

Ecopetrol

Oil & Gas

The Challenge

As the primary petroleum company in Colombia, Ecopetrol has multiple hydrocarbon extraction fields throughout the country. It is one of the largest oil producers in the world, part of the Fortune Global 500, ranked as the 313th largest public company in the world. So it was a significant development when, as part of a push to fight climate change, the company committed to a 20% reduction in emissions by 2030.

Ecopetrol's plan reduces and offsets the company's emissions by implementing energy efficiency measures, particularly those that reduce routine gas flaring in their oil and gas fields. As part of that commitment, the company endorsed the World Bank-led Zero Routine Flaring by 2030, a global initiative to stop routine gas flaring at operations sites.

When it came time to replace one of the reciprocating engine generators in the Rio Ceibas Field, Ecopetrol engineers turned to Supernova Energy Services, Capstone's exclusive distributor for Colombia and Venezuela. Together, they developed a plan for a reliable and low maintenance energy solution that would also address the flaring issue.

The Solution

Capstone microturbine solutions are an ideal choice for oil and gas operators due to their low maintenance and high

Power Profile

Customer
Ecopetrol

Location
Huila, Colombia

Commissioned
First system - January 2020
Second systems - August 2021

Fuel
Pipeline Natural Gas

Technologies
• 3 C1000S Microturbines

Capstone Green Energy Distributor
Supernova Energy Services



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— Nestor Moseres, President
Supernova Energy Services



**Smarter Energy
for a Cleaner Future**

Ecopetrol



Two C1000S microturbines convert high pressure natural gas at Campo Los Mangos, Yaguará, Huila, Colombia into clean, reliable and cost effective power.

reliability characteristics. What's more, microturbines can use associated natural gas as an input fuel source with minimal gas pre-treatment. This allows customers like Ecopetrol to monetize the associated gas, keep operational costs low by avoiding extra fuel-cleaning equipment, and significantly reduce negative impact on the local environment.

Ecopetrol installed their first C1000S at the Rio Ceibas Field site in January 2020. The unit provides electrical power for site operations in a completely stand alone operation. The unit is configured to run on the associated gas from the oil extraction process. During oil production, associated gas is produced from the reservoir together with the oil. Flaring associated gas releases methane, a greenhouse gas that contributes directly to global warming and has a substantial impact on the local environment. In this case, flaring also wastes a valuable fuel resource that the microturbines can use.

After 18 months of successful operation with their initial installation, Ecopetrol commissioned two additional C1000S microturbines, this time for a state-of-the-art facility in Campo Yaguará. The microturbines replaced two aging reciprocating engines that had reached their end of life. The new solution allows operators to reduce electrical consumption from the grid and increase operational productivity.

The Results

Capstone microturbines are recognized in the oil and gas industry for their strong performance and reliability. In this project, the new systems were able to reduce gas consumption, increase the available power and eliminate the need to flare the associated gas. Additionally, the microturbines' minimal maintenance equates to lower operating expenses, thus saving considerable money. In just the first 9 months, through reduced maintenance,

lower fuel costs, and high efficiency and reliability, Ecopetrol saved roughly \$600,000 (USD).

To date, the Yaguará facility, has reduced CO2 emissions by 900 tons and improved efficiency from 18-20% reciprocating engine efficiency to 31.5% microturbine efficiency.

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Capstone C1000S Microturbine



A C1000S Microturbine provides 1MW of reliable electrical power in one small, ultra-low emission, and highly efficient package.