

## **ASX Announcement**

**Thursday 25<sup>th</sup> February, 2016**

### **International Conference on Ocean Energy (ICOE) Presentation**

Please find attached Carnegie Wave Energy's presentation delivered yesterday at the 6th annual International Conference on Ocean Energy (ICOE). The presentation was delivered by Tim Sawyer, the Chief Executive Officer of CWE UK, in Edinburgh, Scotland.

The International Conference on Ocean Energy brings together the world's leading ocean energy delegates to share knowledge, showcase technologies and meet new international partners, investors and suppliers.

For more information:

Dr Michael Ottaviano

Managing Director

Carnegie Wave Energy Limited

(08) 9335 3993

[enquiries@carnegiewave.com](mailto:enquiries@carnegiewave.com)

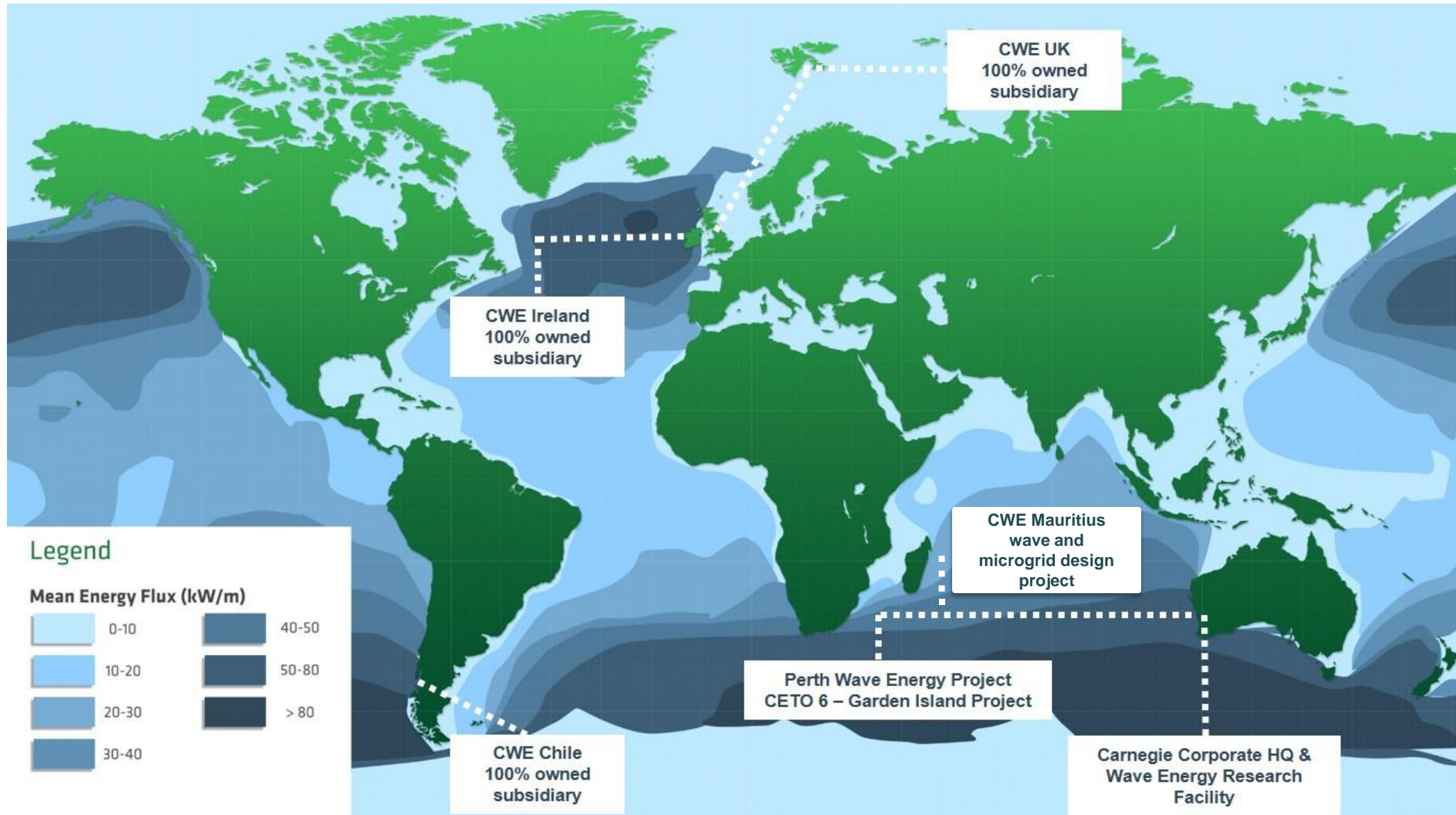
Website: [www.carnegiewave.com](http://www.carnegiewave.com)



