

Santos Tarbat Oil Field

Oil & Gas / Microgrid



The Challenge

Serving as one of Australia's largest independent oil and gas producers, Santos Limited has a 65-year history of safely and sustainably developing Australia's natural gas resources while powering the country's industries and households. As a company that strives to grow its business while also delivering shareholder value, Santos recently took the opportunity to dramatically improve energy efficiency and reduce costs at its Tarbat oil production facility in Southwest Queensland.

Constructed at a time of large-scale oil field development, the Tarbat site used an inefficient gas turbine to power a number of wells, as well as its own infrastructure. But as oil production declined, the site no longer required the amount of energy the turbine was producing.

Officials sought a solution that would help the company achieve several objectives including reducing fuel consumption, lowering operating and maintenance costs, improving efficiency, and reducing emissions. Working with Optimal Group Australia and GPA Engineering, Santos moved forward with the development of a microgrid that included a 1,000 kW microturbine at the heart of its integrated power system. Because the remote site has significant load fluctuations (as much as 250 kW every 8 seconds), the microgrid would also be ideal for improving both power system stability and availability.

The Solution

The new system's one-megawatt Capstone C1000 Signature Series microturbine is fueled by the facility's on-site natural gas. To achieve even greater efficiency and reduction in emissions, the turbine is connected to a 400V AC LV switchboard in conjunction with a 250kW solar PV system.

Power Profile

Customer

Tarbat Oil Field

Location

Southwest Queensland, Australia

Commissioned

June 2019

Fuel

High Pressure Natural Gas

Technologies

- 1 C1000S Microturbine
- Grid Stability Module
- 250 kW 5B Solar
- Jinko Panels

Capstone Turbine Distributor

Optimal Group Australia



"This project is a prime example of how the unique features of the Capstone microturbine deliver exceptional results for customers looking to improve efficiency and reap the benefits of cost and emissions reductions.

— Kane Ravenscroft, Sales Director
Optimal Group Australia

Reliable power when and where you need it. Clean and simple.



A C1000S Capstone Microturbine has reduced the facility's on-site fuel consumption by 50%, thus reducing their carbon footprint resulting in \$1 Million AUD annual savings per year

To address the load fluctuation issues, the system is equipped with a grid stability module (GSM), harmonic filtering and power factor control. The GSM is a sophisticated rapid load response module that incorporates Optimal's proprietary Ultra-Capacitors and conventional lead-acid battery storage. The capacitors rapidly charge and discharge, thereby "absorbing" the significant load fluctuation without losing the available energy.

The Results

Santos' progressive approach to overhauling the energy system at the Tarbat oil field site paid off impressively. Because so many factors in the new design deliver enormous efficiency gains, the new system has reduced fuel requirements by 50%. The resulting annual savings amounts to \$1 Million AUD per year.

In its first 14 months, the site ran 10,000 continuous hours and provided better power stability and improved reliability. And because microturbines only require annual service—a significant benefit for a remote site like Tarbat's—the facility is able to also reduce maintenance costs. Further, the reduction in gas usage contributed to a 50% reduction in emissions, which is an important part of Santos's commitment to be part of a low-carbon future.

"This project is a prime example of how the unique features of the Capstone microturbine deliver exceptional results for customers looking to improve efficiency and reap the benefits of cost and emissions reductions," said Kane Ravenscroft, Sales Director for Optimal. "Exceptional part load capability, load response and modular design, inherent in every Capstone Turbine product, delivers real world efficiency far beyond a simple name plate efficiency comparison. Simply put, using Capstone Microturbine technology enable Optimal to deliver their customers the lowest operating cost and lowest emission energy in the market." ■

Capstone C1000S Microturbine



A C1000S provides up to 1MW of electrical/thermal generation and can be paralleled to generate up to 10MW of clean-and-green power.