SOUTHEAST CHP Technical Assistance Partnerships

PROJECT PROFILE

Milliken Textiles

14-MW CHP System

Milliken's Blacksburg Utility Co-op Plant in Blacksburg, South Carolina

Quick Facts

LOCATION: Blacksburg, SC
MARKET SECTOR: Textiles
CHP IN OPERATION SINCE: 2021
GENERATING CAPACITY: 14 MW
THERMAL OUTPUT: 200,000 lb/hr steam
EQUIPMENT:
14 MW Titan 130 Solar Turbine
Rentech Heat Recovery Steam Generator
FUEL: Natural Gas
USE OF THERMAL ENERGY: Process heating
CHP TOTAL EFFICIENCY: 70%
ENVIRONMENTAL BENEFITS:
Eliminates coal for steam generation
20% overall efficiency improvement
TOTAL PROJECT COST: $25 million
ESTIMATED ANNUAL SAVINGS: $4 million
SIMPLE PAYBACK: ~6 years

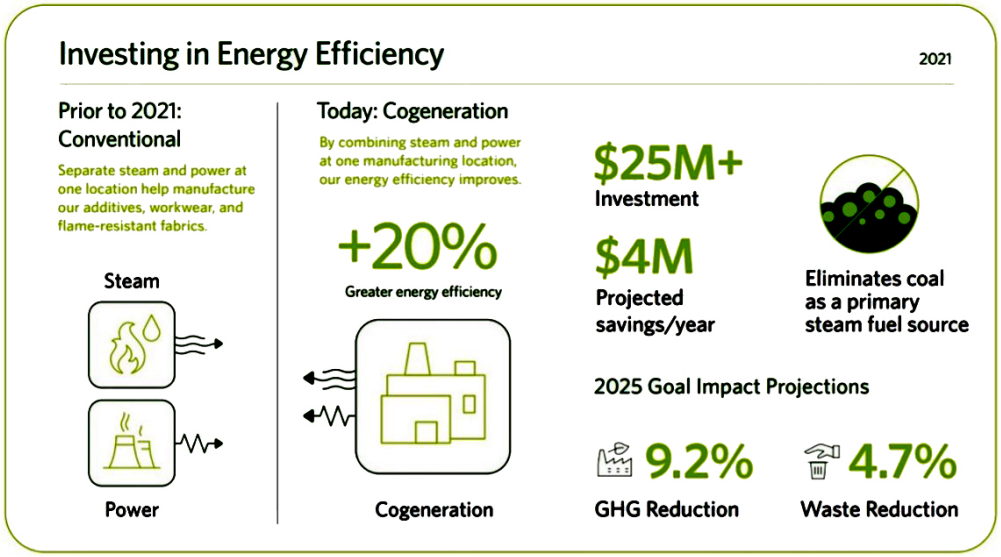
Site Description

Milliken and Company have been in the business of manufacturing and distributing textiles for over 150 years. The company has 26 manufacturing facilities around the globe that produce textiles, chemicals, flooring, and healthcare products. The Magnolia Finishing Plant and Allen Chemical Plant are located on a 900-acre campus that is one of the company's largest sites for manufacturing workwear, additives, and flame-resistant fabrics. Both plants receive electricity and steam from the Blacksburg Utility Co-op, a 14 MW combined heat and power (CHP) plant that started up in 2021.

Reasons for CHP

The CHP system in Blacksburg is an important part of the company's environmental goals to reduce greenhouse gas emissions by 25% in 2025 from a 2018 baseline.

By generating electricity onsite, recovering heat to produce steam, and eliminating coal use, the CHP system reduced the Magnolia Finishing facility's greenhouse gas emissions by 30% and waste by 33%. With respect to Milliken's corporate wide goals, the CHP system is projected to contribute a 9.2% GHG reduction and a 4.7% waste reduction.