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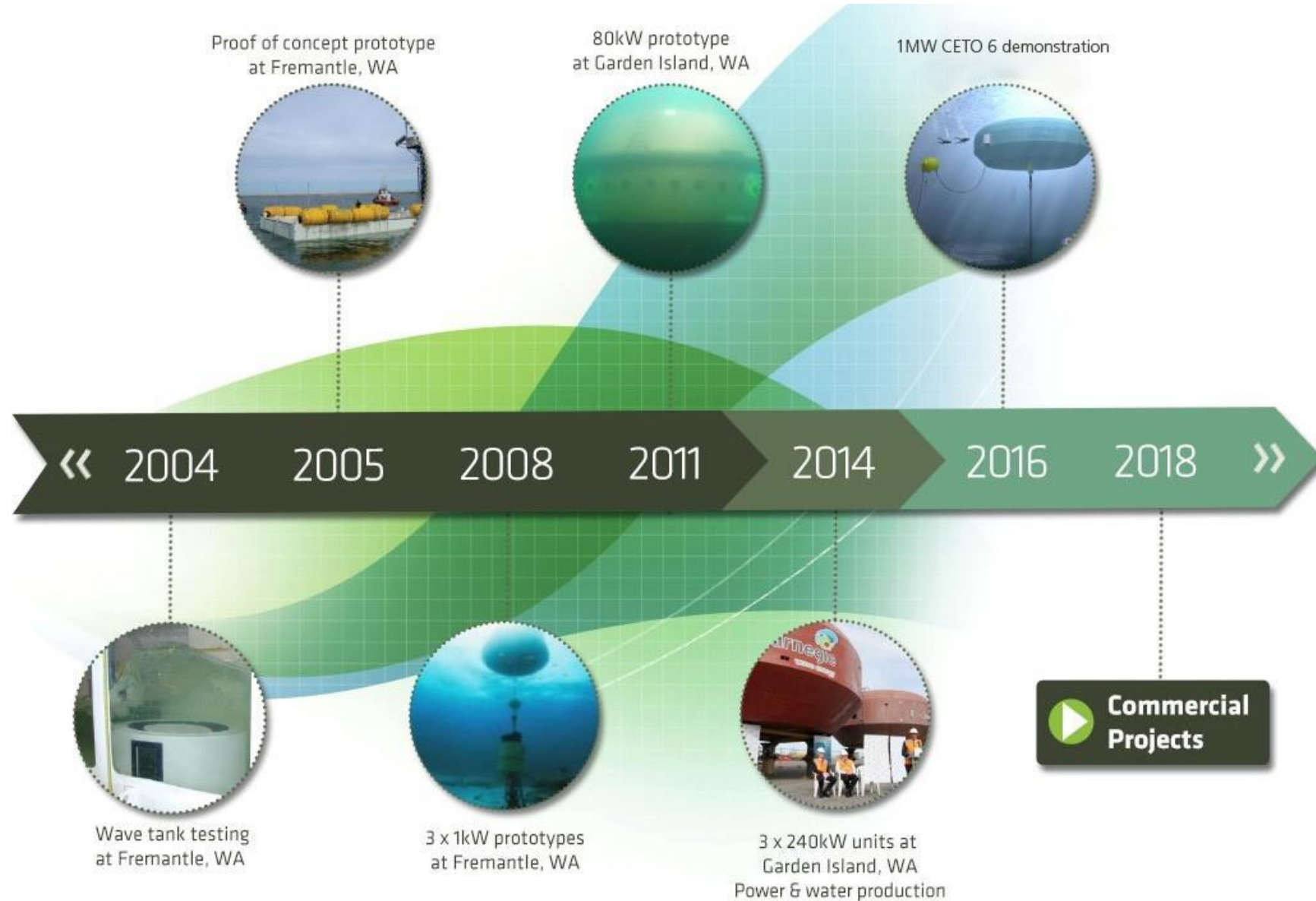
# Global Focus on Highest Opportunity Markets



# Multidisciplinary Carnegie Team



# Technology Development & Commercialisation Roadmap



An aerial photograph of the Perth Wave Energy Project, showing three wave energy converters (WECs) in the ocean. Each WEC consists of a vertical structure with a red and white striped tower, surrounded by a circular area of greenish water. The ocean is dark blue with small, choppy waves. The text "The Perth Wave Energy Project" and "CETO 5" is overlaid in the bottom left corner.

