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 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.

Biogass 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 CO2 produced on site
The three main aspects to a renewable energy project:

- Approvals
- Funding and project feasibility
- Inputs / Output
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

Biogass 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 CO2 from the exhaust of the Co-Generation for use within the blueberry hot houses

- Up to 100M3 of liquid biofertiliser at 6% dry solids
Jandakot Bioenergy Project

Organic Waste Diverted from Landfill

- Improved Richgro Horticulture Production
- 100% Renewable Power Generated Onsite
- Surplus energy export or biogas used in Richgro fleet
- ACCU’s under the Carbon Farming Initiative
- Raw material for Richgro compost and fertiliser
Timeline for the Renewable Project from concept

- **2011 Richgro European trip**
- **2011**: Environmental approval
- **2012**: Funding Applied for
- **2013**: Sept 2013 construction start
- **2014**: Sept 2014 Grid connection for Import
- **2015**: Nov 2014 Construction Complete
- **2015**: Jan 2015 Started to take waste and seeded the process
- **2016**: Oct 2015 Grid connection for export
- **2016**: Mar 2015 Site Operational
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 $8 Million
Accepting Liquid Commercial Organic Waste
Accepting Solid Commercial Organic Waste
Accepting Commercial Packaged Waste
Feedstock Pre-Processor and Depackager Standing By
Contact Reception Hall and Tank Array from Digesters
Contact

Feed and Digestate Tanks

biogass
Energy from Waste

Feed and Digestate Tanks
Digesters Use Parasitic Heat for Warming
Gas Train, First Genset, Transformer and Distribution Infrastructure (lagoon not part of AD plant)
Vacant Location Ready for Second 1.2MW Genset
Biogass 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

Biogass 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 150m3/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. 324m3/hour of Natural Gas (CH4) 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
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