

Carnegie's Perth Wave Energy Project Development & Consenting Experiences from Down Under

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Carnegie Wave Energy Ltd

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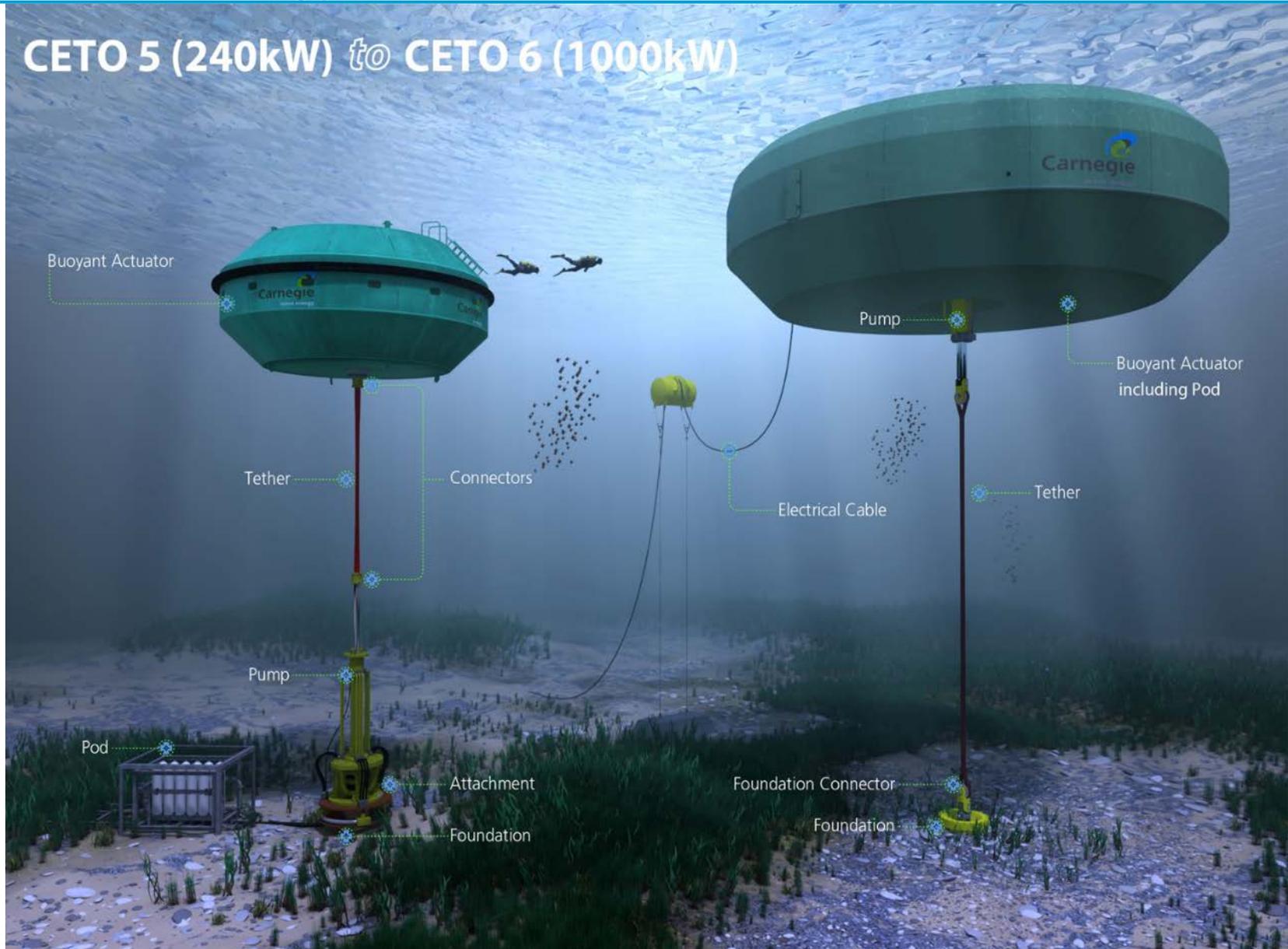
Carnegie Introduction

- Owner and developer of “CETO” wave energy technology
- Board of six directors
- 35 engineering, commercial, administration staff
- ASX listed, based in Fremantle, Western Australia
- Subsidiaries in UK, Ireland and Chile
- 120 Patents or patents pending globally (up from 90 in 2011)
- \$70m spent to date on CETO
- EDF (*Electricite de France*) is a CETO licensee