# The Perth Wave Energy Project

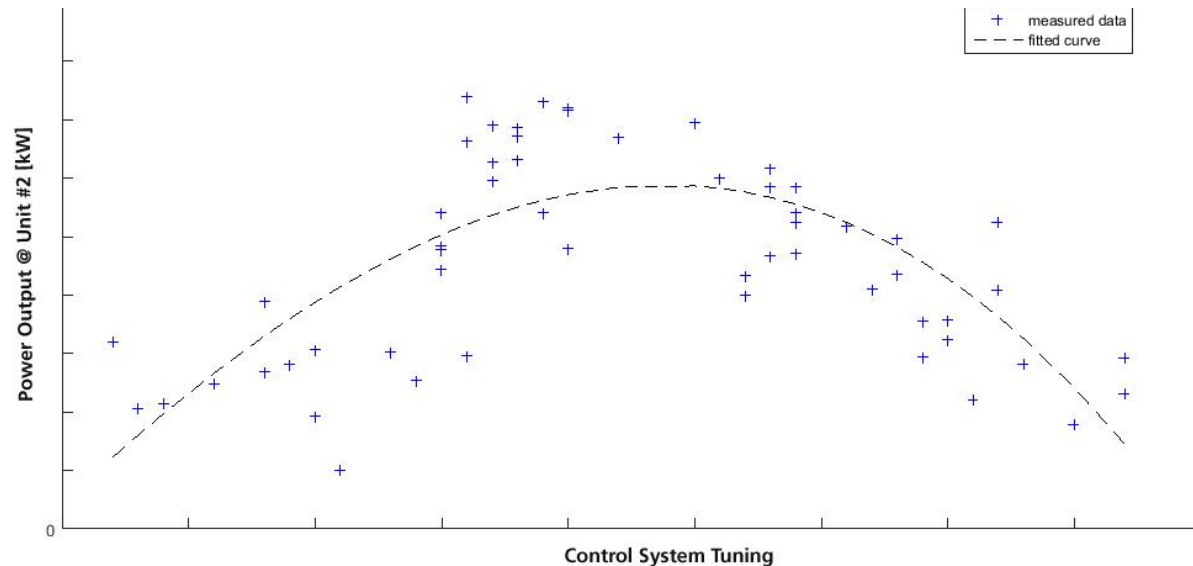
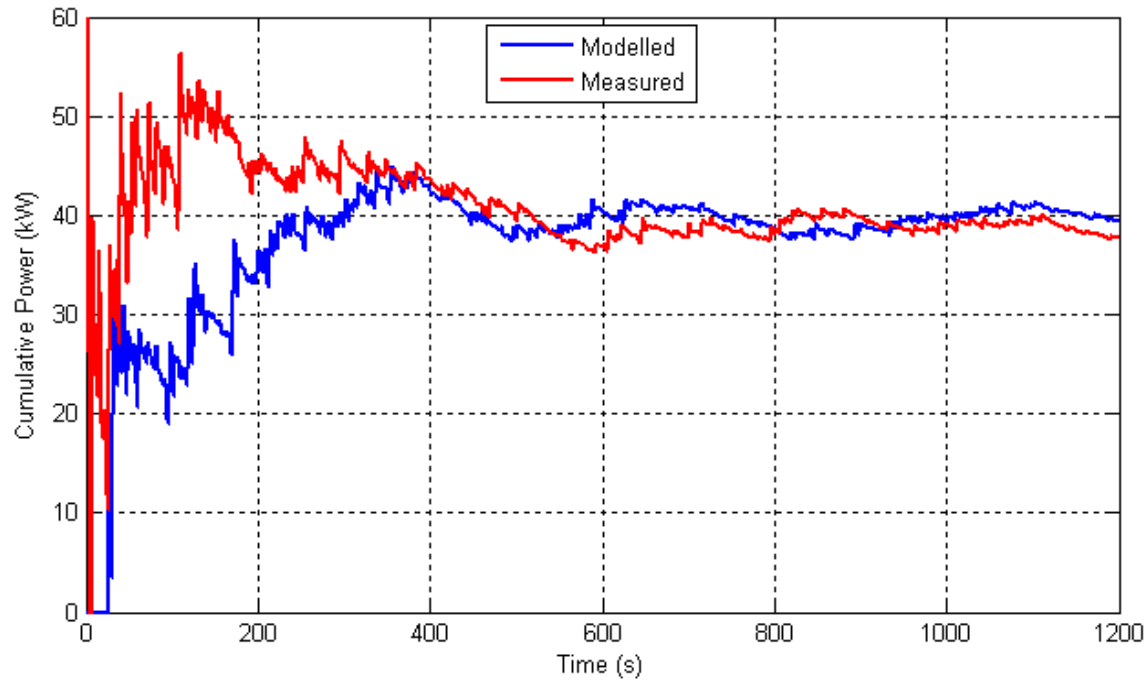
CETO 5

