Jonah Field

At a glance

Location

Wyoming, USA

First Microturbine Commissioned

August 2007

Fuel

Dry and wet natural gas

Technologies

Four Capstone C30 MicroTurbines™ drive well-site production equipment. The microturbines use "wet" flash gas to generate 20kW of power each. Electricity produced by the microturbines power TEG dehydration and glycol heat tracing pumps, eliminating the need for the environmentally unfriendly gas-driven and pneumatic-type pumps.

Results

- The initial microturbine has run since August 2007 with no operational problems.
- Significant reduction of greenhouse-gas emissions.
- Savings of nearly 12 million standard cubic feet of natural gas each year that once had been used to fuel pumps.
- The Jonah microturbine project was a commended entry in the competitive BP Helios Awards in 2008.

Looking Forward

- BP plans to install Capstone microturbines at five more Jonah Field sites.
- In addition, BP hopes to power automation, chemical injection and cathodic protection systems with microturbine-produced electricity and is investigating the use of a VRU (Vapor Recovery Unit) to capture flash gas from the onsite condensate storage tanks.

In the Jonah Field of Wyoming, BP America no longer siphons its own product to get more out of the ground.

One of the largest on-shore natural gas discoveries in the U.S., the expansive Jonah Field is estimated to contain 297 billion cubic meters of natural gas. But to tap into that vast resource, BP had to waste environmentally unfriendly gas to fuel pneumatic pumps that support well-site equipment.

"We recognized an opportunity to eliminate gas-driven pumps, increase revenue by keeping gas in the system and reduce the impact on the environment," said Will Burton of British Petroleum.

In 2007, a forward-thinking Burton agreed to install a microturbine that runs on natural gas produced at the well site. In addition to being fueled by raw natural gas, the clean-and-green microturbine emits extremely low greenhouse-gas emissions and requires little maintenance.

In August 2007, Capstone Turbine Corp. installed a C30 microturbine to drive well-site production equipment. The microturbine uses a small amount of clean natural gas (also referred to as "dry gas") to generate 20kW of power.

Electricity produced by the microturbine powers triethylene glycol (TEG) dehydration and glycol heat tracing pumps, eliminating the need for the environmentally unfriendly gas-driven and pneumatic-type pumps typically found throughout the Jonah Field.

The remote Jonah Field wellsite uses a Capstone C30 microturbine to generate electricity to run the site's pumps.

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Four months after the first microturbine installation, BP's Jonah team tested the use of "wet" flash gas to drive the microturbine. The test was a success.

"Wet gas is usually wasted – put in a combustor and burned away," Burton said. "We weren't getting any benefit from it. Now we have a free fuel source."

"The turbines had never been used in this application before, but Will (Burton) was looking for an innovative way to utilize the power on site," said Bryan Hensley of Pumps and Service, the Capstone distributor that co-designed the Jonah Field application. "He was willing to bet on this opportunity and BP has a success story because of it."

Today, Capstone microturbines operate at four separate BP well sites. Each turbine generates 20kW of electricity that runs pumps typically driven with gas. The initial microturbine has run for 18 months with no operational problems.

The result for BP is significantly reduced greenhouse-gas emissions and savings of nearly 12 million standard cubic feet of natural gas each year that once had been used to fuel pumps.

The original C30 unit is housed in a small building to protect it from low winter temperatures on the harsh Wyoming plains. The building is outfitted with forced ventilation, catalytic heating, gas detection and a small fuel-gas delivery system. After temperatures sank to -35 degrees Fahrenheit in 2007, BP insulated the building to protect the system.

"The system has two fuel types coming in and we had to be able to switch between fuels on the fly," Pumps and Service's Hensley said. "Burton told us what he'd like the system to do, together we figured out how to do it and it worked."

"The microturbines require minimal quarterly preventative maintenance," Burton said. "All they have to do is change the filters, so there's maybe four hours of maintenance per quarter."

BP, which has a strong focus on the environment, has experimented with other forms of alternative energy, but has decided to stick with microturbines.

"We're looking at replacing solar panels with microturbines on some of our large sites due to reliability," Burton said. "There are days when it's cloudy or snowy and you can't count on solar power. Regardless of the weather, the microturbines always run."

The Jonah microturbine project was a commended entry in the competitive BP Helios Awards in 2008. Only 160 of the nearly 1,400 submissions from around the world receive commendation.

"What this commendation says to me is that BP is very pleased with the performance of the microturbines," Burton said.

Looking ahead, BP hopes to power automation, chemical injection and cathodic protection systems with microturbine-produced electricity and is investigating the use of a VRU (Vapor Recovery Unit) to capture flash gas from the onsite condensate storage tanks. Plans are in place to implement those changes in 2009.

BP officials are so pleased with the performance of the Capstone microturbines they want to expand use of the turbines in the field.

"Given their reliability, financial savings and reduced emissions, we're looking at five additional sites this year," Burton said. "The more we build our knowledge base about microturbines, the more we want to increase their use." ■

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