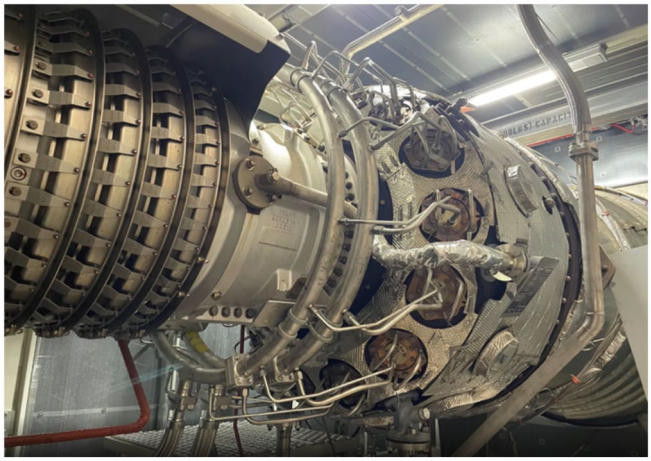


Infographic on Benefits of CHP at Blacksburg (image courtesy of Milliken)

CHP Equipment, Operation, and Configuration

The CHP system consists of a 14 MW Titan 130 Solar Turbine and a 200,000 lb/hr Rentech Heat Recovery Steam Generator (HRSG) that generates 200 psi steam for the facilities. The diversity of the two plants requires weekly planning of utility resources to ensure smooth week-to-week transitions. Adding CHP to the utility system increased both reliability and efficiency for the Milliken plants, with a forecasted up time of more than 95% and expected average annual efficiency of more than 70%.

The utility operations support two major manufacturing sites, which requires optimal reliability. Two weeks of scheduled maintenance are required annually to support reliable operation. Combined, the two plants have a peak electric demand of 16.7 MW, so the CHP system generates most of the electricity required and imports additional power from the utility.



14 MW Gas Combustion Turbine CHP at Blacksburg Co-op

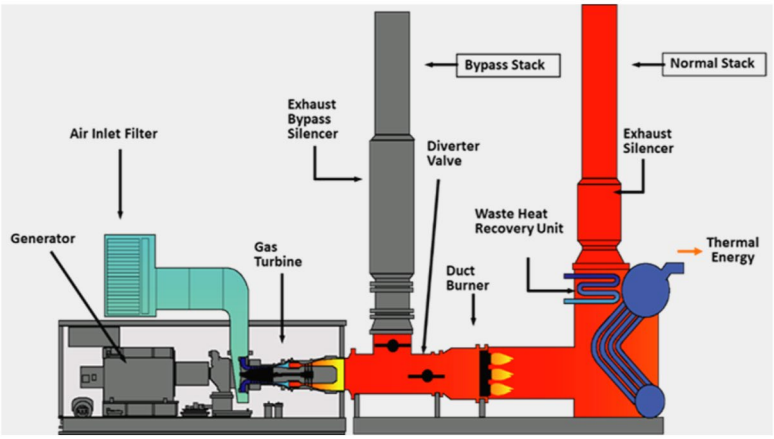


Diagram of Gas Combustion Turbine CHP System with Heat Recovery

> *"The CHP system meets the campus' electricity demand the majority of the time, allowing the grid utility to meet the demand beyond the 14 MW CHP capacity. With many options evaluated for how to operate alongside the grid utility, parallel generation without grid export was the best option for Milliken."*
>
> *- Josh Riggs, Sustainability Manager Milliken & Company*

Lessons To Share

Milliken notes that system startup and operation is a complex process, especially when the CHP is integrated with grid power and supplemental thermal generation. There is a learning curve for becoming a power generator and sufficient time for commissioning and training is required. The Sustainability Manager recommended learning all you can about system operation before startup. Ideally, the team would have made a site visit to an existing CHP system as part of the operator training process but was unable to as was planned due to the coronavirus pandemic (COVID-19) in 2020.

A CHP system is built using just a handful of large expensive components: the turbine, generator, and heat recovery steam generator. Normally, Milliken staff would visit the suppliers for these components, but due to the COVID-19 pandemic, supplier visits were not allowed, making component review very difficult. Milliken adapted to overcome the obstacle through a detailed virtual review process.

For More Information

U.S. DOE SOUTHEAST CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)
www.sechptap.org

Milliken & Company
Josh Riggs
Sustainability Manager
Josh.Riggs@Milliken.com
www.milliken.com

Date issued: 03/2023