CETO Technology

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



Carnegie's Development and Future Roadmap



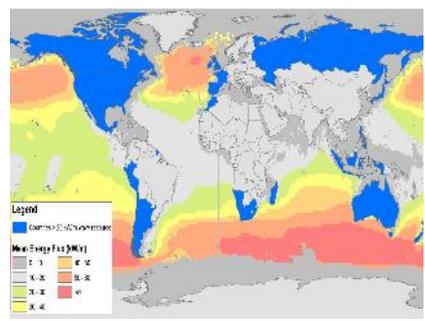
Wave tank testing @ Fremantle, WA



3 x 1kW prototypes @ Fremantle, WA



3 x 240kW units @ Garden Island, WA. Power & water production



Commercial project roll-out



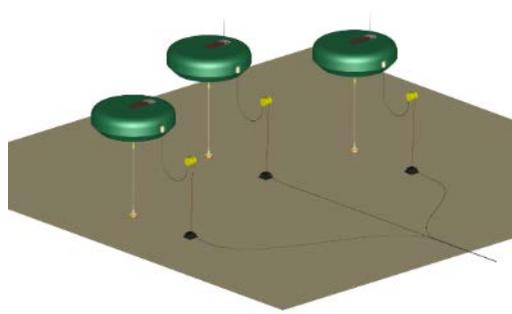
Proof of concept prototype @ Fremantle, WA



80kW prototype @ Garden Island, WA

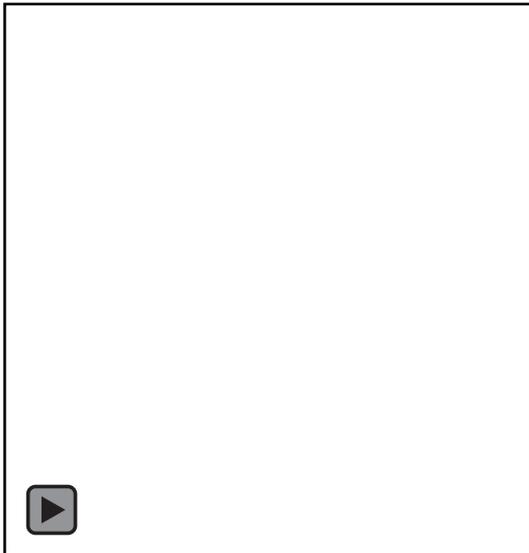


3MW demo (3 x 1MW units)

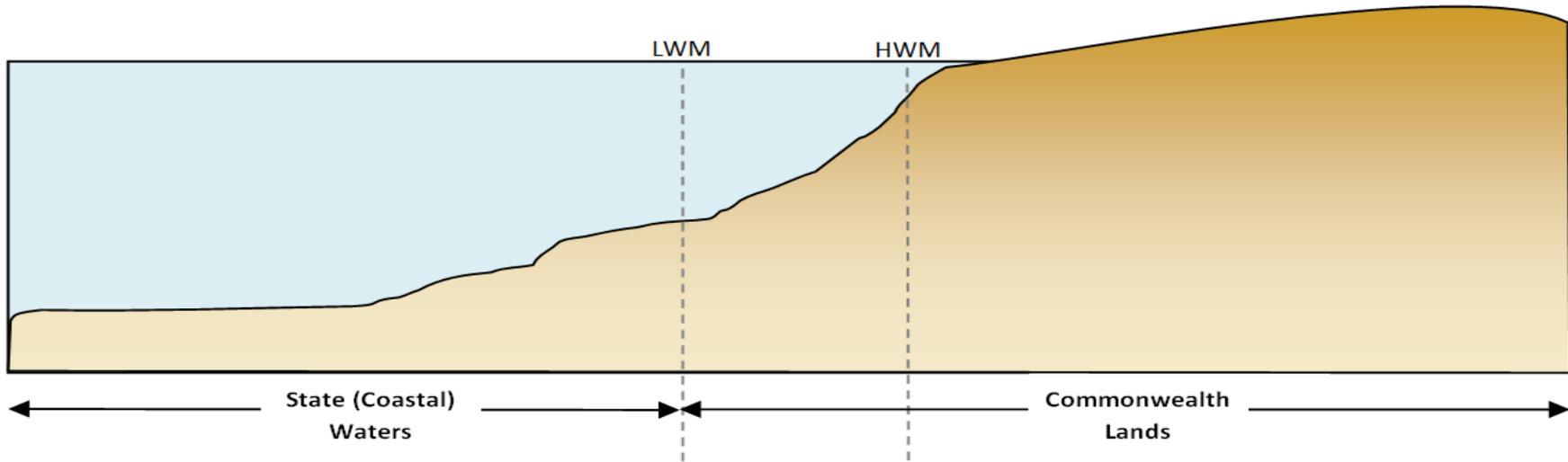
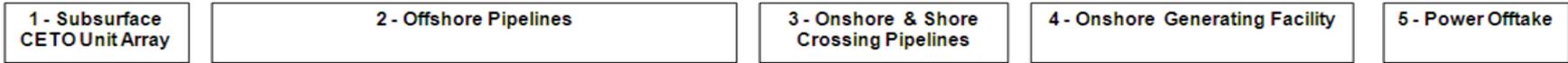


