce clean power and fresh water anywhere in the world.
- Cooperation agreement with Western Australian Government owned Water Corporation
- Water supply agreement with the Department of Defence
- Desalination plant capable of 50m<sup>3</sup>/day potable water production off CETO project or off grid



*“Carnegie’s wave powered seawater desalination technology offers a novel and promising approach to achieving desalinated freshwater with zero greenhouse gas emissions”*

*Sue Murphy, CEO, Water Corporation*



# Perth Wave Energy Project – offshore foundations





# Perth Wave Energy Project – pipeline installation



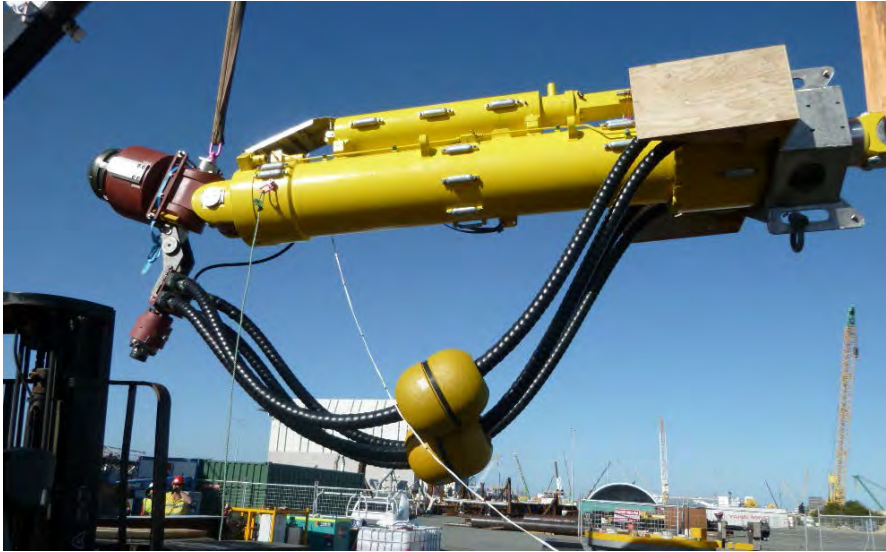