# Perth Wave Energy Project – CETO 5 generation successfully demonstrated



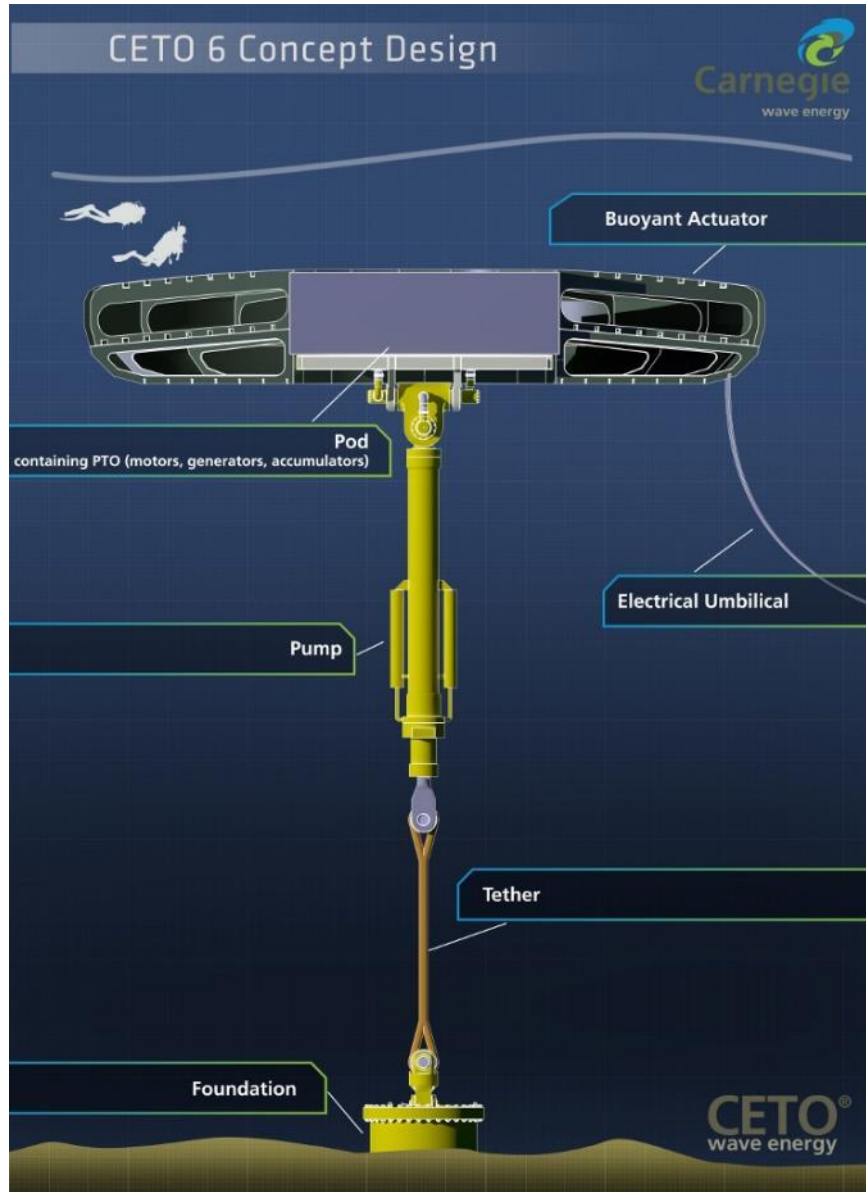
- Demonstrated CETO 5 technology including:
  - Three WECs
  - Power delivery to grid
  - Wave powered, reverse osmosis desalination
  - <1 day CETO WEC installation
- >14,000 operational hours over 12 months
- Designed and delivered by Carnegie
- Measured results confirmed modelled forecasts
- Measured results confirm CETO 6 forecasts

