



NJME is a technical assistance program for NJ industries that is operated through the Center for Advanced Energy Systems (CAES) at Rutgers, The State University of New Jersey.

Funded by the New Jersey Department of Environmental Protection's Office of Pollution Prevention and Right to Know, the purpose of the program is to improve the competitiveness and efficiency of New Jersey companies, while also reducing the impact on the environment. NJME accomplishes this by promoting energy efficiency and pollution prevention.

*For more information:*

**New Jersey Program for  
Manufacturing Excellence**

**73 Brett Road**

**Piscataway, NJ 08854**

**732-445-5540**

[njme@caes.rutgers.edu](mailto:njme@caes.rutgers.edu)

[www.njme.rutgers.edu/](http://www.njme.rutgers.edu/)

## **Roysons Corporation: Energy and Pollution Audit Brings Savings to Wallcovering and Printing Manufacturer**

### **Summary**

The Roysons Corporation is a well-established wallcovering and printing company that has provided its high-quality, family-operated services for over 30 years. Located in New Jersey, Roysons has access to a vast range of industries, including housing, agriculture, and furniture. The **New Jersey Manufacturing Excellence** program, operated by Rutgers University, worked with Roysons to identify solutions for energy usage and cost savings as well as the minimization of pollution; recommendations are projected to yield a 6% decrease in annual energy costs and eliminate the pollutant effects of toxic chemical.

### **Company Background**

Roysons produces a wide range of water-based and solvent-based ink products to suit the needs of customers in both the residential and commercial markets. These products include decorative wall coverings, pool liners, shelf liners, and vinyl shower curtains. Roysons' reported energy usage for the year past was approximately 2,598,522 kWh of electricity and 251,586 Therms of natural gas, equating a combined 34,365 MMBtu of energy usage, and \$692,028 in bills.

### **Assessment Approach**

The NJME team of engineers conducted an assessment of Roysons in November 2006. Once recommendations were thoroughly reviewed, they were compiled in a report by the director and presented to plant managers in January 2007.

### **Observations**

- During the assessment, NJME noticed that the compressed air system was operating at just above the capacity of its first compressor unit, but vastly below the combined capacity of its two units. In order to reduce the run hours of the second compressor, which would effectively increase the efficiency of both units, NJME recommended installing an air receiver on the first compressor, increasing its capacity and eliminating partial loading.
- At the time of the assessment, no free cooling system was in place for the practical reason of having lower outdoor temperatures than the minimum requirements. NJME saw that it would be possible to implement a free cooling system by adding glycol to the loop to decrease its freezing temperature. In conjunction with a heat exchanger, the cooling tower and a bypass loop that would redirect heat from the chiller to the cooling tower during these months, saving substantial energy.
- NJME noticed that the 400W metal halide and T12 fluorescent light fixtures in the facility could be replaced with more cost-effective T5 or T8 fluorescent lamps.
- A proposal of NJME that would yield immediate payback was to introduce a cleaning program for the printers, saving ink, a valuable resource in the printing process.
- Instead of outsourcing the disposal of MEK, a highly hazardous substance, NJME suggested burning off the chemical in-house.
- Excess heat from the boiler room could be re-routed to others areas of the facility to meet heating needs, cutting the cost of resources.
- To achieve more productivity out of its motors, Roysons could replace its mechanical variable frequency drive (VFD) motordrives with electrical VFDs to more precisely vary the speed of its laminating drives, as well as monitor and inventory its motors with the assistance of **MotorMaster™** software.

## Projects Identified

Below is a table citing opportunities for reducing energy consumption and pollution at the facility that NJME observed during the assessment:

**Table 1. Recommendations for Roysons**

Recommended Action	Annual Pollution Reduction	Annual Energy Savings	Annual Cost Savings (\$)	Implementation Cost(\$)	Simple Payback Period (yrs)
#1: Install Air Receiver to increase Storage Capacity in the Compressed Air System	15.1 Tons CO <sub>2</sub>	42,612 kWh 90 kW	\$ 5,801	\$7,737	1.33
#2: Utilizing Free Cooling	3.6 Tons CO <sub>2</sub>	10,190.98 kWh	\$ 1,248.40	\$7,944	6.36
#3: Replace or Retrofit Light Fixtures	58.8 Tons CO <sub>2</sub>	165,720.96 kWh 345 kW	\$22,548.41	\$27,953	1.09
#4: Reduce Water-based Ink Waste with Better Cleaning Practices	-	-	\$1,260	Negligible	Immediate
#5: Burn off waste Methyl Ethyl Ketone	1.5 Tons CO <sub>2</sub> 275 gal MEK	25.025 MMBTU	\$10,302.50	\$1,800	0.16
#6: Reuse Waste Boiler Room Heat For Plant Heating Needs	8.0 Tons CO <sub>2</sub>	136 MMBTU	\$1,639.56	\$1,100	0.67
<b>Totals</b>	<b>87.0 Tons CO<sub>2</sub></b> <b>275 gal MEK</b>	<b>218,523.94 kWh</b> <b>435 kW</b> <b>25161 MMBTU</b>	<b>\$42,799.87</b>	<b>\$46,234</b>	<b>~9.5 yrs</b>

**Table 2. Additional Recommendations for Roysons**

#1: Replace Mechanical VFD with Electrical VFD
#2: Implement Motor Management Program

## Results

Eighteen months after the report was submitted to the Roysons Corporation, NJME is proud to say that at of the 6 assessment recommendations and 2 additional assessment recommendations that were proposed, **at least 3** assessment recommendations and **1** additional assessment recommendation have been implemented thus far, with **1 more** recommendation being strongly considered.

According to NJME's contacts at the facility it is unclear how much energy and monetary resources have been saved during this period (due to fluctuations in energy costs and slight variations in implementation costs), it is clear that the company has enjoyed relative improvement, and that the changes will be even more noticeable in the future. For instance, NJME has been informed that two new compressors have been added to the process- a slight variation of AR#1. The increased storage capacity has reduced the load time on the existing compressor units, increasing their efficiency and productivity. Another example is the enormous lighting project that the facility has undergone in the past months; although the plan cost slightly more than our prediction (roughly \$35,000), the energy cost savings are already reported as approximately \$222 per month. Roysons is now working on the drying aspects of AR#4, as all four of the printers-before 3 of which were solvent-based and 1 water-based-have now been converted to water-based ink machines.

Overall, Roysons was impressed by NJME's professionalism and insight in the field of energy conservation. In fact, on a scale from 1 to 10 (10 being the best), Roysons rated NJME's report as a 10 for both comprehensiveness and content. Roysons has also stated that it would definitely refer NJME to other facilities in the area.

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