

Carnegie Wave Energy Limited

All-Energy 2009

October 2009



Carnegie – *who we are*

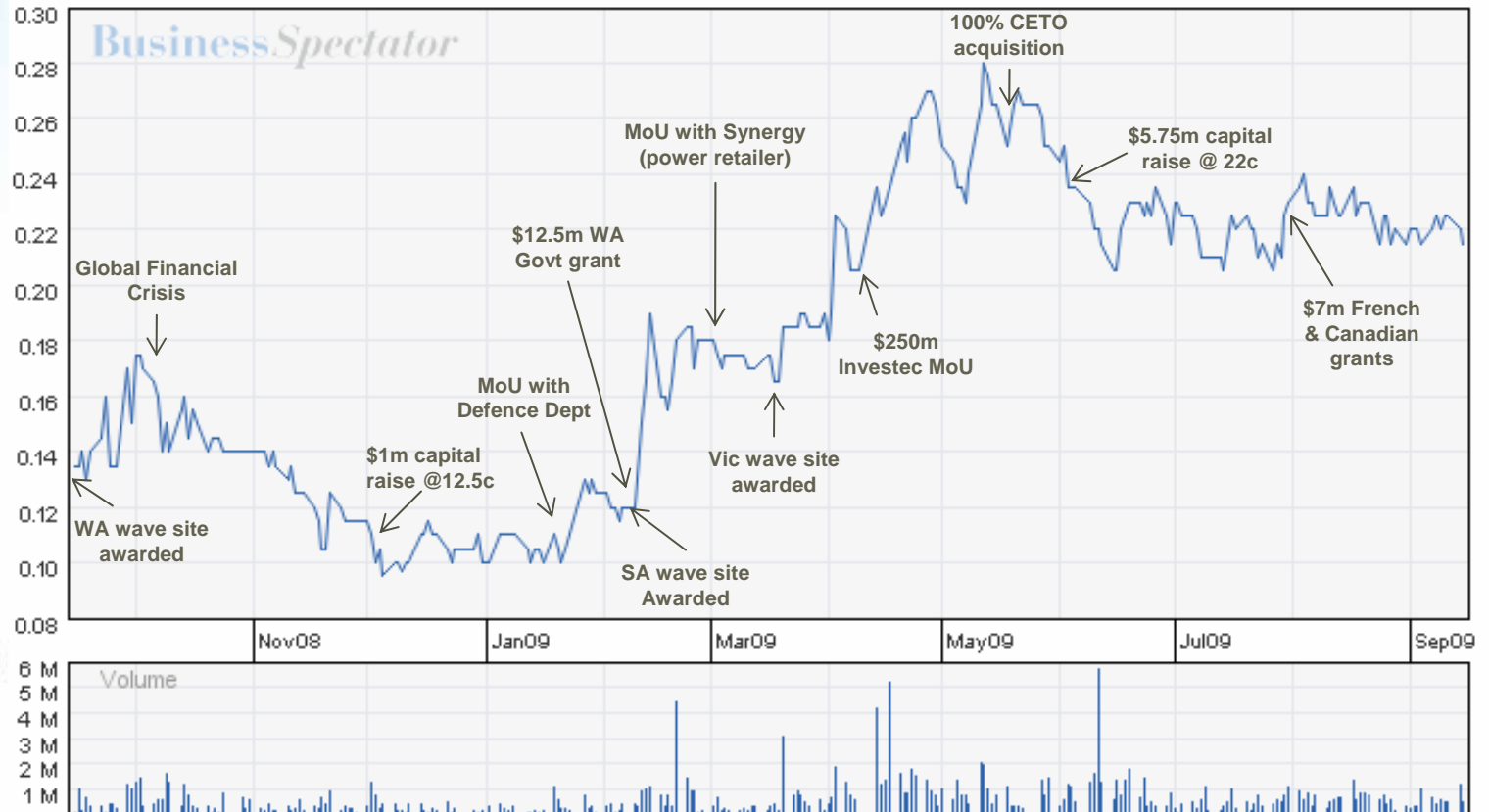
- Australian-based 'CETO' wave energy developer
- ASX-listed (CNM)
- \$100m Market Cap
- 20 staff
- Headquarters in West Perth, Western Australia
- Wave Energy Research Facility in Fremantle, WA



