



CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS

Shaw Industries

14-MW Natural Gas CHP System



Quick Facts

LOCATION: Columbia, South Carolina
MARKET SECTOR: Carpet fiber production
GENERATING CAPACITY: 14.1 MW
EQUIPMENT: Solar Turbines Titan 130
FUEL: Natural Gas
USE OF THERMAL ENERGY: Process steam, hot water, cooling
USE OF ELECTRIC ENERGY: On-site
ENVIRONMENTAL BENEFITS: Reduction of Greenhouse gas emissions by approximately 26,000 metric tons annually
CHP IN OPERATION SINCE: 2018

Project Overview

In May 2018, Shaw Industries Group, Inc. brought online a 14.1 MW Combined Heat and Power (CHP) system at its Columbia, South Carolina fiber production facility (Plant 8S). Shaw made the decision to invest in a combined heat and power system as part of its carbon emissions reduction strategy as well as to increase efficiency and to control energy costs. The CHP system has the capacity to meet all thermal load and most of the electric demand for the plant, which produces synthetic carpet fibers from raw materials, including recycled soda bottles. The system was designed with the capability to “island” which will enable Plant 8S to remain operational if there is an interruption to the power supplied by the local utility. Shaw utilized resources through the U.S. Department of Energy’s Southeast Combined Heat and Power Technical Assistance Partnership (Southeast CHP TAP) to evaluate the feasibility of a CHP application at Plant 8S.

Reasons for Installing CHP

Shaw Industries has been significantly investing in their operations to minimize its environmental footprint. Since 2011, Shaw has invested almost \$50 million to help reduce its energy and greenhouse gas impacts. As a result, Shaw’s greenhouse gas emissions have decreased approximately 32 percent compared to 2010, with a target of reducing both the amount of energy the company uses and the amount of GHG emissions it produces (per pound of finished product) by 40 percent by 2030.

According to Troy Virgo, Director of Sustainability and Product Stewardship at Shaw Industries, “Climate change is a complex, global issue. While no one company or individual can tackle this challenge alone, as a globally oriented company we have a responsibility to positively contribute to the solution. The Combined Heat and Power system [at Plant 8S]

exemplifies one of many ways we are doing our part to have a positive impact on the world we all share.” The result: Less fuel is used to provide the same amount of steam and electricity to the plant, which reduces greenhouse gas emissions. The Plant 8S CHP system will reduce Shaw’s GHG emissions by 26,000 metric tons per year, which is equivalent to removing 5,500 passenger vehicles from the road each year. The plant will realize reduced energy costs as well. The CHP system at Plant 8S supports Shaw’s carbon strategy of reducing energy demand and improving energy efficiency, investing in renewable energy generation and measuring and reporting progress with a goal toward continuous improvement

Equipment and Configuration

The CHP system includes a natural gas-fired Solar Titan 130 combustion turbine with a nominal 14 MW output and a Cleaver Brooks heat recovery steam generator (HRSG) for producing steam from the exhaust gases from the combustion turbine. A duct burner is installed in the exhaust duct between the combustion turbine and the HRSG for supplemental firing of natural gas to increase steam output to supply the needs of the plant’s fiber extrusion processes. The duct burner and HRSG have the capability to operate without the combustion turbine operating. This system provides sufficient steam to meet the entire thermal load and approximately 75 percent of the electric load of Plant 8S. The CHP system reduces emissions of greenhouse gases by approximately 26,000 metric tons per year compared to the pre-CHP scenario.



Shaw Industries’ Plant 8S CHP System

Power of Partners

During its planning process, Shaw reached out to the Southeast CHP TAP for help on a CHP qualification screening to explore the viability of combined heat and power. Once the initial screening deemed the project favorable, the Southeast CHP TAP conducted a detailed feasibility analysis, which included a more in-depth engineering assessment of infrastructure, capital and O&M expenses, emissions reductions and efficiency gains. Additionally, the Southeast CHP TAP arranged for a tour of the North Carolina State University 11 MW CHP¹ and district energy system as part of an operations and maintenance best practices training with Shaw’s engineers. Shaw Industries’ partnership with the U.S. Department of Energy extends beyond the reach of the CHP TAPs. As a Better Plants partner, US DOE resources helped Shaw Industries to meet the Better Plants Challenge by reducing its energy intensity by 25 percent across their operations over a 10-year period.

“Shaw Industries has found incredible value in the CHP TAP, including the report, which demonstrated the viability of the project in measurable ways.”

Kurt Kniss, Energy Manager, Shaw Industries

For More Information

U.S. DOE [REGION] CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)

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¹ Southeast CHP TAP (2015). Project Profile: North Carolina State University http://www.chptap.org/Data/projects/ncsu-Project_Profile.pdf