# Perth Wave Energy Project – power, desalination, grid connection





# Perth Wave Energy Project – pumps, pods, tethers, attachments



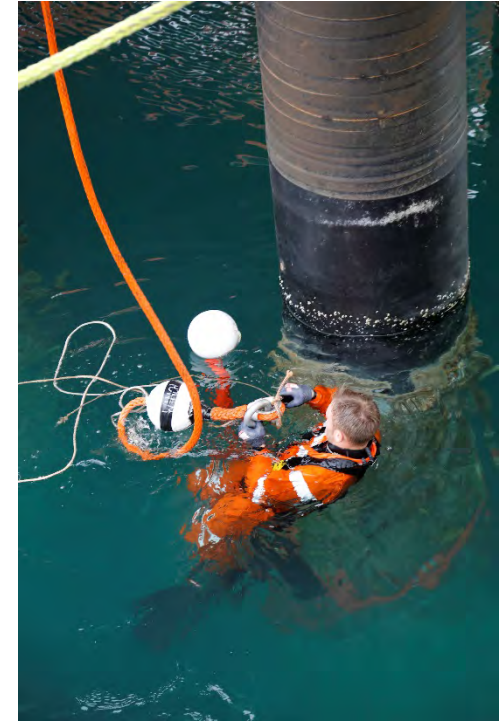


# Perth Wave Energy Project – buoyant actuators





# Perth Wave Energy Project – onshore assembly & test





# Perth Wave Energy Project – CETO Unit #1

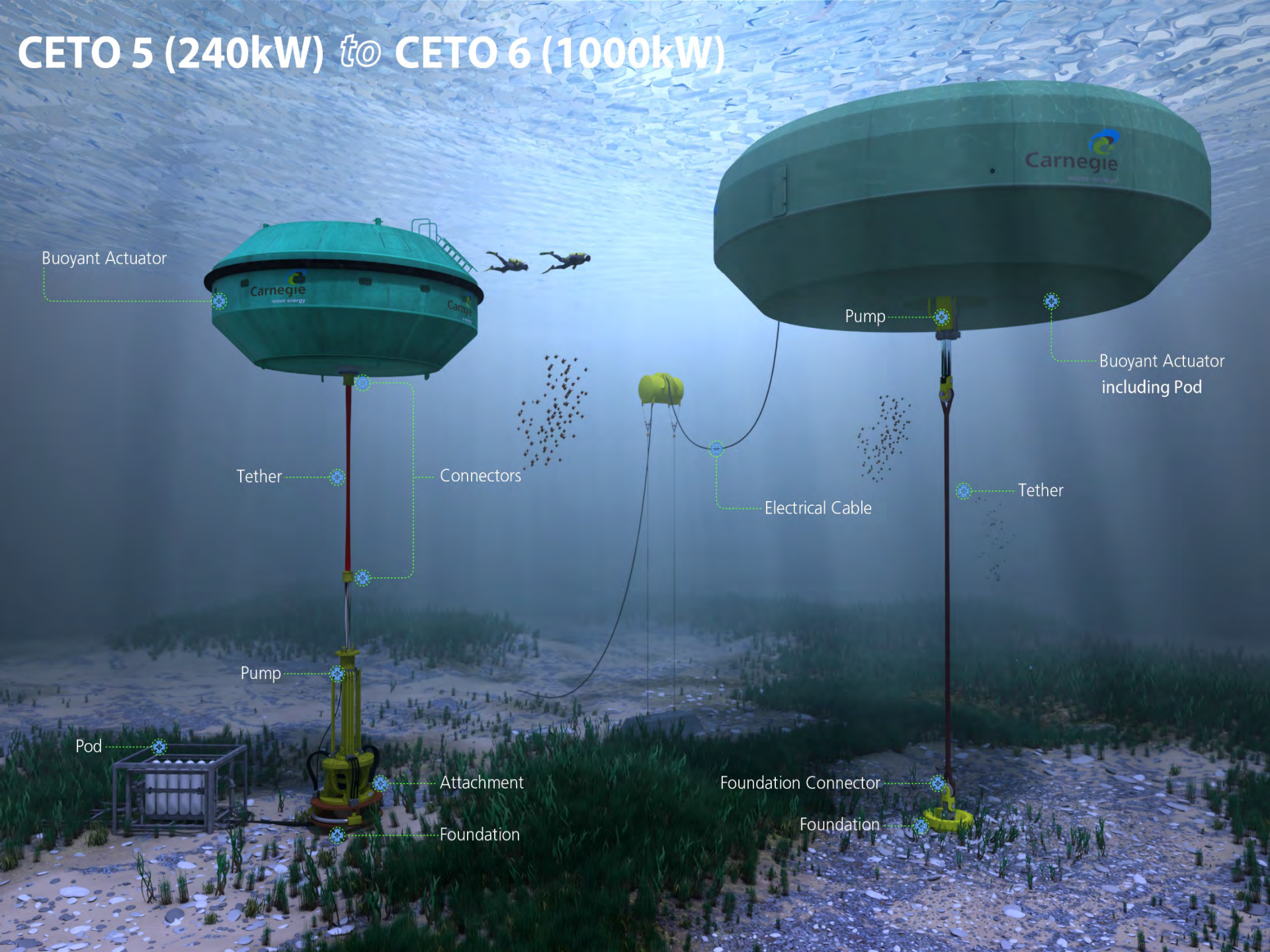


# Perth Wave Energy Project Status

- Deployment phase now commenced (Unit & Pod #1). Further update post pod & unit deployed & initial operation.
- Units & Pods #2 & #3 to follow.
- Operate for minimum 12 months through 2015
- Data collection and analysis is primary objective to validate computational models
- Validated models used to finalise CETO 6 design in 2015