Carnegie (ASX: CWE) – who we are

- Zero Debt
- \$4,000,000 Cash
- \$12,500,000 WA Govt Grant
- 494m shares on issue
- \$100m Market Cap
- Volume: ~\$250,000/day

Carnegie Wave Energy Limited FPO as of 15 Sep 07:01pm



Carnegie – *what we do*

- Develop & commercialise proprietary 'CETO' wave technology
- Build, own & operate CETO wave power stations
- Licence CETO wave technology to third parties
- Sell services and equipment to CETO wave power stations (in future)



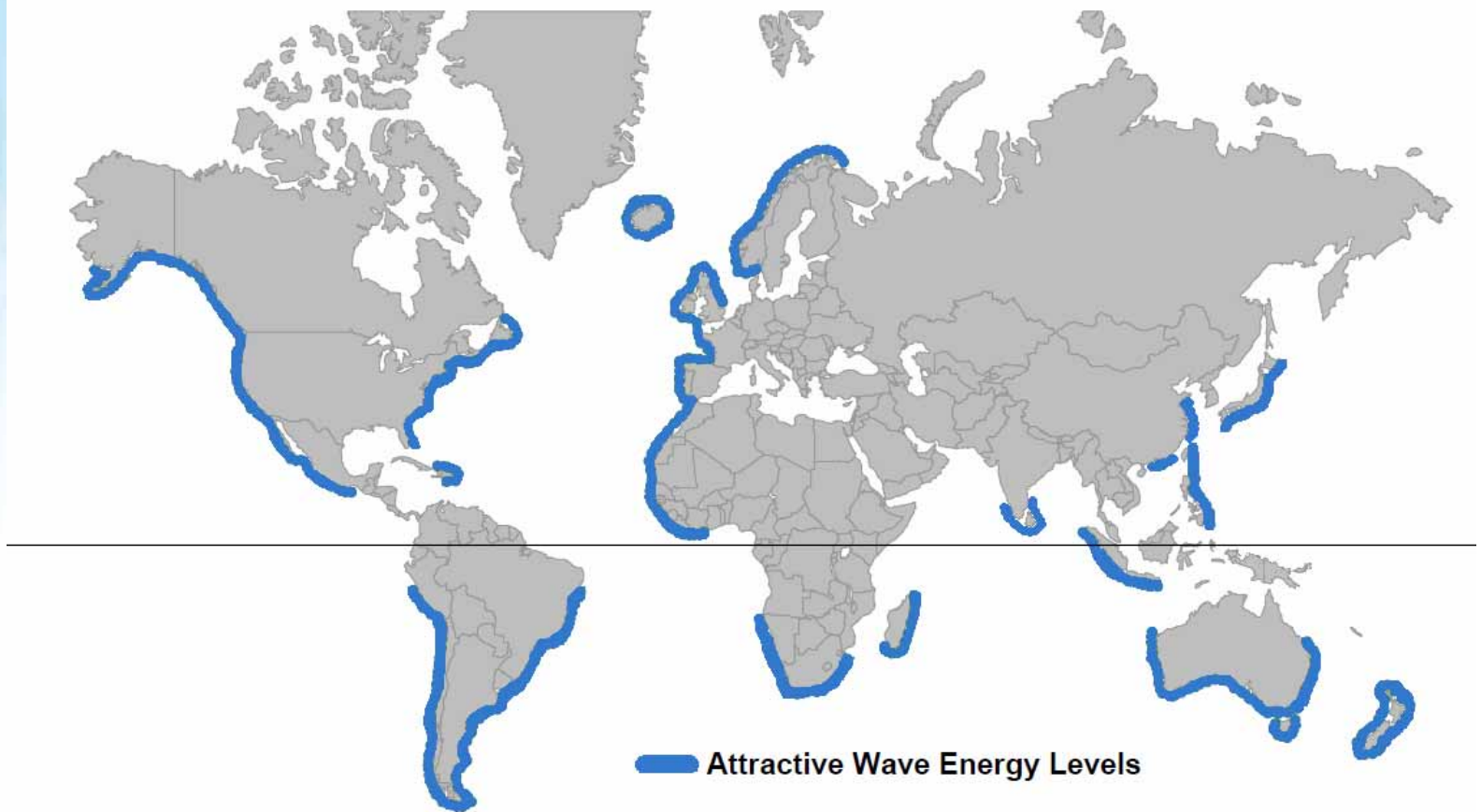
Wave Energy – *abundant, high capacity, predictable*



- Energy in the ocean swell generated by large offshore storms

(not tidal energy which originates from gravity between the Earth & Moon)
- Located near load centres – no costly transmission (60% of the world's population lives within 60km of the coast)
- Abundant – global wave resource is 2TW (2 million MW) or twice the world's power consumption (World Energy Council)
- High availability of resource at best sites globally - less intermittent and more predictable than wind or solar

Wave Energy – *global & untapped*



Wave Energy – major energy companies involved

The enormous potential of wave energy is now increasingly recognized by governments, corporations and investors worldwide...

