

AN EXCEPTIONAL ENERGY CASE STUDY

LPG FOR POWER GENERATION WALLUMBILLA LPG FACILITY

Image provided by Andrew James, Canva.

When needing to replace three ageing, natural gas-fired reciprocating engines at a remote facility located five hours west of Brisbane, Australia, WLPGA member Capstone Green Energy provided an innovative solution which resulted in the first gas site in the world using a butane-fired, grid-connected microturbine to generate power onsite for site electricity demand while exporting excess power to the grid.

This Exceptional Energy case study looks further into the environmental, economic and reliability benefits of LPG for power generation in the provision of stable secure power for a remote facility.



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1. The Challenge

AGL Energy delivers gas, electricity and telecommunications services to 3.95 million customers across Australia, operating Australia's largest electricity generation portfolio, which accounts for nearly 20% of the total generation capacity within Australia's national electricity market.

In 2020, AGL Energy needed to replace three ageing, natural gas-fired reciprocating engines at the company's Wallumbilla LPG facility, located five hours west of Brisbane, Australia. Capstone Green Energy provided an innovative solution that was more environmentally-friendly and helped reduce the high cost of operating and maintaining the generators.



2. The Solution

As a by-product of natural gas production, butane was a readily available and cost-effective choice for fuelling the LPG facility's new system, which featured a Capstone Green Energy C1000S microturbine.

The system is not only the first gas site in the world to use a butane-fired, grid-connected microturbine to generate onsite electricity, it is also the first Type-B certified butane-fuelled microturbine in Australia, and the first microturbine to be connected to the grid in Queensland.



With AGL Energy's installation of a grid-connected, butane-fired microturbine system from Capstone Green Energy, they also received improved efficiency, reliability and a dramatic reduction in noise pollution. It is also the first system of its kind in the world.

3. The Results

Replacing reciprocating engines that had been installed in the 1980s has delivered a wide range of benefits for the Wallumbilla plant, including:

- Cost savings
- Increased power reliability
- Greater efficiency
- Environmental benefits
- Dramatically lower maintenance and repair needs.

The Wallumbilla plant typically consumes about 200 kW of electricity for both operations and gas production. This amounts to roughly 20% of the new system’s capacity, so the selection of the Capstone Green Energy C1000S microturbine allows AGL to export an excess 800 kW to the grid, which not only benefits consumers, it also provides additional revenue for the company.

The cost savings alone from exporting excess electricity reaches \$800,000 AUD per year without including savings from using a by-product fuel and dramatically lower maintenance and repair needs.

One of the important side benefits of the new system is that it significantly reduces noise pollution at the plant, so employees and visitors have an easier time communicating, and the site is better able to meet occupational health and safety requirements.

The benefits of an innovative system like this one reach beyond those immediately realised by the company into Australia’s communities. From environmental benefits to better power security and reduced energy costs, the system at the Wallumbilla plant serves as a model for future projects, not only because it is a proven reference for using butane as fuel, but because it sets a precedent for obtaining grid connection approval.



Image provided by Capstone Green Energy.



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5. Contributors

- Capstone Green Energy
- Optimal Group Australia