# Perth Wave Energy Project – performance data analysis



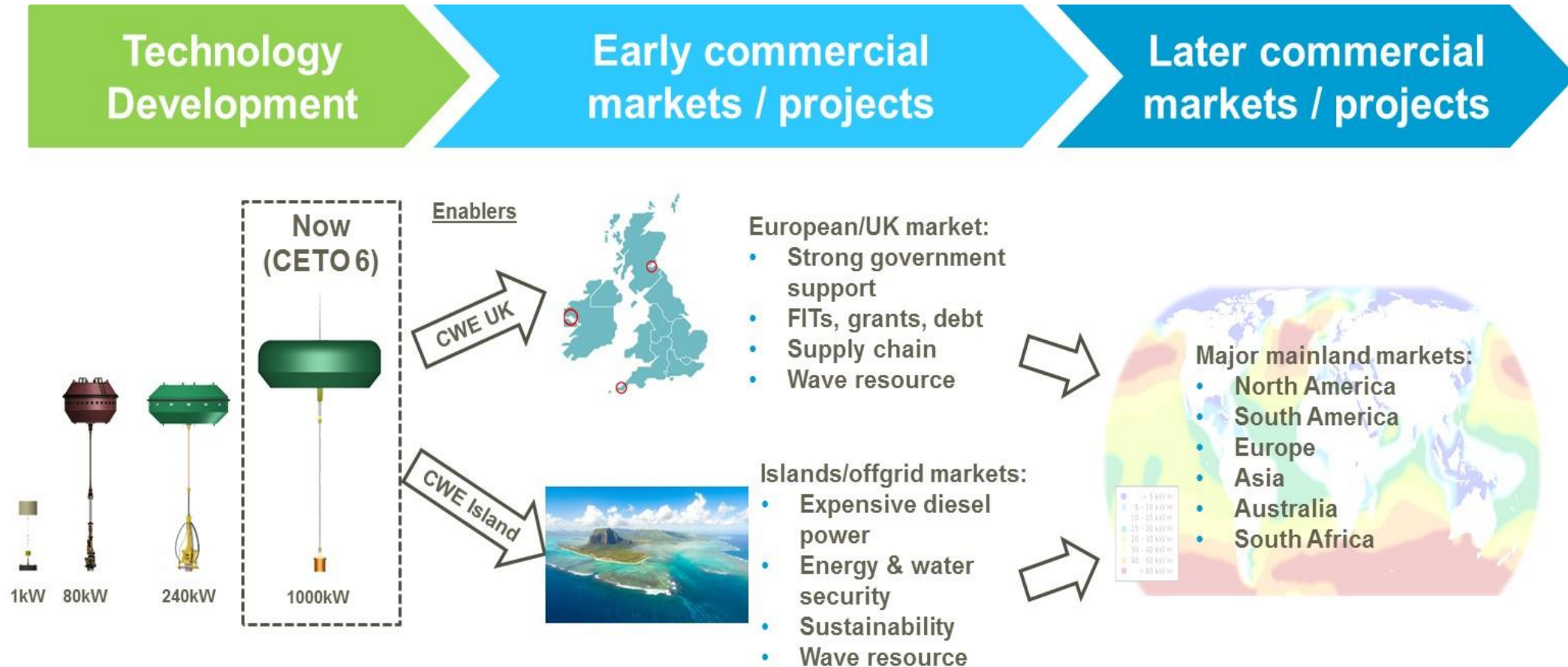
- 400 sensors & more than 2.5GB data daily.
- Strong correlation between power output, modelled and measured results (within <10% variance).
- Demonstrated effectiveness of WEC control strategy against sea states experienced.
- Independent review process of results
- Learnings from Perth Wave Energy Project fed into CETO 6 design.

# Commercial Product Platform – CETO 6



- First deployment at Garden Island, Western Australia.
- Garden Island CETO 6 construction start 2016 and Project commissioning 2017.
- CETO 6 development based on:
  - Data from CETO 5's 14,000 in-ocean operation hours,
  - CETO 6 wave tank testing at FloWave, Edinburgh and Plymouth University,
  - Internal Carnegie modelling and system design development,
  - Component design development with Carnegie's supply chain in UK and EU.
- CETO 6 will deliver approx. four times the rated capacity of CETO 5 generation.
- Other advancements include: rapid installation and offshore power production and export (avoiding hydraulic transmission losses).