Shell take stake in wave energy company



Scotland aiming to become "Saudi Arabia of marine energy" (Scottish 1st Minister)

"Iberdrola Renovables begins tests on wave energy plant"



"GE Invests in Wave Energy"

"EDF Energies Nouvelles signs wave energy agreement"



VATTENFALL



"There is no doubt that marine power will be an important pillar of future energy portfolios...."

Helge Daebel, Emerald Technology Ventures

Chevron buys into wave energy



"Aquamarine and Airtricity to develop 1 GW of wave and tidal"

Portugal Opens Pioneer Wave Power Plant



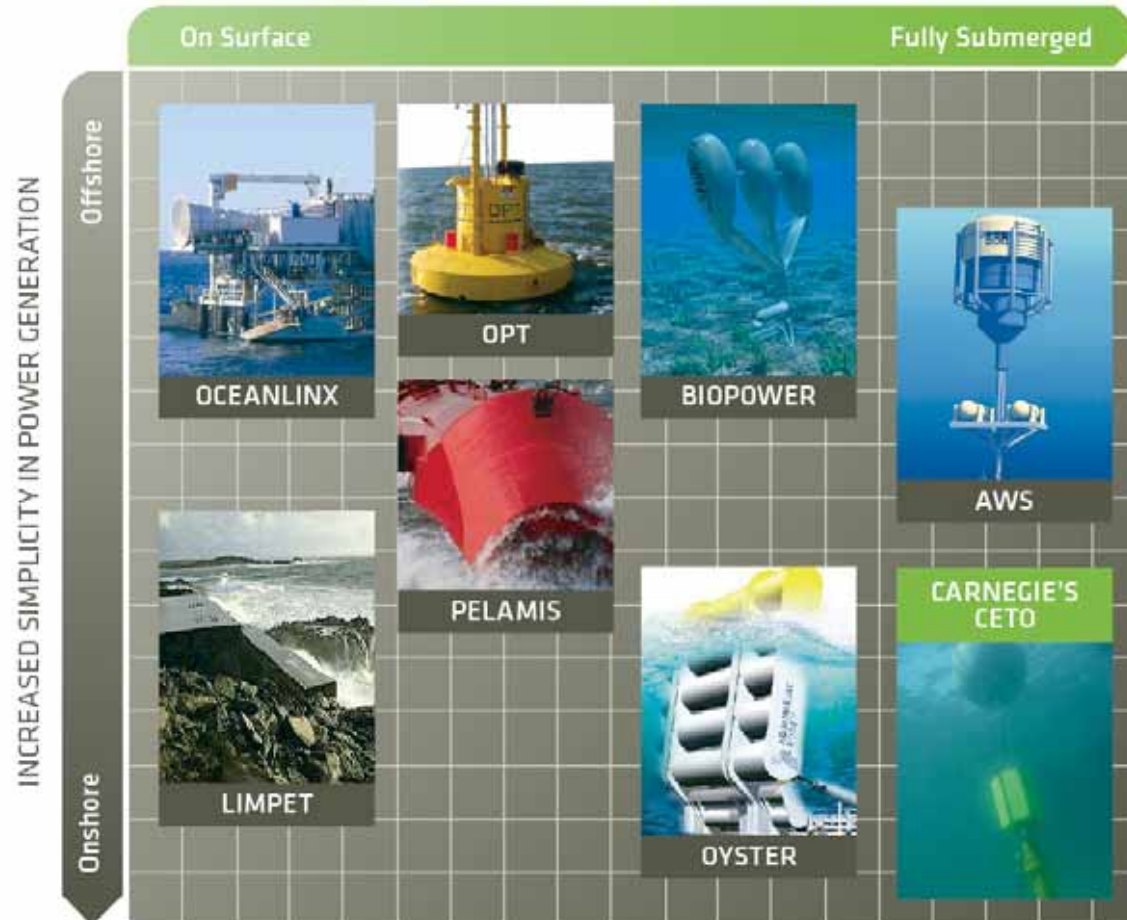
feel our energy



"Investec funds \$250m for Carnegie wave power project"

