Africa Australia Technology & Infrastructure Conference

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CLEAN ENERGY

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CARNEGIE COMPETITIVE ADVANTAGE

Corporate power

- Carnegie is an ASX-listed developer of utility scale renewable energy projects. It a global leader in the delivery of solar, battery, wave and hybrid energy solutions.
- $150M market capitalisation, $13m cash, $27m undrawn grants
- Business model across the full value chain of design, development, finance, construction, operation and maintenance
- Established partnerships to deliver national and international delivery capability and enable larger scale projects with Lendlease Services (Australia), Infratec (NZ and South Pacific) and Eastern Guruma (Kimberly, WA)

lendlease

INFRATEC

EASTERN GURUMA

CARNEGIE COMPETITIVE ADVANTAGE

Wave power

- Undisputed **leader** in wave energy technology - **only company** to have operated a grid-connected wave energy project over four seasons, with thousands of in-ocean operating hours.
- >$130 million invested to date over six prototype cycles with final commercial product (CETO 6) under development
- Three deployment sites for CETO 6 currently under development:
  - Garden Island, Western Australia supported by $13m ARENA grant
  - Wave Hub in Cornwall, UK with £9.6m EU grant
  - Albany, Western Australia supported by $19.5m WA State Government grant

CARNEGIE COMPETITIVE ADVANTAGE

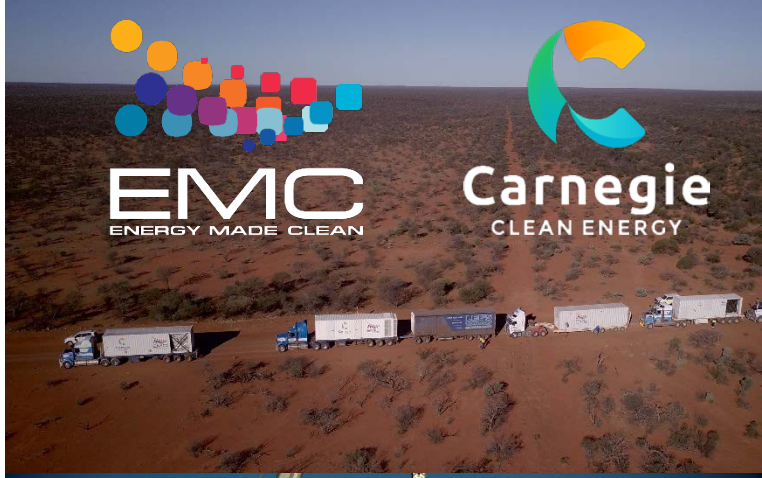
Solar and battery power

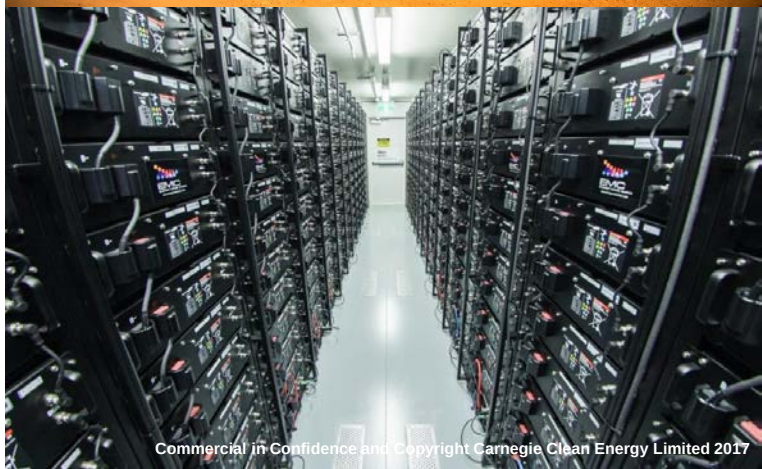
- Diversified into solar and battery systems through the 100% acquisition of Energy Made Clean, a leading Australian renewable energy company focused on solar, battery and hybrid engineering, construction and maintenance.
- Global microgrid market is experiencing transformational growth with market estimated at US$40 billion per annum by 2020.*
- Only ASX-listed company with in-house design, construction, operation, maintenance and power generation and supply of hybrid systems (solar/battery and/or diesel) for off grid and fringe of grid applications.
- Identified EPC pipeline in West Australia alone ca. AU$500m through to 2020.
- EMC has industry leading track record in the design and delivery of complex, hybrid microgrids and utility scale battery storage.