# CETO 5 (240kW) to CETO 6 (1000kW)



Buoyant Actuator

Carnegie  
wave energy



Tether

Connectors

Pump

Pod

Attachment

Foundation



Pump

Buoyant Actuator  
including Pod

Tether

Electrical Cable

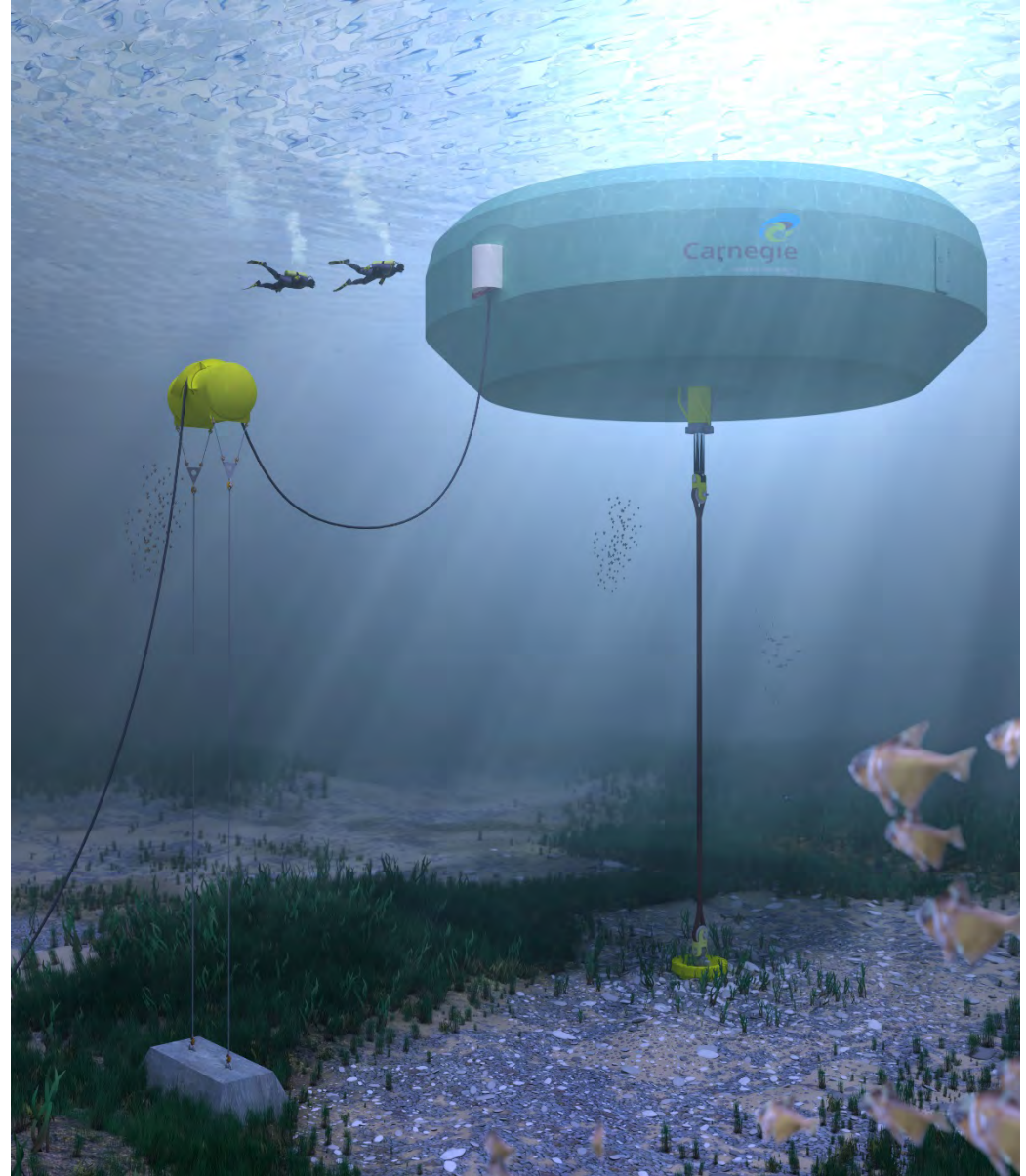
Foundation Connector

Foundation



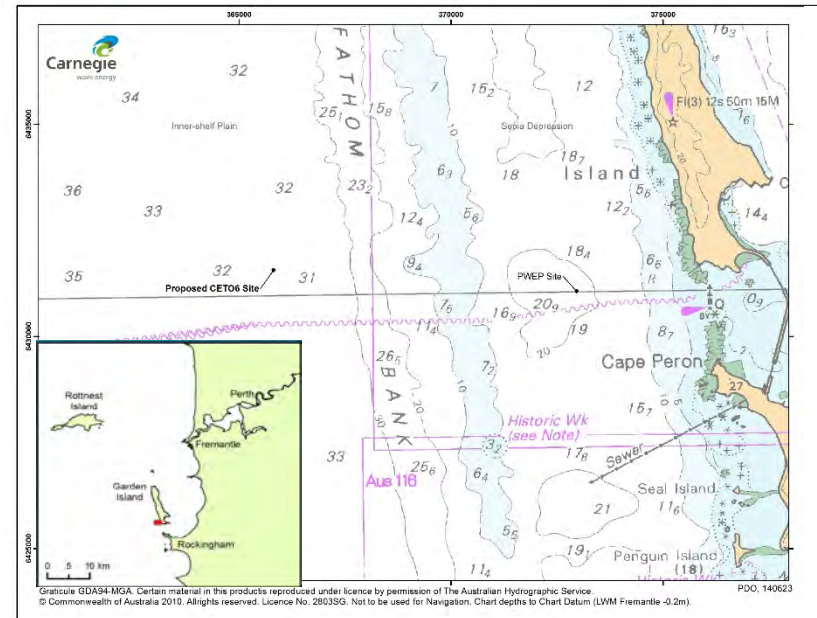
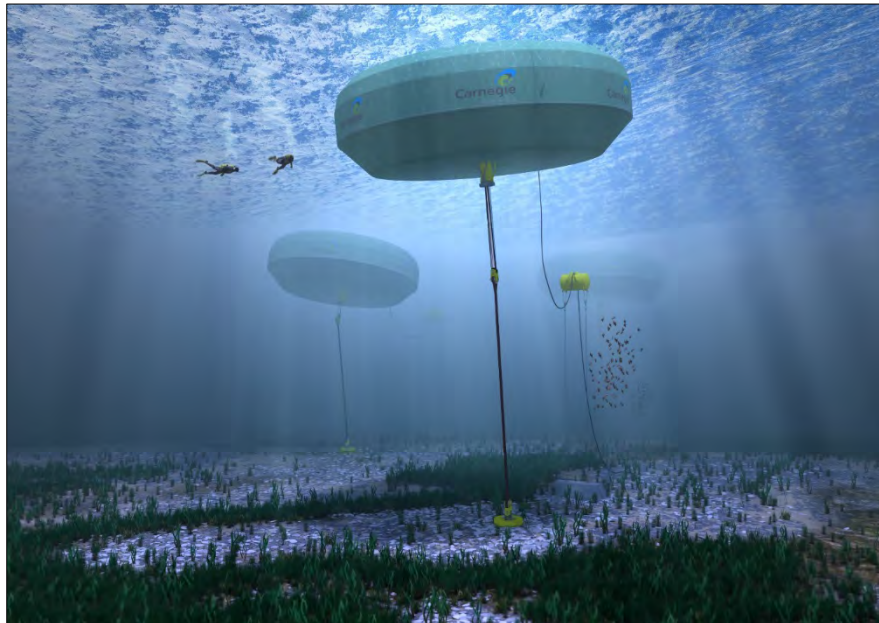
# CETO 6 – Next Generation Design

- 1MW capacity target
- 4 x increase in rated capacity vs CETO 5 => ~50% increase in diameter
- On board power generation
  - Removes heavy lifts (pods on seafloor)
  - Further simplifies install and O&M
  - Enhances ability to tune/control system
  - Allows deeper water and further distance from shore
  - Replaces hydraulic transmission (piping) with electrical transmission (cable)
- First commercial production design



