



# Jandakot Bioenergy Plant

**Commercially-viable bioenergy from foodwaste:  
an Australian success story at Richgro Garden  
Products**

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# Richgro Garden Products

- ▣ Richgro garden products – A Family owned and operated Western Australian company, established in 1916, a nation wide supplier of compost and fertilisers



# Richgro's Journey for Renewable Energy - 2011

- Richgro's team researched viable renewable energy options starting in 2011, touring Europe and America looking for the right solution
- After numerous quotes from third party European companies giving a black box approach with 3 middle men and a 10 year pay back on capital expenditure.
- Biogas Renewables led the Richgro renewable project.

# Decision for Anaerobic Digestion

- ❑ Richgro garden products – A licenced waste receiver of organic waste streams – predominately green waste from council collections
- ❑ Previous electricity costs from the energy retailer of \$600,000+ / annum
- ❑ Enabling Richgro to take future higher revenue waste streams from contaminated organic waste
- ❑ Outputting a bio-fertiliser to blend with existing Richgro's product improving nutritional and breakdown characteristics
- ❑ To form a closed loop, with potential to utilise heat and CO<sub>2</sub> produced on site



# Biogas Renewables led the Anaerobic Digestion Project

The three main aspects to a renewable energy project:

- ▣ Approvals
- ▣ Funding and project feasibility
- ▣ Inputs /Output



# Approvals and Regulations

- For Western Australia, the Department of Environment Regulation will need to approve the location and site application, this process took 6 months to complete, with operation monitoring required once complete.



- Grid connection was required for exporting surplus power generated on site, this process took 2 years to complete.



# Co-Funding and Finance from Feasibility

Biogas Renewables coordinated:

- ▣ WA State Government grant funding
- ▣ Australian Government Clean Technology Investment Program
- ▣ Finance through the Clean Energy Finance Corporation (CEFC).

