MIDWEST

U.S. DOE

CHP Technical Assistance Partnerships

PROJECT PROFILE

Solvay Specialty Polymers

8 MW CHP System

Project Overview

The DTE Marietta/Solvay Specialty Polymers project in Marietta, Ohio – designed, built, owned, operated, and maintained by DTE Energy Services – began operation in February 2015. The combined heat and power (CHP) facility was developed to meet the steam and power generation requirements for the Solvay Specialty Polymers specialty plastics manufacturing plant. The project provides approximately 8 MW of power generation and up to 150,000 lb/hr of 300 psig process steam to Solvay under a long-term agreement. The steam supplied to Solvay also serves the neighboring Americas Styrenics facility. DTE Energy Services has operations and maintenance responsibility for the substation that serves both chemical facilities. The CHP system provides 100% of Solvay's steam needs and about 97% of its electrical load. Over the life of the 20-year agreement with DTE Energy Services, the net present value of Solvay's utility savings will exceed its costs by an estimated $6 million.

Quick Facts

LOCATION: Marietta, Ohio

MARKET SECTOR: Chemical

CHP GENERATING CAPACITY: 8 MW

PRIME MOVER: Solar Taurus 70 gas turbine

FUEL: Natural Gas

HEAT RECOVERY EQUIPMENT:
150,000 lb/hr HRSG with fresh air firing capability
Two 80,000 lb/hr package boilers

HEAT RECOVERY RATE: Up to 150,000 lb/hr of 300 psig process steam

USE OF THERMAL ENERGY: Process heating

ENVIRONMENTAL CONTROLS: Low NOx burners and SCR

TOTAL PROJECT COST: $35 million

BEGAN OPERATION: 2015

History of Project

Solvay Specialty Polymers is a 24/7 operation that employs more than 300 people in the manufacturing of various specialty plastic products, including plumbing fixtures, water filtration media, and cell phone components. In 2010, Solvay lost its source of steam for its plant when American Municipal Power shut its Gorsuch Power Plant as part of an environmental settlement with U.S. EPA. Solvay was forced to install a temporary boiler system, but sought a long-term solution.

DTE Marietta CHP Plant at Solvay Specialty Polymers (Source: DTE Energy)

The company enlisted assistance from AEP's Energy Efficiency Program in 2013. AEP agreed to pay Solvay 0.5 cents/kWh for 5 years, enabling the utility to count the electric generation from the new CHP system at Solvay towards its state energy efficiency benchmarks. Receiving the incentives helped Solvay with overall plant/project justification. Ultimately, Solvay chose to pursue CHP both to gain greater control of energy reliability and to reduce its energy costs. The company also selected a third party arrangement with DTE Marietta to better focus on its core business and eliminate capital expenditures for utilities.

Third Party Ownership – DBOOM Model

DTE Marietta CHP Plant showing raised site. (Source: DTE Energy)

This project not only demonstrates the benefits of combined heat and power to meet the energy requirements of an industrial customer, but provides an example of third party development of such energy solutions. DTE Energy Services' business model is to provide DBOOM (design, build, own, operate, and maintain) services for energy intensive customers to allow them to realize the benefits of state-of-the-art technology, conserve their resources, and focus on their core business on both a near-term and long-term basis. The CHP system installed at Solvay Specialty Polymers includes an 8 MW Solar Taurus 70 gas turbine, a 150,000 lb/hr HRSG with duct firing and fresh air firing capability, two 80,000 lb/hr package boilers for back-up steam supply, and a dedicated water treatment system.

Environmental Benefits

Combined heat and power provides greater overall efficiency than independently produced steam and electricity; and, therefore, the CHP system at Solvay Specialty Plastics results in lower greenhouse gas emissions. The system is equipped with various emission controls that reduce other air emissions as well. The gas turbine includes dry low NOx burners and the HRSG is equipped with SCR to further reduce NOx emissions. If CO emissions reduction is required in the future, the HRSG is also equipped with space for a CO catalyst.

Project Challenges / Lessons Learned

The plant site is located in a flood plain next to the Ohio River. To manage that issue, the site was raised more than 10 feet with trucked-in fill. The plant site required 0.75 miles of piping and electrical interconnections including crossing a major highway and a rail spur which required extensive permitting and interaction with state and local agencies, as well as on-site stakeholders. Marietta, Ohio experienced the coldest February on record during startup, necessitating measures to address problems caused by the extreme weather. DTE added insulation to equipment, added housings to encapsulate instrument tubing, and made modifications to the gas compressor to handle the cold temperatures. The physical changes added slightly to the project cost, but the CHP system is now more resilient and better equipped to handle future weather extremes. Solvay Specialty Polymers and DTE Energy Services continue to assess improvements to the system including expansions and further optimization of services.

"Solvay Specialty Polymers and DTE Energy Services worked together closely to develop a customized energy supply facility to meet our plant's specific needs. The DTE Marietta cogeneration project has provided a reliable, efficient, economic energy supply solution to the Solvay complex to insure that our plant can meet its production goals."
Al Wanosky, Solvay Site Utilities Manager

For More Information

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