NEW ENGLAND

CHP TECHNICAL ASSISTANCE PARTNERSHIPS

PROJECT PROFILE

Erving Industries, Inc.

6.2-MW CHP System

Erving Industries, Inc.'s paper mill in Erving, Massachusetts.

Quick Facts

LOCATION: Erving, Massachusetts
MARKET SECTOR: Pulp and Paper
FACILITY PEAK LOAD: 6.36 megawatts (MW)
EQUIPMENT: Solar Taurus 60 gas turbine with duct-fired heat recovery steam generator
FUEL: Compressed natural gas
USE OF THERMAL ENERGY: Steam for paper machines and other process users
CHP TOTAL EFFICIENCY: 75%
ENVIRONMENTAL BENEFIT: Reduced 21.6 million lb of CO_2/yr
ENERGY SAVINGS: 39 million kWh/yr
PAYBACK: Less than 3 years (with utility incentives)
CHP IN OPERATION SINCE: December 2015
SPECIAL NOTE: The turbine can also run on ultra-low-sulfur fuel oil if needed

Site Description

Erving Industries, Inc. is a family run company that owns and operates a paper mill between Route 2 and the Millers River in Erving, Massachusetts. The paper mill produces approximately 120 tons per day of tissue- and towel-grade paper for a wide variety of products, including napkins, toweling, and table covers. Consistent with Erving's environmental stewardship objectives, Erving paper is manufactured using 100% recycled paper feedstock.

Since opening in 1908, the Erving paper mill has undergone extensive additions and modifications and has been successful via personalized customer service and Yankee ingenuity. For example, the rerouting of Route 2 provided the mill with the space to expand operations and increase flexibility. As another example, Erving implemented energy efficiency improvements and installed a CHP system in 2015. The CHP system supplanted a 250-million lb/yr boiler and reduced Erving's 45 million kWh/yr electric consumption by approximately 39 million kWh/yr. Erving's ongoing efforts to reduce operating costs and improve resiliency will benefit the mill for years to come.

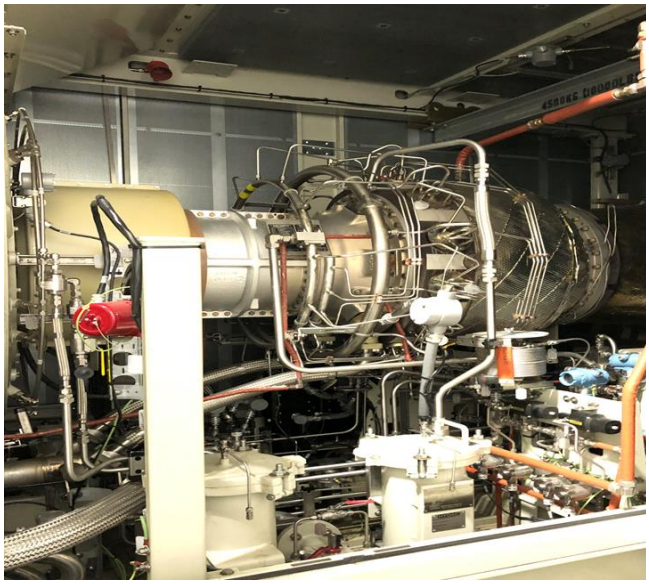
Reasons for CHP

The site was an excellent candidate for CHP because of a large, consistent steam load, and because of utility, state, and federal incentives that improved the project's economics. Additionally, CHP provided Erving Industries a proven means to achieve three of their goals:

- Reduce energy-related operating costs,
- Increase reliability, and
- Further corporate sustainability objectives.

CHP Equipment & Configuration

Absent a local natural gas pipeline, Erving Industries receives 3000-psig compressed natural gas from an on-site gas-conditioning skid. The 3000-psig pressure is reduced to 275-psig prior to entering the Solar Turbine 60 gas turbine, which generates 5.67 MW of power. Exhaust gases are fed through a heat recovery steam generator (HRSG) with a Honeywell Eclipse duct burner, economizer, evaporator, moisture separator, and superheater to generate 600-psig steam at 680°F. By incorporating a carbon monoxide (CO) catalyst and an aqueous ammonia-fed selective catalytic reduction (SCR), the HRSG also reduces CO and nitrous oxide (NO_x) emissions. The HRSG is capable of producing 23,000 lb/hr of steam without operating the duct burner, and up to 50,000 lb/hr of steam with the duct burner activated. The 600-psig steam is then fed through a 525-kW back pressure steam turbine to generate an additional 525 kW of electricity and reduce steam pressures to 135 psig for process heating (e.g., paper machine, de-inking plant, wastewater plant) within the paper mill.



Solar Turbine Taurus 60 gas turbine.

CHP Operation

Erving Industries received energy efficiency rebates from the local utility after the operational demonstration test in late 2015. Since then, the CHP system has successfully operated for approximately 3.5 years and has achieved a total efficiency of approximately 75%. The CHP system is responsible for reducing carbon dioxide (CO_2) emissions by 21.6 million lb/yr and reducing grid-purchased electricity by 39 million kWh/yr. The mill also has successfully transitioned to island mode operation on multiple occasions in response to disruptions in the power quality of the utility grid. Further, the CHP system's less than 3 year payback means that the system has already paid for itself. As noted in a 2017 POWER magazine article, Erving Industry's CHP system has reduced Erving's operating costs and enabled Erving to stay competitive.

Lessons To Share

- Compressed Natural Gas (CNG) CHP systems are economically and technically feasible
- It is important to implement energy efficiency improvements prior to installing a CHP system in order to correctly size the CHP system, reduce capital costs, and maximize operational savings

"We wouldn't be operating today if not for the CHP system."

- Michael Peterson, Maintenance / Electrical Manager, Erving Industries

For More Information

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