# Commercialisation of CETO – UK/EU & Islands



## Commercialisation via two key initial markets:

- UK/EU: taking advantage of sites, funding, tariffs and supply chain.
- Islands: taking advantage of high power tariffs, competitive advantage of wave (consistency and footprint).

# UK/EU Market

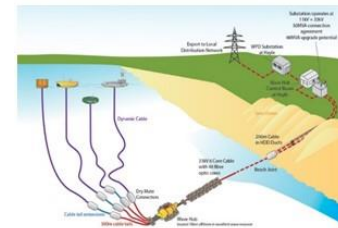
- Multiple, dedicated wave energy sites in Europe and UK either in operation or in development with a total potential capacity approaching 100MW.
- Dedicated wave energy tariff support, grants, debt available.
- Experienced supply chain for manufacturing, assembly, installation and maintenance.
- Carnegie now very active in the UK:
  - CWE UK subsidiary
  - Locally based CEO and Directors
  - Wave Hub berth
  - Extensive R&D activities
  - Deep supply chain engagement.
- First deployment of CETO 6 post Garden Island will be in UK and as part of a 10-15MW project.



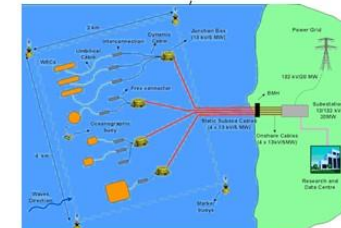
EMEC, Scotland



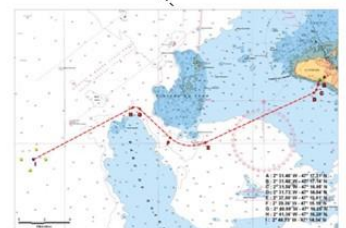
Westwave, Ireland



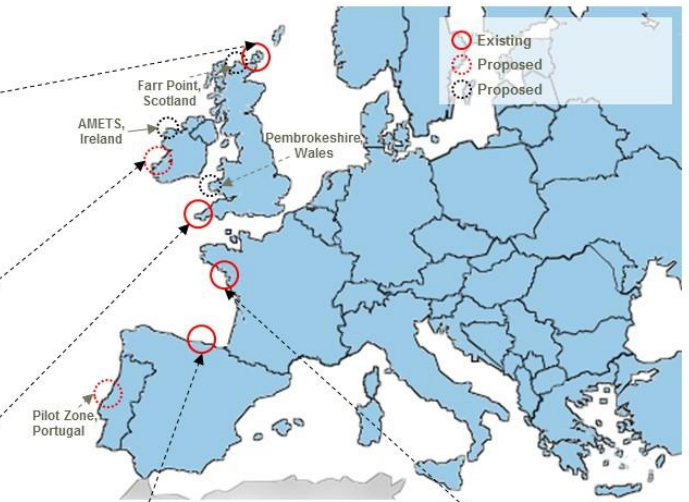
Wave Hub, Cornwall, UK



BiMEP, Spain



SEM-REV, France



# Ongoing R&D Focused on Highest Opportunity Areas

- Wave Energy Scotland (WES) funded Artemis hydraulic motor digital displacement technology applied to CETO.
- Partner in the SUPEGEN funded “E-Drive” linear generator project with University of Edinburgh applied to CETO.
- Wave tank testing to be conducted at FloWave & Plymouth University’s COAST facility in April 2016 for CETO 6.
- Collaboration Agreement with Atlantis Resources focused on electrical architecture.
- University of Western Australia’s (UWA) Centre for Offshore Foundation Studies (COFS) development of novel foundation technologies and improvements in calculation of load cases for CETO.
- University of Adelaide development of control strategies to increase efficiency of CETO.
- University of Dublin collaboration to optimise hydrodynamics performance through BA shape studies.



# Key Achievements & Upcoming Wave Developments

## CETO 5 Perth Wave Energy Project

- ✓ 3 units installed and > 14,000 hours of operation completed.
- ✓ Exported power and water to the Australian Department of Defence.

## CETO 6 Project, Western Australia

- ✓ CETO 6 concept design complete.
- ✓ Fully funded.
- Construction to start 2016.

## CETO 6 Project, UK

- Design started 2015.
- Construction 2018.
- Proactive and collaborative R&D programme.
- Project financing progressing well.