Wave Energy – Technology Overview

DECREASED EXPOSURE TO LARGE STORMS



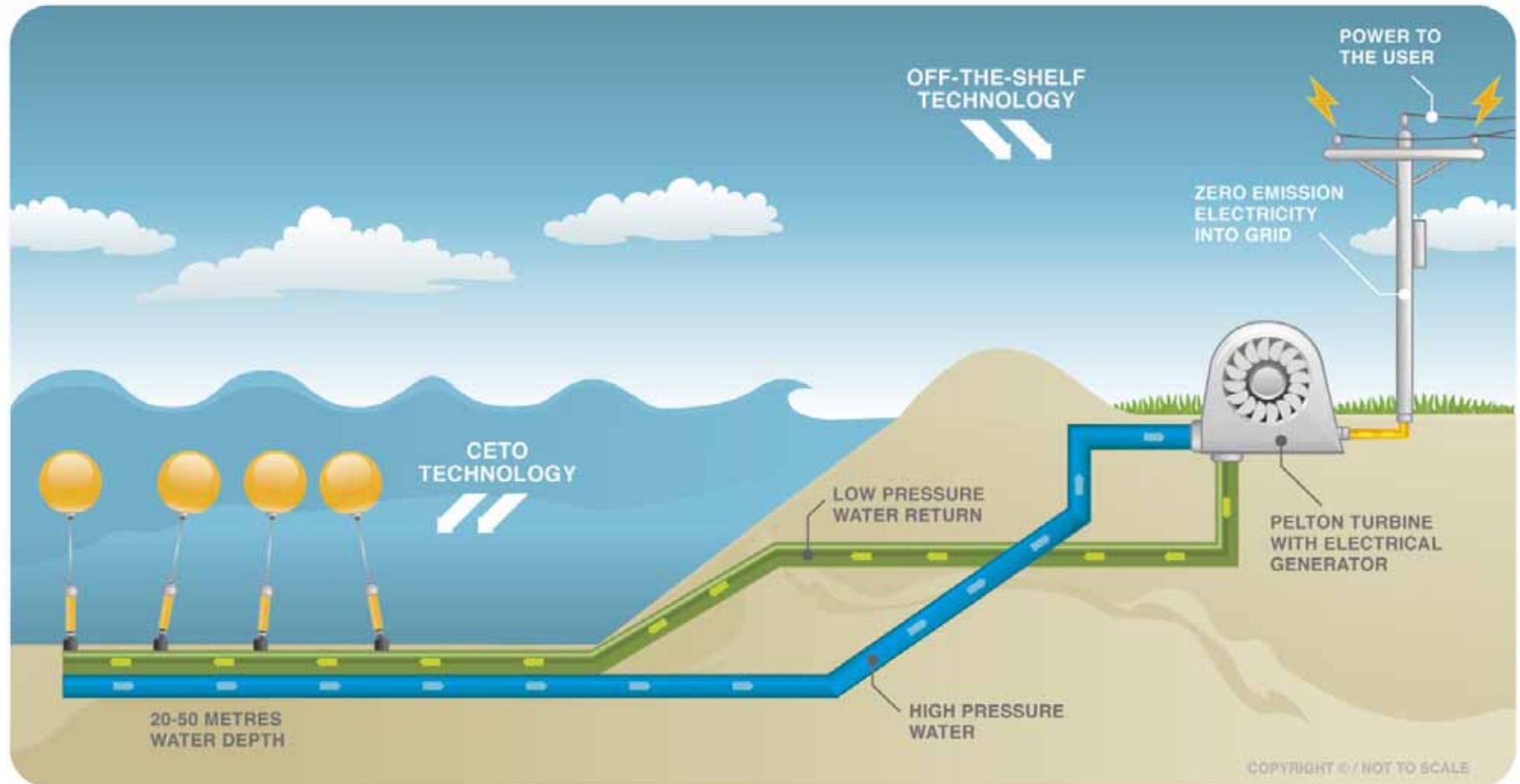
INCREASED SIMPLICITY IN POWER GENERATION



