



MIDWEST  
**CHP**  
APPLICATION  
CENTER

In Partnership with  
the US DOE



NiSource  
Energy Technologies  
A NiSource Company

combined heat & power in industry

# Vestil Manufacturing Company

## 140 kW CHP Application

### Project Profile

#### Quick Facts

**Location:**  
Angola, Indiana

**Facility Type:**  
Manufacturing Facility

**Manufacturing Product Type:**  
Materials Handling Equipment

**Facility Size:**  
500,000 square feet

**CHP Generating Capacity:**  
140 kW

**Prime Mover:**  
2 MT70 Ingersoll Rand Microturbines

**Primary Fuel:**  
Natural Gas

**Heat Recovery Type:**  
1.1 MMBtu/hr Direct Exhaust

**Heat Recovery Applications:**

- Convection Cure Oven
- Convection Drying Oven
- Wash Solution Holding Tanks

**CHP System Efficiency:**  
80%+ Design Efficiency

**Local Electric Utility:**  
Steuben Cnty. REMC

**Total Installation Cost:**  
\$217,440

**Began Operation:**  
June 2005

#### Project Benefits

The CHP project qualified for a \$30,000 award from the Indiana Department of Commerce, under the Distribution Generation Grant Program to offset equipment costs. The project also met necessary qualifications to be included in a larger U.S. DOE program focusing on DG demonstration projects securing an additional \$100,000 in funding. Specific project operation benefits include:

- Efficient use of input energy
- Reduced electric utility purchases
- Enhanced recycling of waste energy
- Environmental emissions reduction

#### Background Information

Vestil Manufacturing Company, located in Angola, Indiana, is a leading manufacturer of materials handling and ergonomic equipment focused on providing a diverse and continually improving product line to their customers in an efficient manner. With the desire to improve plant operating efficiency, reduce emissions, and cut energy costs, Vestil looked to NiSource Energy Technologies (NET) in the fall of 2004 for an integrated energy solution incorporating the technologies of combined heat and power.



Vestil Manufacturing Company – Angola, IN

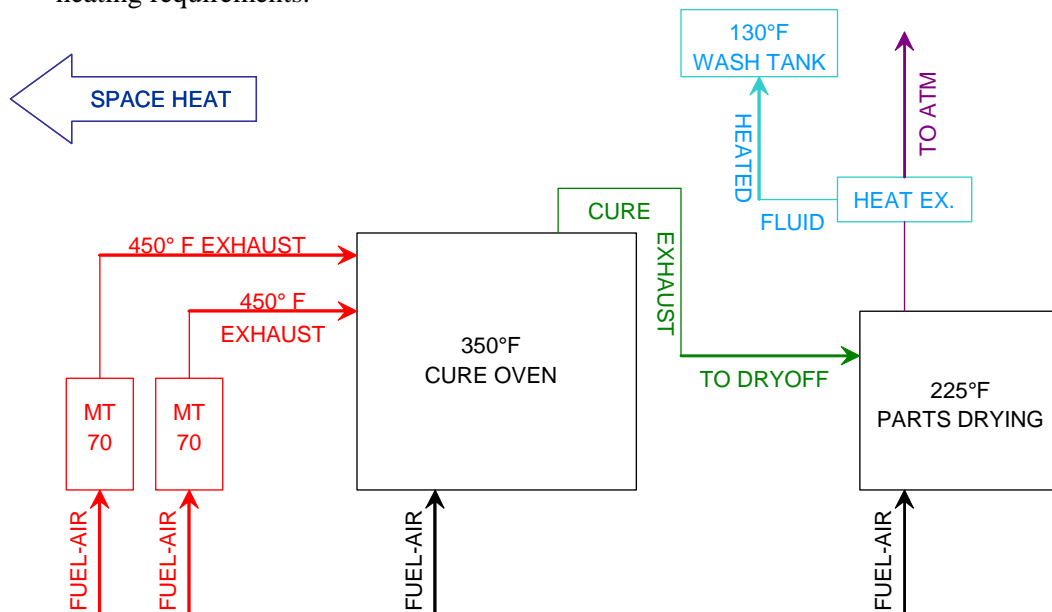
#### Project Overview

NET, a subsidiary of NiSource Inc., identifies, develops, and applies technological advances in the distributed energy market. Upon analysis of the electric and thermal loads at Vestil, NET designed and recommended baseload operating CHP system to ensure optimal performance and maximum overall efficiency by utilizing all available thermal energy. The CHP system incorporates two (2) MT70 Ingersoll Rand microturbines, one (1) Beckwith M3410 protective relay, and two (2) 80 kVAR capacitor banks to compensate for the reactive power needs of the induction generator. The CHP system was commissioned in June 2005 and operates in parallel with the local utility grid. 1.1 MMBtu/hr of exhaust energy is recovered directly from the microturbines and supplements the heating needs of various ovens and wash tanks with future possibilities of also supplementing space heating needs.

## Maximizing Heat Recovery Applications

The system was designed for maximum flexibility and full utilization of the generator's available electrical and thermal energy. When all of the recovered heat is utilized from the microturbines, total efficiencies in excess of 80% are realized by the CHP system.

- Primary Heat Recovery System - The 450° F exhaust stream produced by each microturbine is diverted for use at the 350°F powder coat cure oven to supplement the existing source of heat, a 4.50 MMBtu/hr natural gas, direct-fired burner.
- Secondary Heat Recovery System - For increased system efficiency, the powder coat cure oven's 350° F exhaust stream is likewise diverted for use at the 225° F dry-off oven to supplement its existing 1.70 MMBtu/hr natural gas, direct-fired burner.
- Tertiary Heat Recovery System - In a final effort to further increase system efficiency, the dry-off oven exhaust stream is routed through a fin-tube heat exchanger. This provides heat for the five-stage wash process, supplementing its existing 3.50 MMBtu/hr natural gas fired, tube type burner.
- Future heat recovery applications could incorporate applying excess heat to space heating requirements.



**Schematic of Heat Recovery Applications from the CHP System**

### Other Project Notes

- A remote monitoring system is used for NET to observe site operation data for maintenance and troubleshooting of the microturbines.
- The energy audit and engineering were performed by NET.
- Electrical connections and exhaust ductwork were installed by local contractors selected by NET.
- Commissioning of the microturbine system was completed by Ingersoll-Rand, with the assistance of Vestil and NET.
- Vestil may qualify for NO<sub>x</sub> emission reduction credits through the Indiana Dept. of Environmental Management's NO<sub>x</sub> budget trading program.

***For further information, contact:***

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**State and Federal Funding Incentives resulted in installation costs of \$625/kW**

**Initial Contact, Design, and Installation Completed in 6 Months**

**Awarded 2005 CHP Certificate of Recognition by EPA**

