SOUTHEAST

U.S. DOE

CHP Technical Assistance Partnerships

PROJECT PROFILE

# Evonik Industries

## 5 MW Natural Gas CHP System

## Project Overview

Evonik is one of the world's leading specialty chemicals companies, with segments serving the automotive, plastics, pharmaceutical and other industries. Headquartered in Essen, Germany, Evonik employs approximately 33,000 people worldwide and operates production plants in 25 countries. Evonik seeks to address global needs by concentrating on megatrends, especially resource efficiency, health & nutrition, and globalization. Combined heat and power (CHP) is a technology solution to resource efficiency that Evonik has applied at a number of their facilities worldwide.

In April 2012 Evonik started operation of a 5 MW natural gas fueled CHP system at their superabsorbent polymers production site in Garyville, LA. The plant is located on 92 acres and is comprised of one administrative, one production and one maintenance building as well as two receiving/stock warehouses. This CHP system provides for most of the plant's electric load and for 100% of the thermal load. The operation of the CHP system places a priority on thermal production, and at times there is an excess of power production, which is exported to the grid.

## Quick Facts

**LOCATION:** Garyville, LA
**MARKET SECTOR:** Chemical
**FUEL:** Natural Gas
**GENERATING CAPACITY:** 5 MW
**THERMAL OUTPUT:** 80,000 lbs/hr Steam
**IN OPERATION SINCE:** 2012
**EQUIPMENT:** (1) 5 MW Solar Turbines gas turbine
(1) Cleaver Brooks D-tube HRSG
**USE OF ELECTRIC ENERGY:** On-site & export to utility
**USE OF THERMAL ENERGY:** Process steam
**INSTALLED COSTS:** $10 million
**EMISSIONS CONTROLS:** Gas turbine equipped with SoLoNOx, a dry low emissions pollution prevention combustion system
**EFFICIENCY:** 92%

## Reasons for Installing Combined Heat & Power

Evonik decided to invest in a CHP system to improve both their electric power and steam reliability. Louisiana is often hit by hurricanes and other natural disasters that can cause long power outages. Before installing the 5 MW system the facility bought steam from a neighboring chemical plant and electricity from the local utility. Power outages and/or disruptions at the neighboring plant would affect Evonik's electric or steam supply. The CHP system allows the facility to run independently from the grid, which gives them the capability of operating through power outages. By generating their own steam the plant also eliminated their dependency on their previous steam supplier, minimizing process thermal disruptions that were out of their control.

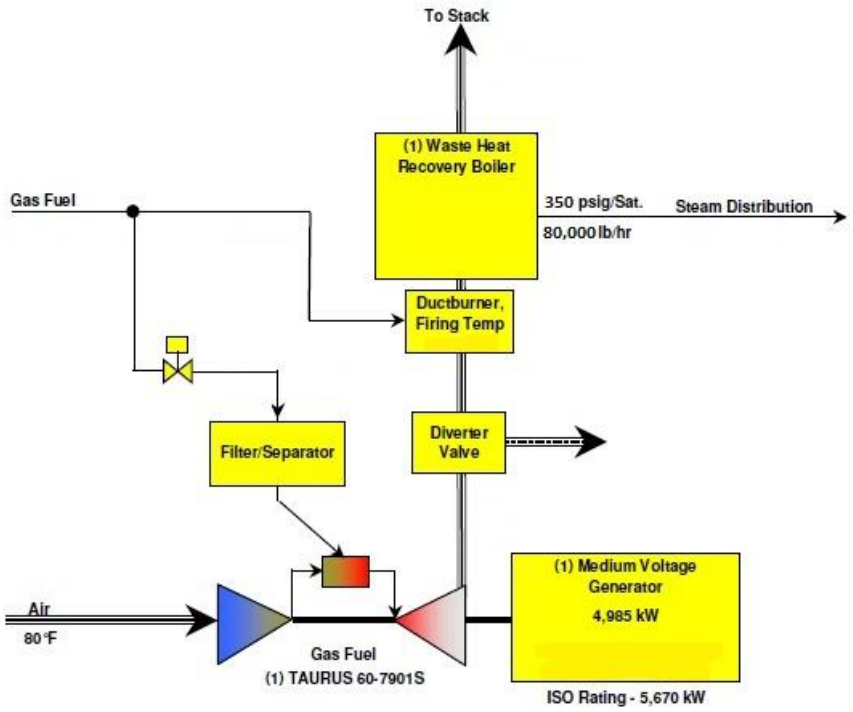
*5 MW Gas Turbine at Evonik*

## Equipment and Configuration

Natural gas fuels a 5 MW combustion turbine manufactured by Solar Turbines that provides 100% of the facility's electric needs for most of the year. Occasionally, during the hottest days of the year, the facility will purchase supplemental power from the utility. The waste heat from the turbine is sent to a Cleaver Brooks D-tube heat recovery steam generator (HRSG) which with

supplemental firing produces 80,000 lb/hr of saturated steam at a pressure of 350 psig for the plant's processes. The gas turbine uses SoLoNOx, a dry low emissions pollution prevention combustion system that is designed to meet exhaust emission regulations during steady-state operation at 50-100% engine load and all ambient temperatures above 0°F.

The plant has a monitoring system with critical alarms hardwired to alert inside the production unit central control room, as well as at the CHP unit itself. With the CHP system in parallel with the utility grid, the grid serves as a standby power source and Evonik can request additional steam from their previous supplier if needed. Solar Turbines provides the maintenance for the turbine/generator set and the plant's maintenance department services the HRSG.




*CHP System Diagram (by Solar Turbines)*

## Project Economics and Partners

*Interior of 5 MW Gas Turbine at Evonik*

The CHP project cost approximately $10 million and Evonik was eligible to claim a Federal investment tax credit of 10% or $1 million. Fuel price cycling and standby charges were accounted for in the project's economics, and so the CHP system has been generating electricity for $0.034/kWh since startup.

Much of the project development and engineering for the CHP system was done using in-house personnel and resources; the feasibility study was completed by Evonik Engineering together with the site's business and engineering departments, and the engineering & design phase was conducted by Evonik Process Technology and Engineering. Other project partners include Solar Turbines, Cleaver Brooks, NatCom, and Tesecon Construction.

## For More Information

**U.S. DOE SOUTHEAST CHP TECHNICAL ASSISTANCE PARTNERSHIP**
Isaac Panzarella
919-515-0354
ipanzarella@ncsu.edu

**EVONIK INDUSTRIES**
Garysville, LA Production Facility
Joi Williams
Process Engineer
joi.williams@evonik.com

More Case Studies: http://www.southeastchptap.org or http://www.energy.gov/chp

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