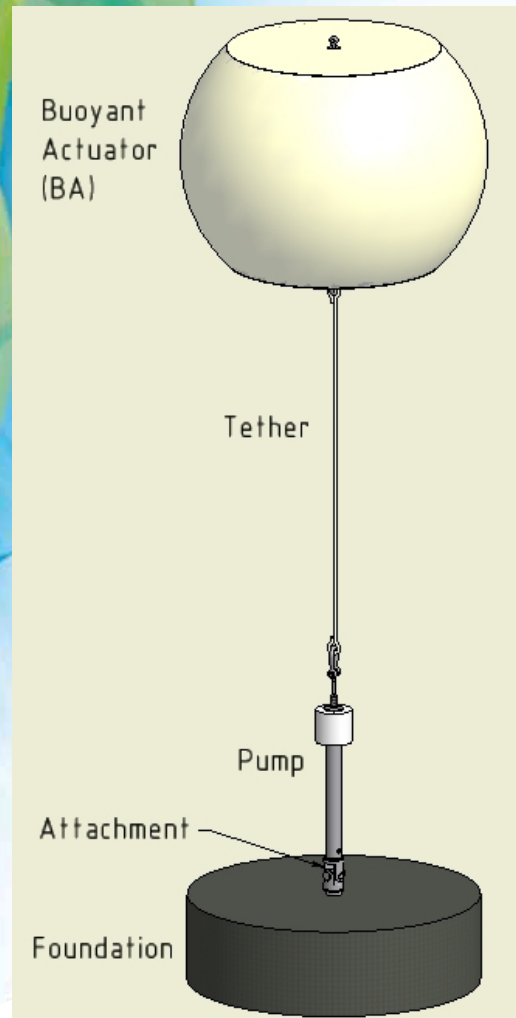
Wave Power Generation

Examples of different wave technologies, their location and mode of power generation