Perth Wave Energy Project (PWEP)

- World first multiple wave unit array producing clean power and fresh water
- >\$22 million Australian and WA grant funding
- 3 x 240kW CETO 5 units
- 100NB(4"), 3000psi flexible pipeline 3.2 km ashore
- Onshore power plant and grid connection
- Onshore reverse-osmosis desalination pilot plant
- Design, approvals, off-take, funding complete; construction underway



PWEP: *Legislative Framework*



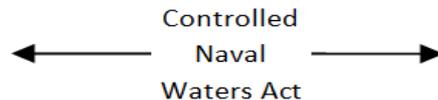
Principal State Approvals

- Land Administration Act 1997
- Navigable Waters Regulations 1958
- Environment Protection Act 1986
- Wildlife Conservation Act 1950
- Conservation and Land Management Act 1984
- Aboriginal Heritage Act 1972
- WA Planning and Development Act 2005

- Lands Acquisition Act 1989
- Defence Act 1903 (inc. Defence Instructions)

Principal Commonwealth Approvals

- Environment Protection and Biodiversity Conservation Act 1999
- Native Title Act 1993 (Note, Native Title has been extinguished over Commonwealth (Defence) lands to the low water mark)



PWEP: *Terrestrial & Marine Environment*



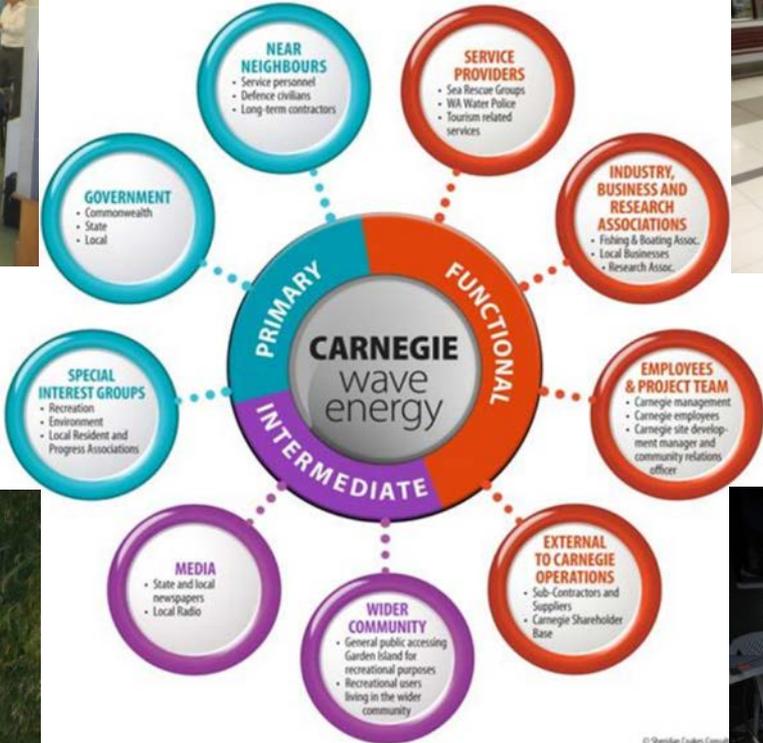
Heritage values of Garden Island, Western Australia (Department of Defence 2011)

PWEP: Community Consultation

Rockingham Volunteer Sea Rescue (13 Aug 2012)



Community Information Day (11 Aug 2012)



Boat ramp intercept survey (11 Aug 2012)

