



renewable
energy
& energy
efficiency
partnership



4

PetroSA Biogas to Energy Project MethCap SPV1 (Pty) Ltd

Summary

The project is the first Independent Power Producer in South Africa to use the Clean Development Mechanism under the Kyoto Protocol and is a 4.2 MW biogas to electricity plant located in Mossel Bay at the state owned gas-to-liquids refinery PetroSA. The project was developed and financed by MethCap, a company owned by international engineering firm WSP Group and minority shareholders include the Central Energy Fund and a group of broad based Black Economic Empowerment investors. Project debt was provided by the Development Bank of Southern Africa. The project uses 3 gas-fired engines supplied by GE Jenbacher and project revenue comprises of electricity sales and Certified Emission Reduction units. The generation plant, which took 11 months to construct, was formally opened by the Minister of Minerals and Energy Ms Buyelwa Sonjica on 28 September 2008 and has been operating ever since.

#Please select the categories to which the project belongs. At least one per column #

End-user area	Target Audience	Technical
<input type="checkbox"/> New buildings	<input type="checkbox"/> Citizens	<input checked="" type="checkbox"/> Energy efficiency
<input type="checkbox"/> Refurbishment of buildings	<input type="checkbox"/> Households	<input type="checkbox"/> Heating
<input type="checkbox"/> Transport and mobility	<input type="checkbox"/> Property owners	<input type="checkbox"/> Cooling
<input type="checkbox"/> Financial instruments	<input type="checkbox"/> Schools universities	and <input type="checkbox"/> Appliances
<input checked="" type="checkbox"/> Industry	<input checked="" type="checkbox"/> Decision makers	<input type="checkbox"/> Lighting
<input type="checkbox"/> Legal initiatives (municipal regulations, directives, etc)	<input type="checkbox"/> Local and regional authorities	<input checked="" type="checkbox"/> CHP
<input type="checkbox"/> Planning issues	<input type="checkbox"/> Transport companies	<input type="checkbox"/> District Heating
<input type="checkbox"/> Sustainable communities	<input type="checkbox"/> Utilities	<input type="checkbox"/> Solar energy
<input type="checkbox"/> User behaviour	<input type="checkbox"/> ESCOs	<input type="checkbox"/> Biomass
<input type="checkbox"/> Education	<input type="checkbox"/> Architects engineers	and <input type="checkbox"/> Wind
<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Financial institutions	<input type="checkbox"/> Geothermal
	<input type="checkbox"/> Other	<input type="checkbox"/> Hydro power
		<input type="checkbox"/> Other

#Please add photos, pictures and/or tables that make the description of the project more visible and easy to understand and read. Include these as JPEG files in separate documents. Please include figure caption in respective places. The suggested number of lines is exclusive of figures and tables #

Introduction



renewable
energy
& energy
efficiency
partnership



The project is located at PetroSA, a state owned corporation that has since 1987 operated a gas to liquids plant at Duinzicht, some 12 kilometres from the town of Mossel Bay on the south coast of South Africa. The production process at Duinzicht leads to waste process water which has been dealt with by way of anaerobic digestion since the inception of the Plant. The anaerobic digestion is continuous and a critical process for the operation of the PetroSA plant. In the anaerobic digestion process methane rich biogas is naturally generated. The biogas is burned in the reciprocating engines and causes the national grid to generate less coal based electricity therefore reducing CO₂ emissions by 33,000 tonnes per annum for the life of the project.

Objectives

The main objective of the project is to generate non-fossil fuelled electricity thus leading to a reduction in CO₂ emissions in South Africa. A further objective was to create a poverty alleviation mechanism in the Eden municipality and this aim is being achieved by paying an annual 7.5% royalty to a poverty alleviation fund for the development of sustainable social projects. The program is managed by and NGO Ikamva Labantu which has more than 40 years experience in implementing projects with similar objectives.

Methodology

The project activity included:

- The building of an engine room on existing, already disturbed land inside the PetroSA plant;
- The installation of gas fired combustion engines;
- Piping the gas from the existing T-piece into the engines. Due to the corrosive nature of the gas, the new gas supply pipes to the engines are stainless steel;
- The design ensures oxygen free gas lines and constant positive pressure in the digester and associated piping;
- Three 1.416 MW General Electric Jenbacher engines have been installed to establish an installed capacity (maximum output) of 4.248 MW. The generation set is complete with intercoolers and water coolers and are housed in a specially built, 198 square meter plant room;
- The engines drive coupled electrical generators that produce electricity at 6,6 kV;
- The existing biogas flare stack remains open and on-line to allow for engine shutdowns and to burn excess gas.
- The cable transporting the electricity from the genset to the grid approximately 1000 meters long, and for the majority it runs with existing cables below the surface.



renewable
energy
& energy
efficiency
partnership



- The GE Jenbacher gensets were chosen based on reliability, performance guarantees and operational efficiency.

Financial resources and partners

The total project cost is R30 million which was funded by a combination of debt and equity. The principal project sponsor and sole developer was MethCap SPV 1 and minority shareholders are Central Energy Fund, Ikamva Labantu and NRG Investments, the latter two of which are broad based empowerment companies.

Finding / Outcomes

The project produces approximately 34GWh of electricity per annum which is sold to the local grid at PetroSA displacing coal-based electricity. The PetroSA demand is substantially larger than the project generation and the tariff paid to MethCap SPV 1 for the electricity matches exactly that of the imported grid cost. With the CER revenue, the project is financially feasible, but completely unfeasible in the absence thereof.

OTHER BENEFITS:

The project reduces 33,000 tonnes of CO₂ annually and was registered by the UNFCCC in September 2006. The project created approximately 100 part time jobs directly during different times of construction and 2 full time positions for the next fifteen years. In addition, the poverty alleviation project will create jobs for approximately 50 people with their dependents.

Lessons learned and repeatability

The project implementation was delayed by 5 months due to petrochemical and site specific requirements which were not in any way anticipated. There were also delays caused during the project registration phase at the UNFCCC which were administrative by nature. The general project development process including obtaining licences, permits, approvals, raising debt, project construction and management are universally applicable and similar to those encountered previously in the EU. The skills set required for successful project development and finance is however unique and specialised and whilst applicable in most other geographies, are not readily nor abundantly available in the market. Particular areas factors contributing to the success include deep financial and project finance experience, strong technical knowledge and innovation and a pioneering position in the carbon market particular to non-annex 1 countries.

Contact for more information:

Project Web Site: refer www.biothermenergy.com
Organisation / Agency: BioTherm Energy (Pty) Ltd
Main contact: Charles Liebenberg
Address: 199 Bryanston Drive, Bryanston 2052



renewable
energy
& energy
efficiency
partnership



Tel: +27 (0) 72 954 7116
Fax: + 27(0)11 361 1301
E-mail: charles.liebenberg@wspgroup.com
Web Site: www.biothermenergy.com