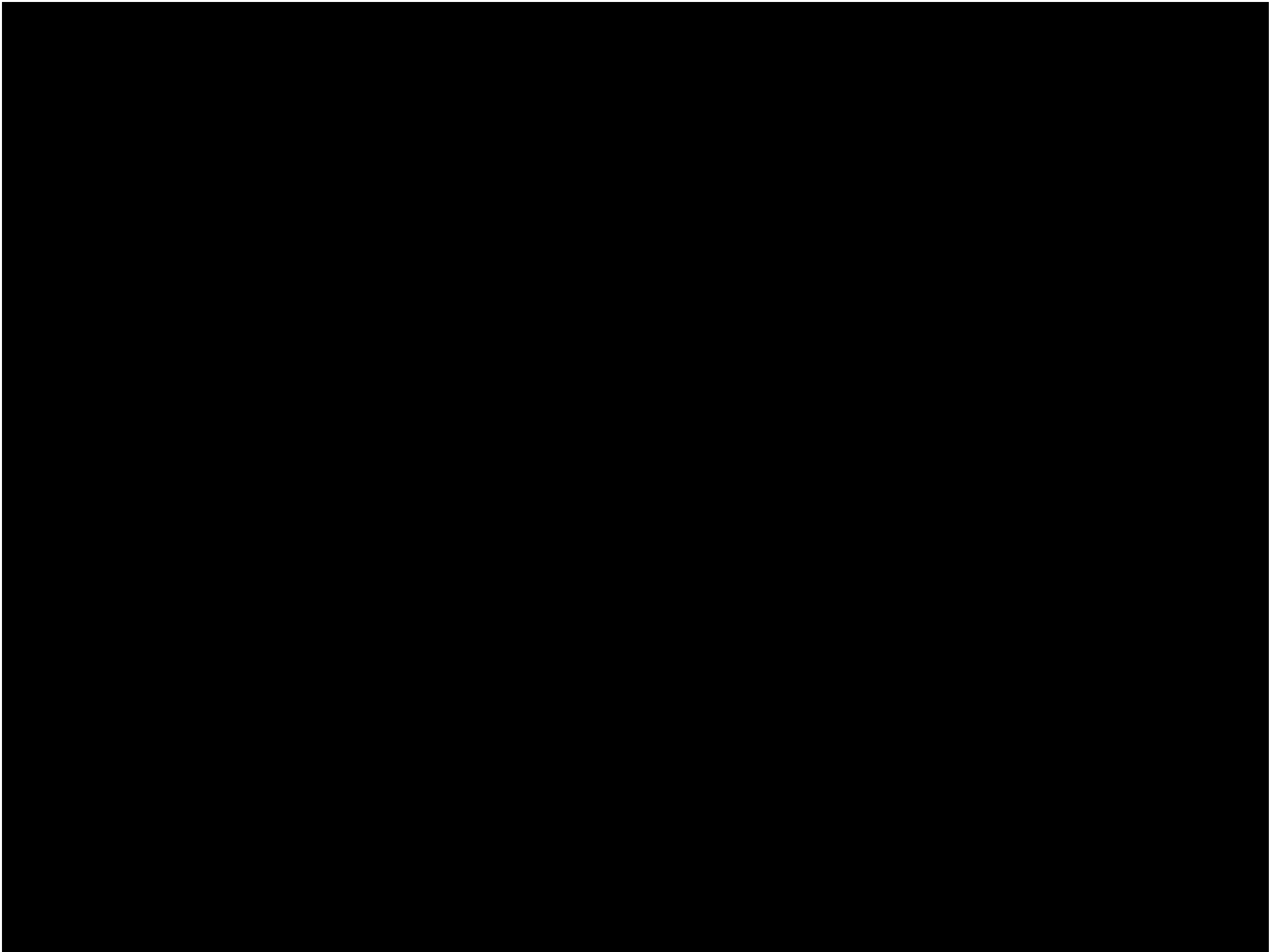
CETO – *technology overview*



CETO – *technology overview*



- **BA** – proprietary design and core knowledge with respect to dynamic response and energy release
- **Tether** – provides flexible link between BA and pump. Tension member engineering group providing specialist input.
- **Pump** – Custom engineered in conjunction with specialist hydraulic cylinder manufacturers.
- **Attachment** – Designed and manufactured by advanced manufacturing and production engineering group
- **Foundation** – designed, based on site specific seabed substrate composition, by subsea engineering and deployment experts.