# CETO 6 Demonstration Project

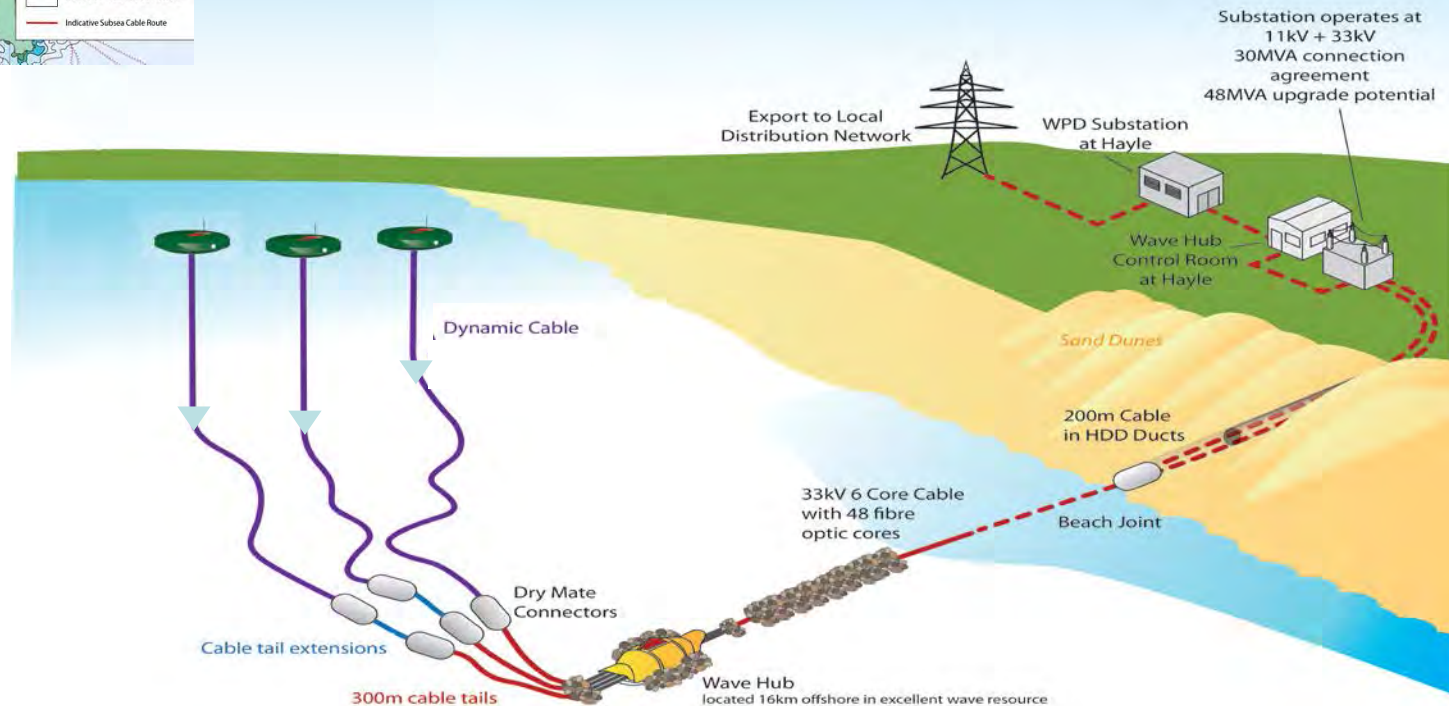
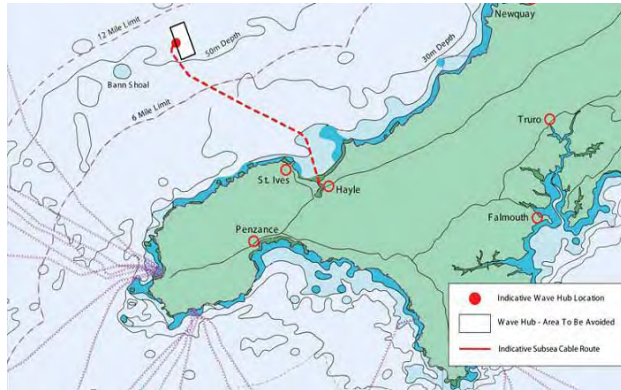
- 3MW CETO 6 project: 3 x 1MW CETO 6 units
- Design start: 2013. Project commissioning: 2016
- Location: Garden Island, Western Australia. Further offshore (deeper water, higher energy waves) than CETO 5 Perth Project
- Offtaker: Australian Department of Defence (HMAS Stirling)
- ca. \$46m total budget
- Funded by CWE, CEFC loan & Government grant.





