



Assessment Date: May 20, 2003

#### Benefits:

- Made six recommendations with total potential cost savings of more than \$53,000
- Showed potential to cut energy use by up to 50% per year
- Prompted company to consider three recommendations that could save of \$16,000 per year with a combined payback of 1 year

#### Applications:

To help the Wexco Corporation reduce energy use and optimize its operation, the North Carolina State University IAC focused primarily the plant's manufacturing process, compressed air, and lighting systems.

## Wexco Corporation: Assessment Uncovers \$53,000 in Energy Efficiency Opportunities at Plastic Extrusion Cylinder Manufacturer

### Summary

North Carolina State University's Industrial Assessment Center (IAC) performed an energy conservation assessment of Wexco Corporation's plant in Lynchburg, Virginia, and found the company could save more than \$53,000 per year by implementing assessment recommendations. The IAC, sponsored by the U.S. Department of Energy (DOE) Industrial Technologies Program (ITP), is one of 26 across the nation in which faculty and students provide eligible small- and medium-sized manufacturers with no-cost energy assessments. This assessment project was sponsored by ITP and The Society of the Plastics Industry, Inc. (SPI), a DOE Allied Partner.

The assessment team identified six opportunities to save electricity and natural gas, including waste heat recovery and new equipment to improve plant ventilation and air compressor operation. The team found that Wexco could improve operation of its heat-treating furnace, either by recirculating a portion of the diluted flue gases to the furnace's burner to preheat it, or by using electric heating elements instead of natural gas elements. The first option could reduce natural gas demand by more than 1,600 MMBtu per year—nearly 25% of the furnace's current natural gas consumption—and could save more than \$10,000 per year. The second option would virtually eliminate the stack loss from the existing setup, with net energy cost savings of more than \$43,000 per year.

### Company Background

Wexco Corporation is a leading producer of bimetallic cylinders for plastic extrusion equipment. With sales of about \$10 million per year, Wexco produces custom, high-quality cylinders for after-market distribution and for new equipment use by major extrusion machine builders around the world. The Lynchburg facility measures 48,000 square feet and includes manufacturing space and corporate and engineering offices. The total energy budget for the plant is approximately \$146,000 per year, with electrical costs about twice that of natural gas costs.

### Assessment Approach

A team of students and staff from North Carolina State University's IAC performed the assessment of the Lynchburg plant on May 20, 2003. IAC Director James W. Leach and Extension Specialist Stephen Terry led the assessment. The team examined processes at the plant to determine major sources of energy use. They collected key data, such as process temperatures, lighting levels, and nameplate information from process equipment. Additionally, the team gathered typical operating schedules to use in modeling the heat-treating furnace.



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## Recommendations

**Process Heating.** The furnace used for heat-treating the cylinders uses 50% of the energy at the facility, which amounts to about 30% of total annual energy costs. During the assessment, two options were explored to reduce these costs. However, only one of the options can be implemented.

- Recirculate a portion of the diluted flue gases to the burner of the heat-treating furnace, preheating the combustion air to 700°F.
- Install an electrically heated furnace to eliminate the stack loss (estimated to be 90% of the total fuel fired). This option will replace 6,950 MMBtu of natural gas with 161,000 kWh of electricity. While this measure has a higher initial cost, it reduces the furnace operating costs by more than 75%.

**Heating, Ventilation, and Air-Conditioning.** The plant uses five rooftop air-conditioning units with a combined rating of 190 tons. Several large ceiling fans force about 24,000 cubic feet per minute of air from the plant to remove smoke from the welding areas. Much of the air-conditioning and space heating loads result from hot, humid air in the summer, and cold air in the winter.

To improve efficiency, the assessment team recommended that Wexco install smoke eliminators and change fan schedules. Portable smoke eliminators to the welding stations will filter air to remove smoke particles. The plant could then deactivate at least two of the three exhaust fans and will reduce electrical power needed for cooling and natural gas for space heating.

**Compressed Air Systems.** Wexco's process requires compressed air, which is currently supplied by a 60-horsepower screw compressor. To reduce energy use and improve energy efficiency of the compressed air system, the assessment team suggested installing equipment to recover heat from the air compressor. This hot air can be directed into the plant in the winter for space heating, which would offset natural gas use to heat the building.

## Results

Since the assessment, Wexco has shown significant interest in implementing three of the six recommendations from the assessment. The table below shows that these three measures could help the company achieve annual savings of more than 2,700 MMBtu in natural gas and nearly 39,000 kWh in electricity. If implemented, Wexco would see costs savings of about \$16,000 per year from these three measures.

### Selected Recommendations for Wexco Corporation's Plant in Lynchburg, VA

Project Category/ Recommendation	Annual Resource Savings	Annual Cost Savings	Implementation Cost	Payback Period
<b>Process Heat-Treating</b> Recirculate exhaust gas to furnace inlet	1,678 MMBtu	\$10,471	\$10,000	1 year
<b>Compressed Air</b> Recover compressor waste heat	205 MMBtu	\$1,284	\$800	8 months
<b>HVAC Systems</b> Install smoke eliminators and change fan schedules <sup>1</sup>	773 MMBtu; 38,711 kWh	\$4,325	\$5,653	1.3 years
<b>Total</b>	<b>2,788 MMBtu/yr 38,711 kWh/yr</b>	<b>\$16,080</b>	<b>\$16,453</b>	

<sup>1</sup> Wexco reports that this recommendation was implemented as of September 2005.

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### Project Partners:

Wexco Corporation  
Lynchburg, VA

The Society of the Plastics  
Industry, Inc.  
Washington, DC

### For Additional Information:

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