* Navigant Research 2013 Report *Market Data: Microgrids*

CSIRO Square Kilometre Array - Off-Grid Hybrid System

- Customer: CSIRO - world's most sophisticated antenna system to have the most sophisticated solar/storage/diesel power system in the world.
- Location: Off-grid, 645 km northeast of Perth, Western Australia
- Scope: EMC engaged to design, construct and install 1.6MWp solar facility in combination with 2.6 MWh battery energy storage system capable of diesel off functionality.
- Features:
    - 1.25 MVA microgrid-connected at 6.6 kV
    - 2.6 MWh Samsung SDI Lithium batteries
    - PV central inverters delivered in EMI shielded containers manufactured by EMC in Perth
    - Containerised installation, Fire Suppression / Fire Rated, Centralised HVAC
    - EMC control system (National Instruments)





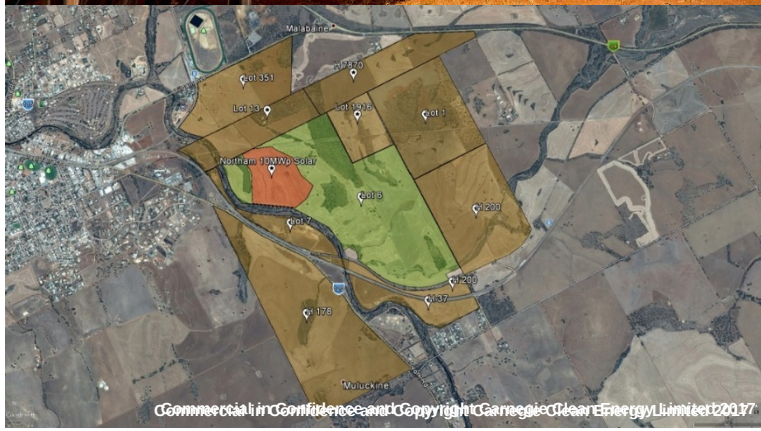
2.6MWH Battery Convoy- July 2017

Solar array & crane ready to lift battery containers into place

Solar array with battery containers in place

Northam Solar Power Station

- 10 MW solar power station in Northam, Western Australia (Located 100 km east of Perth)
- Build Own Operate project – 100% privately funded project, Carnegie will own and operate for 25 years
- Merchant and contracted power models under consideration. Capex of between $15-20m
- First large scale solar project to be delivered as part of the Energy Made Clean Lendlease joint venture
- 34,000 solar panels will be constructed on 25 hectares of land
- Planned for the addition of utility scale battery storage in future
- Deliver approximately 24,000,000 kWh of electricity per annum, enough to power approximately 4,000 households for 25 years
- Effectively displace 17,000 tonnes per year of greenhouse gas emissions, which is the equivalent of taking 3,500 cars off the road
- Financial close imminent with a construction timeline of 6 months



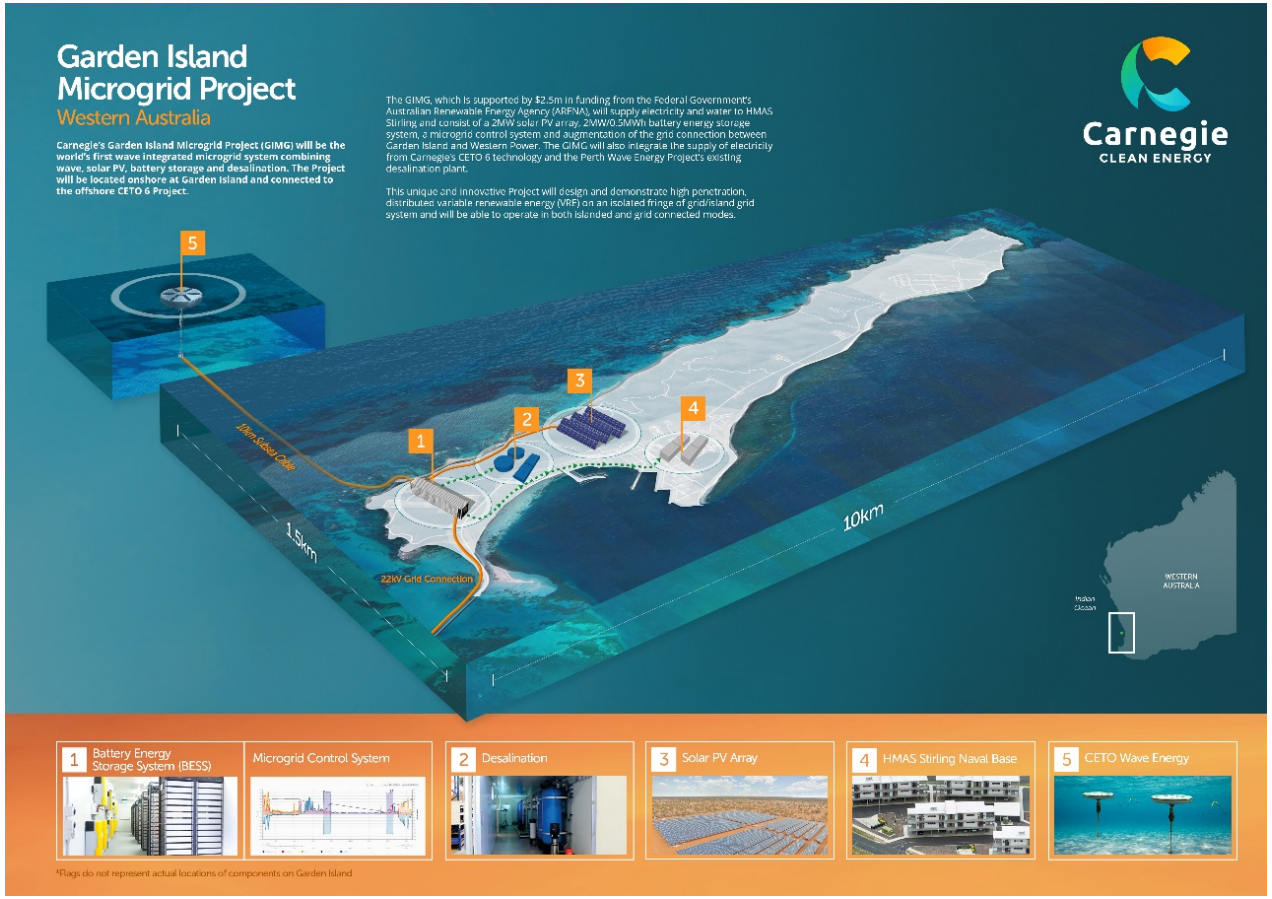
Alkimos Project - Utility Scale Energy Storage