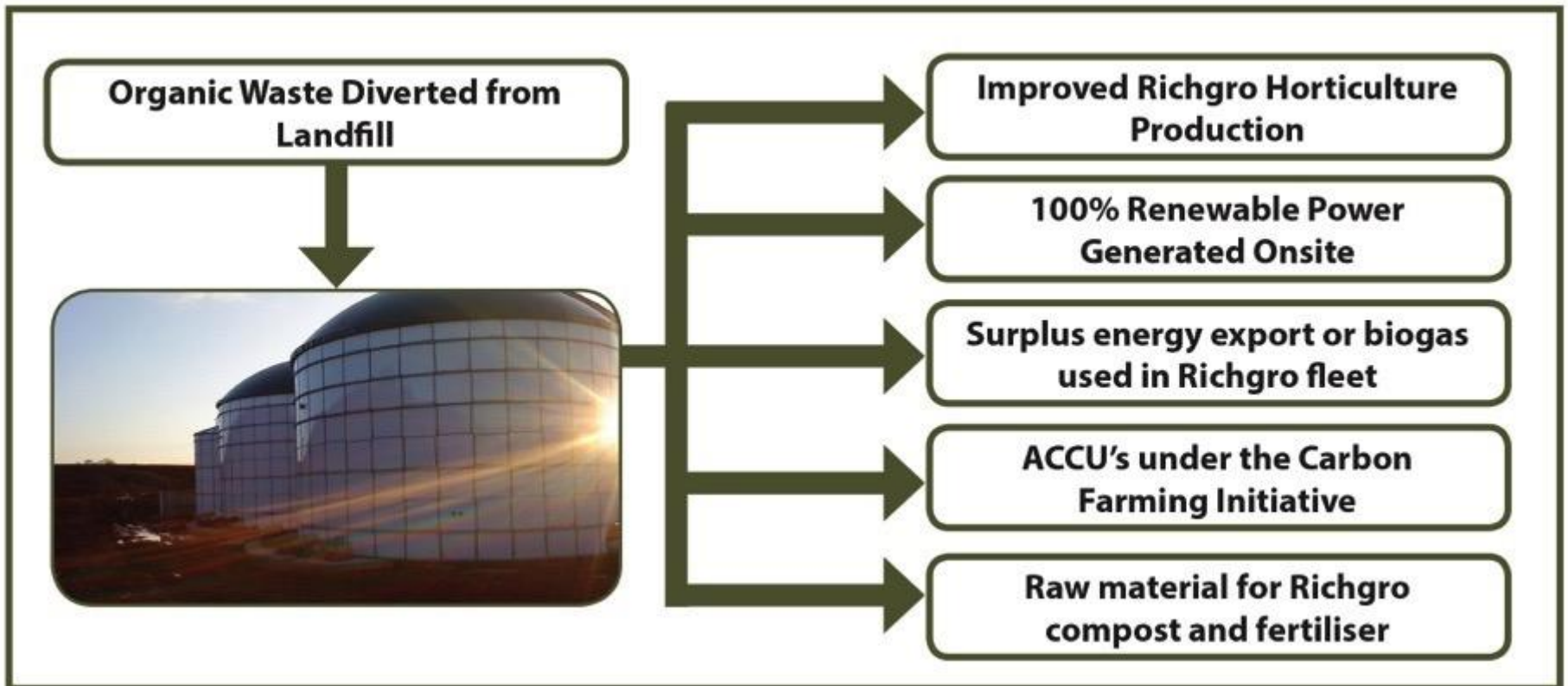


# Inputs / Outputs

- ▣ 35,000- 50,000 tonne available per annum foodwaste anaerobic digestion plant at Richgro Garden Products.
- ▣ Designed to produce over 2MWe capacity electricity – 1.7MWe to the grid.
- ▣ Up to 2.2MWth Heat for utilization
- ▣ Potential to clean the CO<sub>2</sub> from the exhaust of the Co-Generation for use within the blueberry hot houses
- ▣ Up to 100M<sup>3</sup> of liquid biofertiliser at 6% dry solids



# Jandakot Bioenergy Project



# Timeline for the Renewable Project from concept



2011 Richgro European trip



Environmental submission to the DER



Funding Applied for



Nov 2014 Construction Complete



Mar 2015 Site Operational

2011

2012

2013

2014

2015

2016

3<sup>rd</sup> Party Quotes for AD solutions

Environmental approval



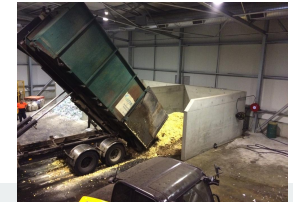
Sept 2013 construction start



Sept 2014 Grid connection for Import



Jan 2015 Started to take waste and seeded the process



Oct 2015 Grid connection for export

# Project Numbers

- Biogass Renewables was the project developer, from a green field site to a fully operational process.
- Commissioned in March 2015.
- Sub – 4 year payback on capital (before grants etc).
- Total capital spend \$8Million





Accepting Liquid Commercial Organic Waste



Accepting Solid Commercial Organic Waste



Accepting Commercial Packaged Waste



Feedstock Pre-Processor and Depackager Standing By



Feedstock Pre-Processing





Clean Dry Recyclables Fetching Premium Prices



Reception Hall and Tank Array from Digesters



Feed and Digestate Tanks



Digesters Use Parasitic Heat for Warming



Gas Train, First Genset, Transformer and Distribution Infrastructure (lagoon not part of AD plant)



Digesters, Gas Train and First 1.2MW Genset



Vacant Location Ready for Second 1.2MW Genset



biogas  
Energy from Waste

Biogas Proprietary AD Plant Control System



# Challenges/Lesson Learned

- Anaerobic digestion is a viable commercial baseload power source with low capex and good project yields.
- Environmental approvals for AD not a major constraint
- Design and Construction- Devil is in the Detail - need an experienced partner development partner.
- Australian conditions and requirements are different to Europe
- Commence grid connection early and manage it tightly.

# Alternative Outputs

Biogas AD plants can be configured to produce;

- ▣ Power and heat or steam through Co-generation or tri-generation,
- ▣ Heat or steam through a biogas boiler,
- ▣ natural gas, CNG

or a combination of all of these.

For example:

- ▣ 50,000 tonnes per annum of food waste at 150m<sup>3</sup>/tonne of biogas has the capacity to produce a mix of:
  1. Biogas to power a 600KW genset 24/7 (as well as 660KW of thermal output) to power a large commercial site, plus
  2. 324m<sup>3</sup>/hour of Natural Gas (CH<sub>4</sub>) for compression to CNG which could displace the equivalent of \$3M/year in diesel if used in static engines or a transport fleet.

# Sectors that could benefit from AD technology

- ▣ Water corporations
- ▣ Food Processing and manufacturing
- ▣ Food Supermarkets and food outlets
- ▣ Abattoirs and meat handling processes
- ▣ Agricultural and energy crops
- ▣ Waste processing and handling operators
- ▣ Composters
- ▣ Councils
- ▣ Gas Grid Networks

# Contact

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