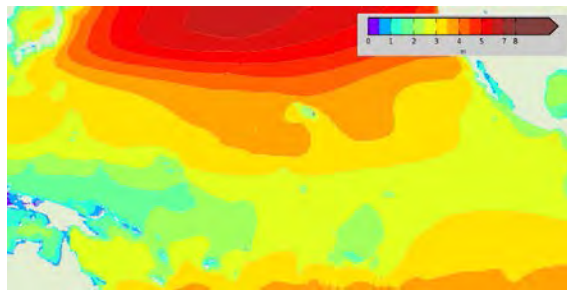
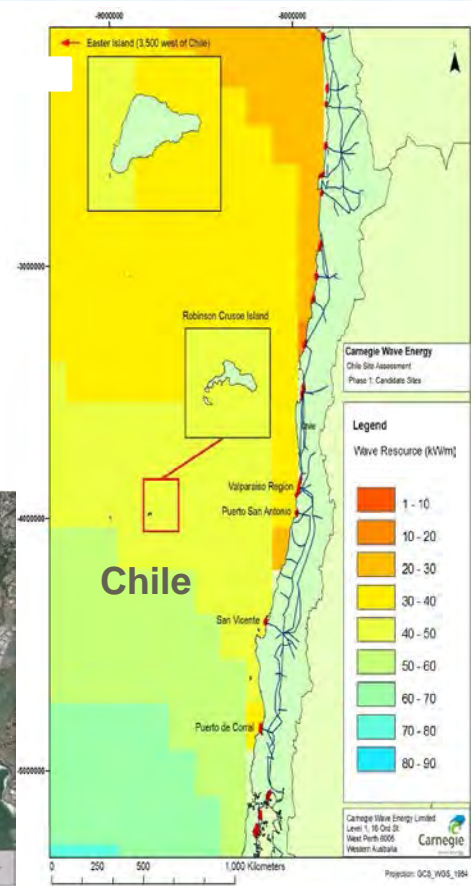
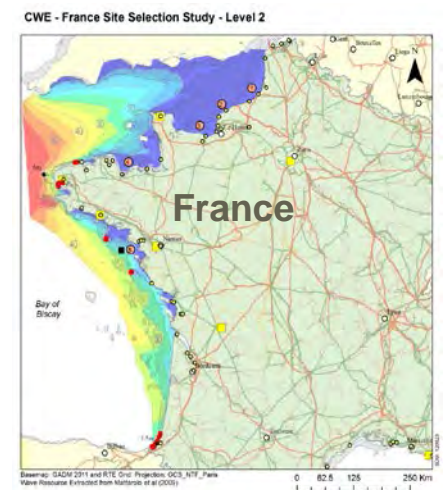
# UK CETO 6 – Wave Hub, Cornwall

- 3MW + 7MW CETO 6 project
- Planned commissioning in 2018.
- \$50m+ spent by UK Govt on existing offshore and onshore power infrastructure and grid connection.
- Existing infrastructure capable of hosting 50MW project
- Supported by \$500/MWh feed in tariff. Govt grant potential

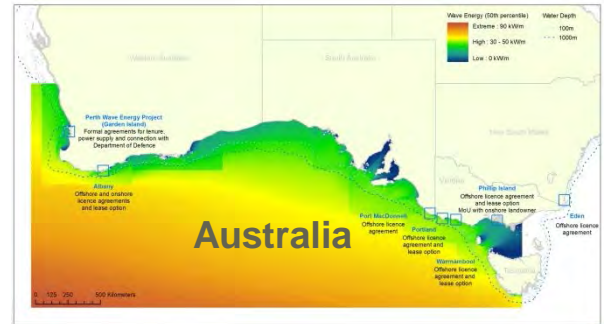
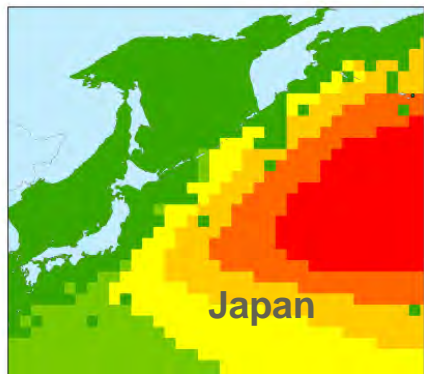
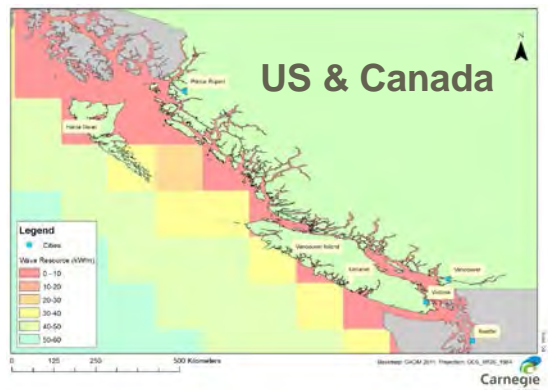




# Commercial Priority Markets - Snapshot



Remote Islands



# Milestones



- 2011-13:
  - ✓ Single unit test (CETO 3) at project site
  - ✓ Power offtake with Dept of Defence
  - ✓ \$22m in Government grants secured
  - ✓ Design & approvals of Perth Project
- 2014:
  - ✓ Start construction of Perth Project
  - ✓ CETO 6 project design and location
  - ✓ \$40m in CETO 6 project funding secured
  - Power and water production from Perth project
- 2016:
  - CETO 6 project (Garden Island, WA)
- 2017:
  - CETO 6 project (Wave Hub, UK)