- Customer: Synergy (WA Government Generator and Retailer)
- Location: Alkimos suburb of Perth, Western Australia
- Scope: EMC engaged to design and construct on-grid, utility-scale battery for new residential sub-division
- Features:
  - 1.1MWh energy storage system
  - Offers residents: Virtual energy storage rebates for solar PV
  - Supported by ARENA (Australian Government) $3.3m grant

Containerised battery solution 1.6 MWH

Garden Island Microgrid Project
Western Australia

- Garden Island Microgrid (GIMG) will be the world's first wave integrated renewable microgrid project.
- GIMG will integrate:
  - Existing diesel generation and grid infrastructure.
  - Large scale 2MW solar PV farm.
  - 2MW battery storage and control systems.
  - Planned CETO 6 Project.
- Partnering with Western Power, who provide grid and network expertise and support.
- Solar/battery funded by AU$2.5m from ARENA, $3.7m debt financing agreement and $1.3m CCE equity
- CETO 6 funded by $13m ARENA grant, debt finance and CCE equity
- Design complete, long lead items ordered, construction commenced on solar array
- Power supply agreement signed with Department of Defence



ARENA
Australian Government
Australian Renewable Energy Agency

westernpower

GOVERNMENT OF WESTERN AUSTRALIA

Thevenard Island Project - Island Microgrid

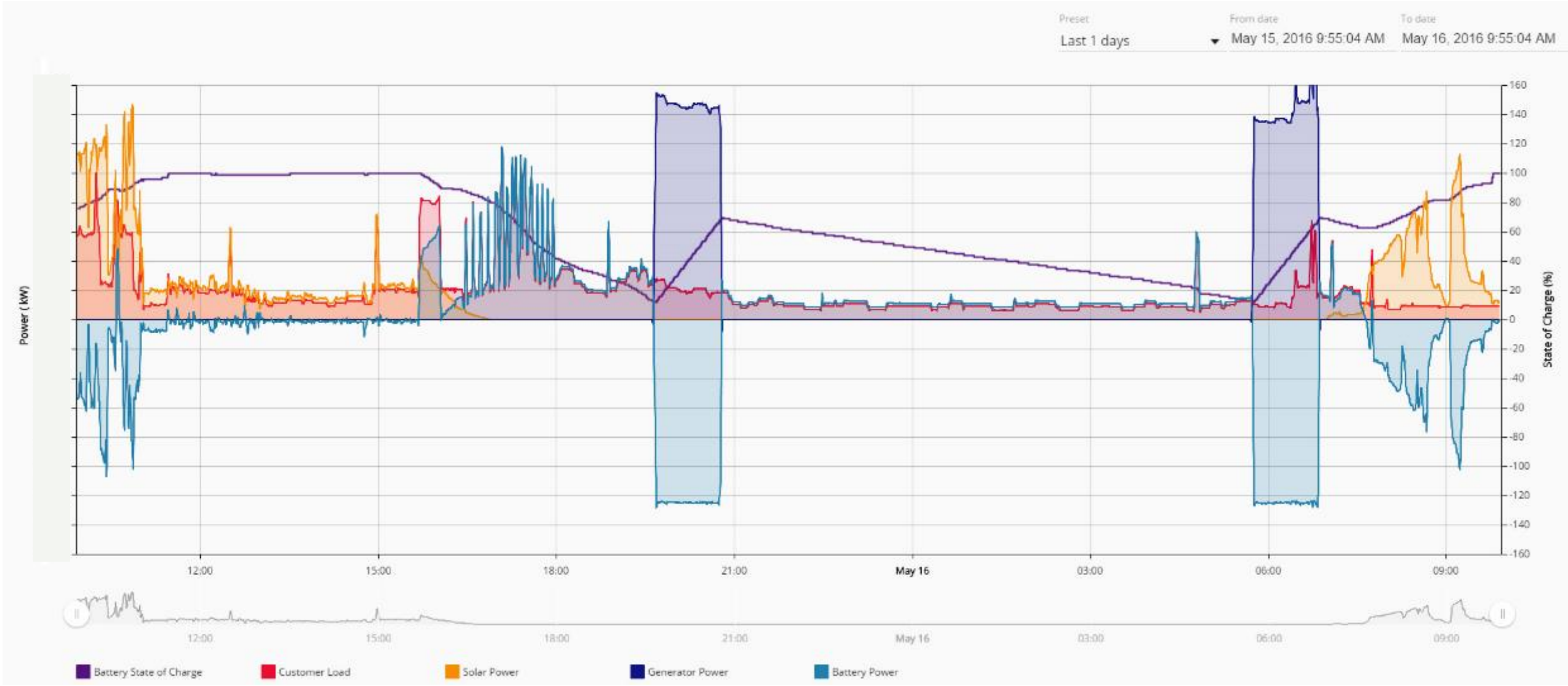
- Customer: Mackerel Islands Corporation
- Location: Thevenard Island, offshore from Onslow, 1300 km North of Perth, Western Australia
- Scope: EMC engaged to design and construct solar/battery/diesel microgrid to enable provide fuel independence and energy savings
- Features:
    - 324 kW Solar PV (ground mount screwpile)
    - 614 kWh Sony Lithium Iron Phosphate (2 x 40ft containers)
    - 440 kVA Diesel Generation (4 x 110kVA)
    - Corrosive location and high wind (CAT-D) region
    - EMC fully remote monitored and controls


HORIZON
POWER

Stand-alone Power Systems - Poles and Wires Replacement

