Solar® Turbines
A Caterpillar Company

COMBINED HEAT AND POWER PROJECT

Powering the Global Energy Demand

Sustainable Energy Production at Macon Municipal Energy Center

Location: Macon, Missouri

Partner: Northeast Missouri Grain

Engineering/Design: Shafer, Kline and Warren, Inc.

Installed: 2004

In 2002, Macon Municipal Utilities approached Northeastern Missouri Grain (NEMO), a 40 million gallon per year ethanol production facility, with the idea of implementing combined heat and power (CHP) for the economic, efficiency, and operational benefits it would provide. After reviewing several options, they decided on a new and highly efficient CHP system to be built on-site at the NEMO ethanol plant.

At the heart of the system is a *Mars*®100 gas turbine generator set, designed to provide both highly reliable electrical power and steam at an overall thermal efficiency of 72.8%.

The CHP plant produces 11 MW of electricity for Missouri Power Utilities Association (MPUA) and 23,100 Kg/hour (50,100 pph) of saturated steam for process by Northeast Missouri Grain. If the grid experiences a power outage, the CHP system can provide full backup power to the plant.

Solar's extended scope of supply included the complete power island, consisting of the gas turbine, unfired heat recovery steam generator, and fuel gas compressor. The *Mars* gas turbine operates 100% base load and is equipped with *SoLoNOx*™, Solar's dry low-emissions combustion system, required to meet stringent air emissions regulations.

With 72.8 percent operating efficiency the CHP system requires approximately 25% less fuel than typical on-site thermal generation and purchased electricity. The CHP system reduces carbon dioxide emissions by an estimated 29,100 tons per year, which is equivalent to removing the annual emissions from 4,965 cars or planting 7,945 acres of forest.

This project received an Energy Star award from the United States Environmental Protection Agency in 2007 for reducing air pollution and greenhouse gas emissions.

In more than 2,000 installations worldwide, *Solar*® gas turbines generate clean electrical power from natural gas, while simultaneously producing useful thermal energy tailored to meet your needs for heating and cooling and process steam.

Our CHP packages are specifically designed to limit the impact on the environment, protect people who operate the equipment, and respect people who live nearby. Due to the exceptional overall efficiency, *Solar* gas turbines can provide significant reductions in greenhouse gas emissions by displacing power and heat from more traditional and carbon-intensive sources while at the same time maintaining very low pollutant emissions levels.

For more information on this project and how Solar Turbines can provide a sustainable, effective solution to meet you energy needs, contact:

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