Bioenergy
in the Goulburn Valley

Background

Diamond Energy has developed two distributed renewable energy generation projects which use biogas as a source of fuel and which support the local electricity grid.

Diamond Energy is a boutique generation and advisory energy company founded in 2002 by two former Directors of Duke Energy, both with extensive global experience in energy and gas systems and processes. The company has active projects in Australia and Singapore, and specialises in power project development, energy trading and risk management. It has an increasing focus on renewable and co-generation opportunities.

Early in 2003, Diamond Energy identified that in the Shepparton region, the electricity supply would be enhanced by a local source of generation. That same year, local water company Goulburn Valley Water invited expressions of interest for the use of biogas produced at their waste water treatment plants (WWTPs). Diamond Energy applied, won the tender and subsequently installed generators at Tatura and Shepparton.

Project outcomes

Together the two generators produce about 9,000 megawatt hours of electricity per year which is sufficient to supply about 1,700 homes. This generation results in the abatement of over 12,000 tonnes of greenhouse pollution per annum.

The Tatura project was commissioned in January 2007 and the Shepparton plant in December 2008.

Project snapshot

Project developer: Diamond Energy Pty Ltd

Renewable energy type: Biogas for renewable electricity generation

Technology description: 1.1 MW V12 Deutz (Model TCG2020V12) gas engine generator at each site

Project completion date: January 2007 (Tatura) and December 2008 (Shepparton)

Renewable Energy Production: 9000 MWh /yr

GHG pollution offset: 12,150 tonnes CO_2-e/year

EPC Contractor: Energen Solutions

Technology Provider: Deutz Australia

Project Cost: $4.08 million

Sustainability Victoria Contribution: $800,000

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Project description

The generators at Tatura and Shepparton are owned and operated by Diamond Energy and use biogas from the covered waste water lagoons owned by Goulburn Valley Water.

These WWTPs utilise High Rate Anaerobic Lagoons (HRAL) as their primary treatment process. In the absence of oxygen, the organic matter in the waste water is digested by bacteria and releases methane-rich gas. The lagoons are sealed from the air with a polypropylene cover. This enables the collection of the biogas, which is then fed via pipes to the gas engine generator set.

Depending on the amount of available gas, generation occurs daily over a 9 to 12 hour period. An innovative feature of these lagoons is that the covers can expand under modest pressure to store gas overnight. This allows Diamond Energy to generate electricity during peak demand periods and sell it at a higher price on the spot electricity market.

Pipes surrounding the covered lagoons bring the gas to the generator. Here it passes through a 'scrubber' that cleans the gas by removing corrosive elements which could damage the engine. The gas is then pressurised, dried and fed into the engine. Both generators are automatically programmed to operate during the most useful times of the day but can also be remotely monitored and controlled from Diamond Energy's office in Melbourne.

Stakeholders

Critical to the success of the project was the negotiation of agreements between key stakeholders including:

• Biogas Purchase and Supply Agreement between Diamond Energy and Goulburn Valley Water, covering the responsibilities and obligations of the parties and the essentials of the commercial relationship regarding gas supply and use.

• Access and Lease Agreement under which Diamond Energy leases the land where its biogas generation plant and power line poles are situated, and has appropriate access rights.

• Network Connection agreement with the Distribution Network Service Provider.

• Agreements with the turnkey contractor, Energen Solutions.

For more information on this project download the video case study from resourcesmart.vic.gov.au