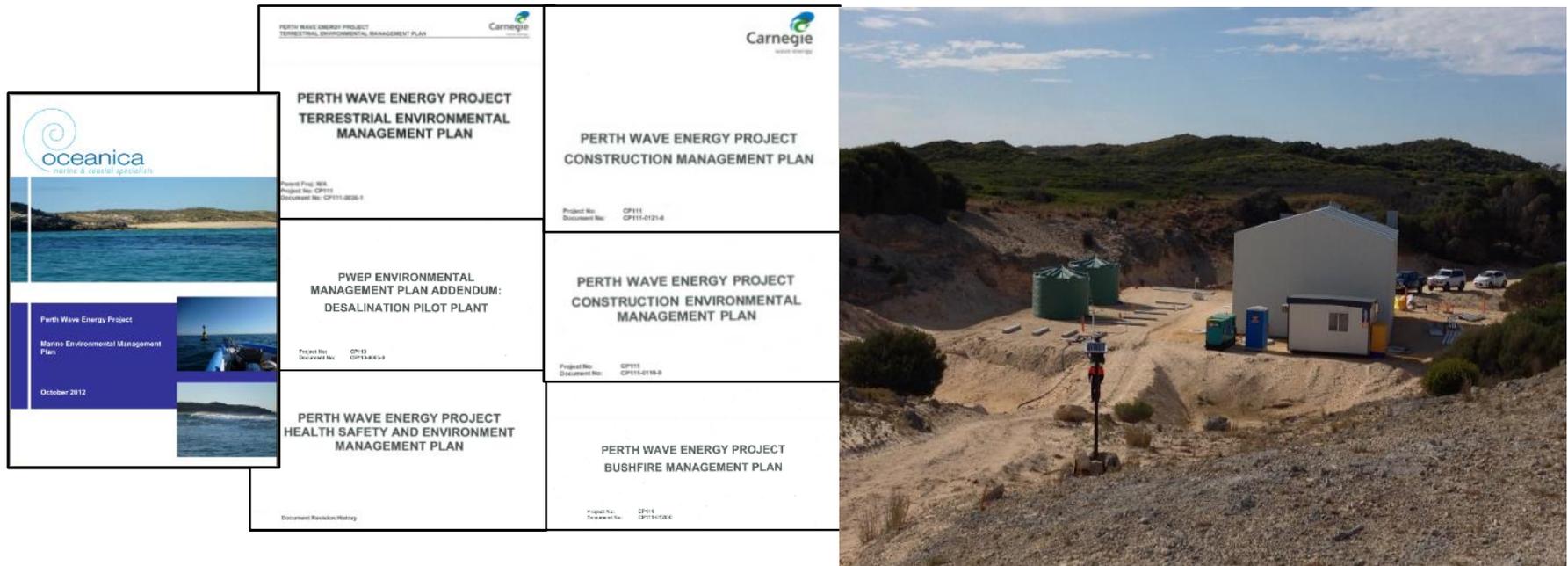


Fremantle Port's Maritime Day (30 August 2013)

PWEP: *Environmental Assessment*

Carnegie Environmental Risk Assessment

- Comprehensive, Due Diligence report
- Resulting management and mitigation measures were adopted
- Overall, PWEP assessed with no high or unacceptable risks or potential impacts remaining after management
- Large number of approved management plans



PWEP: *Surveys, Monitoring & Knowledge-sharing*

Baseline surveys and monitoring were undertaken and are ongoing

- Offshore (CETO3 as well as PWEP)
- Onshore
- Aerial photography is also being used for monitoring purposes

Knowledge-sharing

- Scottish Association for Marine Science
- Oceans Institute, University of Western Australia
- Centre for Marine Science and Technology, Curtin University
- Murdoch University



PWEP: *Onshore Vegetation Monitoring*



Transect F SC 4 Sep 2013



Transect F SC 16 Dec 2013



Transect F SC 12 Feb 2014



Transect G SA 4 Sep 2013



Transect G SA 16 Dec 2013



Transect G SA 12 Feb 2014

PWEP: *Key Activities*



Seacore Ensung 1200 installing foundations for CETO units



Barges laying pipelines



Rock-bolted pipelines



Onshore power plant



Desalination pilot plant



Buoyancy Actuators Launch

PWEP: *Key Activities*



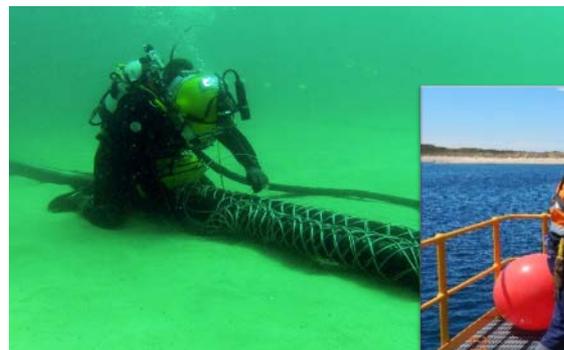
Onshore Pipeline Activities, with resident onlooker



PWEP & Future: *Milestones*



- **2013**
 - ✓ Detailed Design of PWEP
 - ✓ Environmental and planning approvals
 - ✓ Start construction of PWEP
- **2014**
 - Power production from PWEP
 - Desalination demonstration
 - Develop future commercial projects
- **2016**
 - Construction of CETO 6 project



Thank you: *Any Questions or Feedback?*

- Any questions?
- Any feedback?

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PWEP: *Animation*