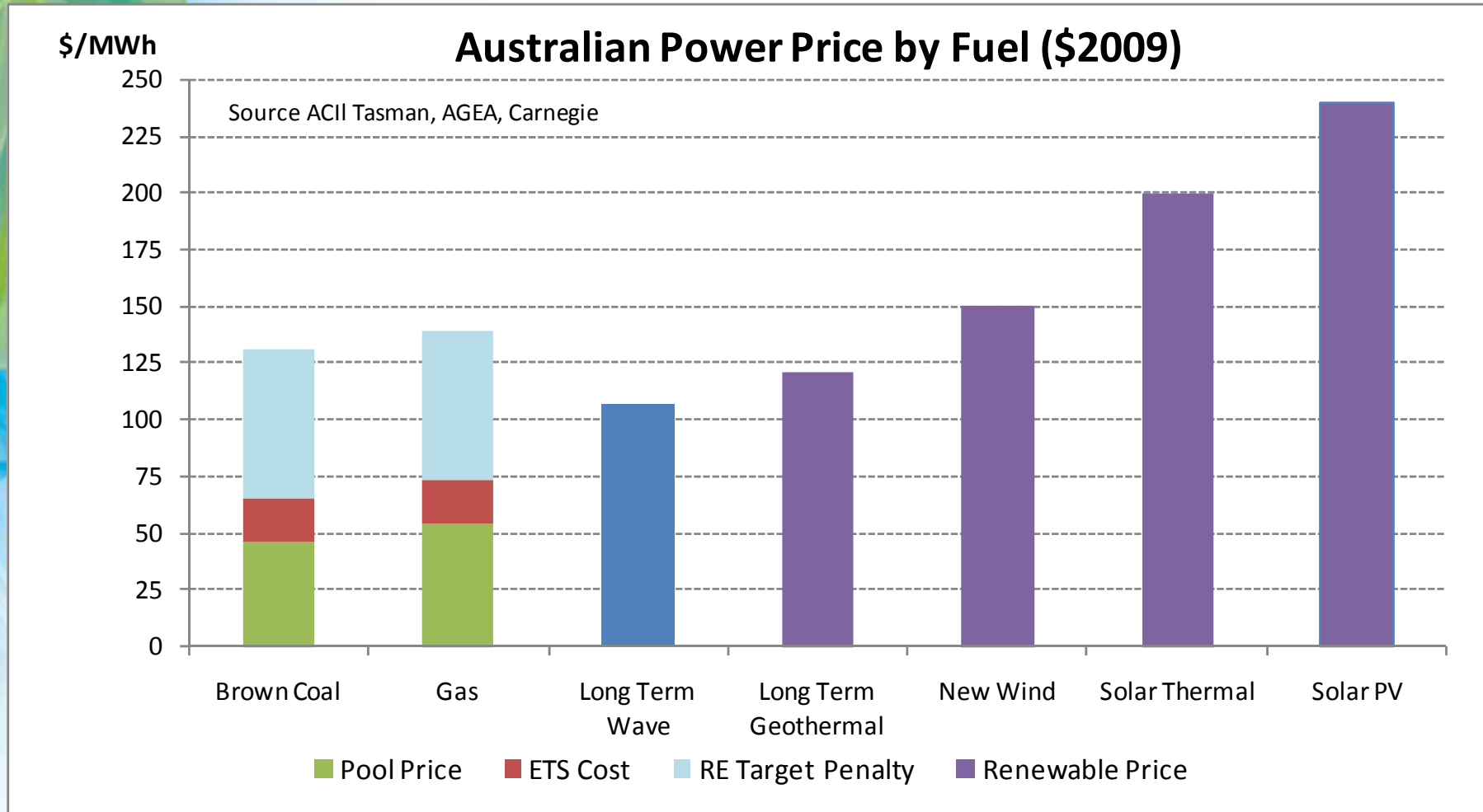


CETO – *how it is different*

- Simple – no power generation equipment offshore
- No visual impact – fully submerged
- Enhanced storm survivability – fully submerged and storm relief
- Zero-emission freshwater co-production possible
- Minimal environmental impact
- Offshore: Minimal moving parts – low maintenance
- Onshore: Off the shelf power and water production components



CETO – cheaper than wind and solar at scale



NB: Capacity factor wave expected to be ca. 2 x wind or solar

CETO – *technology development timeline*

1999 - 2003

**Concept
Development**

✓ Scale models & wave tank testing

2003 - 2006

Proof of Concept

✓ Prototype producing zero-emission power and desalinated water

2006 - 2008

Pilot Plant

✓ Multiple, commercial design units generating power

2008 - 2010

**Commercial
Demonstration**

- Commercial scale demonstration – starts in November 2009

CETO – *technology development timeline*

2008 - 2010

**Commercial
Demonstration**

- Commercial scale unit deployment
 - Single autonomous unit and associated energy dissipation and instrumentation infrastructure
 - Verify energy delivery performance of a single CETO unit
 - Foundation scheduled for deployment in Nov/Dec 2009
 - Stakeholder consultation and permitting underway
 - CETO unit and associated infrastructure deployment in Sepia Depression to the West of Garden Island following on from mooring deployment



CETO – *project development timeline*

2006 - 2008

**Site
Identification**

- ✓ WA & Victorian wave research licenses
- ✓ WA, SA & VIC project sites awarded

2008 - 2009

**Project Pre-
Development**

- ✓ \$12.5 million WA Govt grant for 5MW project
- ✓ MoU with Dept of Defence for Garden Island
- ✓ \$250 million Investec HoA for 50MW project
- ✓ French & Canadian Govt grants (\$7million)
- Australian Govt grant for 50MW project