- Customers: Horizon Power and Western Power (WA Government)
- Location: Esperance and Ravensthorpe, ca. 500-700 km south-east of Perth, Western Australia
- Scope: EMC engaged to design and construct cost effective and reliable alternative to replacing poles and wires damaged in bushfires or requiring replacement due to asset age
- Features:
  - Systems between 10-80 kWh Lithium Batteries
  - Systems between 8-20 kW Solar PV ground mounted
  - Fully remote monitored and maintained by EMC
- Opportunity to deliver thousands of these systems in WA alone and the across Australia and region

Operating Philosophy



ISLAND MICROGRID PROJECT - MAURITIUS & RODRIGUES

- Isolated grid system with peak load of 378MW supplied by multiple generation sources (diesel, biomass, hydro, PV, wind,..)
- Currently 22% RE with near term target of 35% and longer term target of >50%
- Will need grid integration technologies and distributed generation in the form of microgrids (importing/exporting) to ensure power quality and reliability can be maintained.

CCE delivered:

- A high penetration renewable energy roadmap for Mauritius.
- Assessment of the wave energy resource, site conditions and priority sites for commercial CETO wave energy devices.
- Design of a decentralised micro-grid for the Island of Rodrigues, offering battery storage and control systems
- Funded by DFAT

UPCOMING MILESTONES

- Northam Solar Power Station financial close. Construction start mid 2017 and commissioning end 2017
- Garden Island Microgrid Stage 1: 2MW Solar and 2MW/0.5MWh Battery System Construction finalisation
- Responding to multiple utility scale battery energy opportunities across Australia
- Continued growth in solar & microgrid Build Own Operate (BOO) project pipeline development
- Strategic partnerships in the microgrid business to expand market and capability
- Over $170 million in project pipeline opportunities through EPC joint venture with Lendlease

THANK YOU

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