

Fallowfield Gas Processing Plant

CONSOL Energy Inc., named one of America’s most admired companies by Fortune Magazine, is a leading producer of bituminous coal and natural gas in the Eastern United States. The forward-thinking company regularly looks for opportunities to reduce methane gas vented into the atmosphere during the mining process. The diversified-fuel producer’s efforts are successful. In 2011, CONSOL captured and used 2,109-million-cubic-feet (59,720,229-cubic-meters) of methane.

The company targeted its Fallowfield coal bed gas processing plant, located 21 miles (33.8 kilometers) south of Pittsburgh, Pennsylvania, as a key location to use the waste methane while reducing the plant’s greenhouse gas footprint. The Fallowfield Gas Processing Plant had been emitting 18.5-million-cubic-feet (523,861-cubic-meters) of methane annually into the atmosphere.

CONSOL contracted Capstone Turbine Corporation’s mid-Atlantic distributor E-Finity Distributed Generation to install at Fallowfield the first Capstone CR200 microturbine in the United States to run on waste coal bed methane.

Methane is the primary gas emitted from coal mining and has a greenhouse-gas impact on the atmosphere 21 times that of carbon dioxide. Fortunately, Capstone’s microturbine technology allows companies to capture waste methane and use it as an onsite fuel source to produce clean-and-green electricity.

The CONSOL Fallowfield Gas Processing Plant purifies coal bed methane extracted from the Upper Freeport coal seam in the Appalachian region. The processing plant primarily removes carbon dioxide and water from the coal bed methane to produce pipeline-quality gas.



Capstone CR200 microturbine integrated with the Fallowfield Gas Processing Plant.

At a glance

Location

Charleroi, Pennsylvania, USA

Commissioned

March 2012

Fuel

Waste methane from coal bed methane gas processing plant.

Technologies

- Capstone low-emission CR200 microturbine.
- Unison Solutions gas-conditioning skid.
- Absorption chiller.
- Methane monitors (optional).
- Capstone Logic Controller – interfaces with plant’s Supervisory Control and Data Acquisition (SCADA) system and E-Finity’s remote monitoring. Also controls turbine and gas-conditioning system.

Results

- Recovery of up to 18.5-million-cubic-feet (523,861-cubic-meters) of methane.
- Generates a net 1.331-million-kWh of clean electrical power.
- Potential annual energy cost savings of US\$80,000.
- Eliminates global warming potential equivalent to 6,486-metric-tonnes of carbon dioxide – equivalent to removing 1,400 U.S. cars from the road.

The methane-fueled Capstone CR200 microturbine installed at the plant in early 2012 produces 200kW of low-emission power. The microturbine uses waste methane from the purification process to produce electricity used onsite. The microturbine recovers 18.5-million-cubic-feet (523,861-cubic-meters) of methane gas and generates 1.331 million net kilowatt hours of clean electrical power. The anticipated energy cost savings to the processing plant is US\$80,000 each year.

Helping the Environment and the Community

CONSOL found the Capstone microturbine technology the best solution for its gas-processing plant. In collaboration with E-Finity, CONSOL determined that purchasing the low-emission, highly reliable CR200 would improve its environmental impact and provide the greatest benefit to the region and company. Installation of the CR200 eliminates global warming potential from the plant equivalent to 6,486-metric-tonnes of carbon dioxide each year – which is comparable to removing 1,400 U.S. cars from the road.

By installing the Capstone microturbine, CONSOL is showcasing a clean-and-green energy system that converts low and variable concentrations of methane to electricity and provides electric power to the processing plant.

“The flow rate and methane concentration of the waste gas stream are well suited to the capacity of Capstone’s C200,” explained Jim Grech, Chief Commercial Officer of CONSOL Energy Inc. “The microturbine is rated to operate at 33 percent electrical efficiency, based on a lower heating value. It’s expected to have much lower maintenance costs and emissions than those from reciprocating engines.”

CONSOL secured partial funding through the Pennsylvania Department of Environmental Protection under a Pennsylvania Energy Development Authority (PEDA) grant. The support from the state’s Environmental Protection Department “made it feasible for CONSOL to install the microturbine on this site and test the microturbine application on a gas processing plant,” Grech said. The PEDA grant encourages the use of Pennsylvania companies, like E-Finity, for energy-related projects.

Unlike other distributed generation technologies that produce electricity, microturbines easily can operate with low and variable methane concentrations around 35 percent. The Fallowfield microturbine continuously operates with methane concentrations around 33 percent.



The microturbine system includes a gas conditioning skid, chiller, and microturbine.

The microturbine power system could qualify the plant to sell CO₂ credits. In addition, the power system is expected to qualify it as a source of Tier 2 alternative energy under Pennsylvania’s Alternative Energy Portfolio Standard. To further extend its green initiative to the nearby community, CONSOL donated funds to the local school system equal to the value of the electricity generated during the microturbine’s first two months of operation. ■