2010 - 2011

**Small Scale
Commercial Demo**

- 5MW Power Offtake
- 5MW in WA

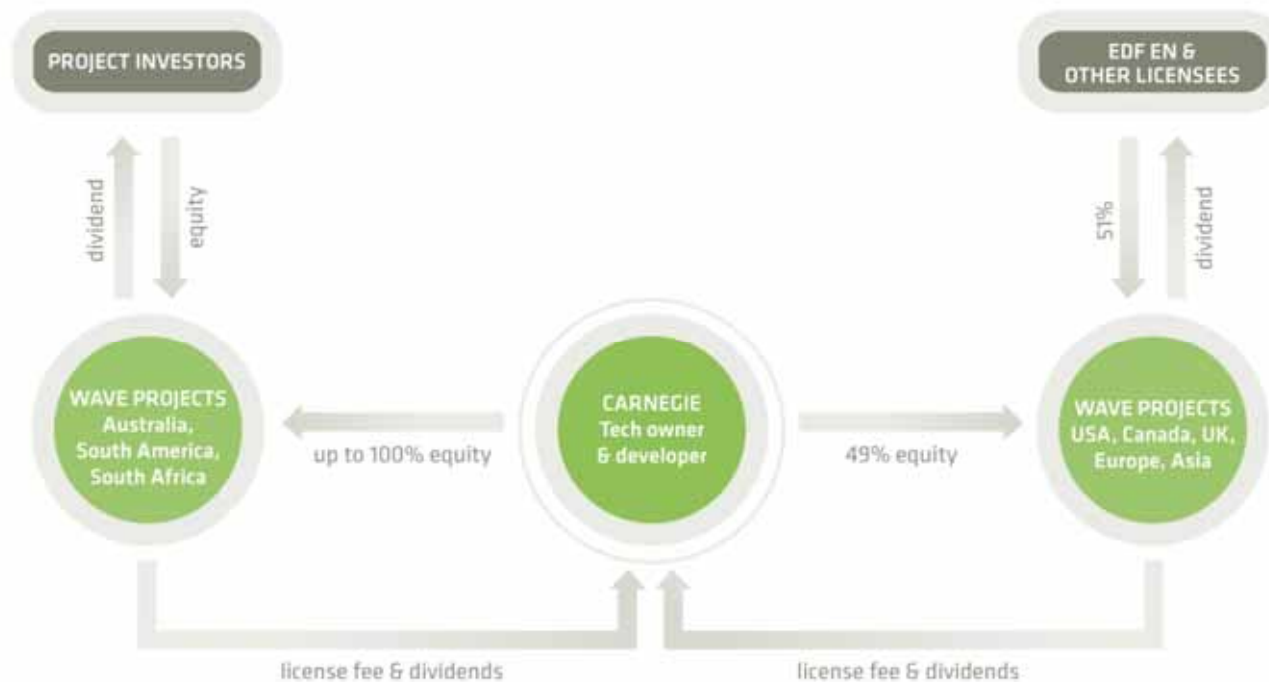
2011 - 2013

**Large Scale
Project**

- 50MW Australian project
- 10-20MW international

Business Model - *license fees plus project returns*

- Projects undertaken on build, own and operate basis via special purpose company
- Projects will pay a license fee to Carnegie plus a dividend in line with any equity stake
- Licensee projects in non-core markets or where other parties benefit from a lower cost of capital – e.g. utilities



EDF EN - *CETO licensee & JV partner*

- Northern Hemisphere licensee of CETO
- Pays Carnegie capex license fee/project
- Carnegie retains right to participate in Northern Hemisphere projects
- EDF EN has over 2,200 MW of installed renewable capacity in operation and another 1,000 MW under construction
- generated A\$130 million earnings on A\$1.8 billion revenue in 2008
- 50% owned subsidiary of the EDF Group - one of the largest power generation companies in the world
- EDF has over 120,000 MW, 38 million customers and 160,000 staff & generated A\$9 billion earnings on over A\$120 billion revenue in 2008



Investec – Australian Financing Partner



- Heads of Agreement to fund up to \$250 million of first large scale project with Investec Australia - subject to certain conditions
- Investec has pre-emptive investment rights on subsequent Australian grid connected projects for 3 years
- Carnegie retains equity participation rights
- Projects to be developed in Special Purpose Company
- Projects will pay Carnegie a license fee/project plus dividend
- Investec Australia is subsidiary of Investec International - \$4.4 billion market capitalisation listed on LSE & JSE
- Investec is rated Baa1 by Moody's Investors



Summary

CETO

- Advantages compared with competing wave technologies
- Expected to be cost competitive with fossil fuels when deployed at scale

Carnegie

- Global owner of CETO IP
- Target first revenue generation 2011
- Strong technical team focused on commercialisation

Upcoming Milestones

- Deployment of commercial scale unit begins in Nov 2009

Emerging Technologies

- Majority of efforts and resources focused on CETO
- Carnegie also 100% owns a number of earlier stage, clean technologies including a solar thermal storage, an aerofoil and a green heat exchange technology
- In April 2009, Carnegie was awarded a \$156,567 Australian Government grant for its green heat exchange technology
- \$1 for \$1 matched funding basis to test the feasibility of the system over the next 12 months
- for use in coal power stations as well as for gas heat transfer applications to deliver greenhouse gas reductions, cost saving and improved system efficiencies