

## Overview of Energy Conservation programs at Rohm and Haas Electronic Materials Marlborough Facility

Eco-efficiency programs (creating more products with fewer resources and less waste) have been a focus area for all Rohm and Haas businesses over the last several years. Conserving energy is a key element of our eco-efficiency programs and success in this area is critical for sustainable business growth. The Rohm and Haas Electronic Materials Marlborough site has made significant progress in energy conservation through the use of better building management controls, equipment upgrades, technology replacements, process modifications and programs to increase employee awareness. Several of our conservation programs were accomplished without significant capital investment and in concert with our utility providers and their various energy conservation rebate programs.

### Rebates

Incentive rebates are available from utility companies for energy-efficient projects. These incentives typically result in conservation projects having a payback of less than two years. The process begins with a company identifying an energy-efficient upgrade versus a “base-case” option (e.g. replacement in kind of older or less efficient technology). A Technical Assurance Study is then conducted to verify the project is technically feasible and to determine the potential energy savings. The utility company reviews the data and offers an incentive rebate to move the project forward. Taking advantage of these rebates has made it possible for the Marlborough site to implement several energy conservation improvements which positively impact our bottom line as well as reduce our environmental footprint. The following are a few examples of conservation programs made possible through utility rebates:

#### Boiler Upgrades

- Replacement of burner control hardware on 7 gas-fired boilers with high-efficiency PLC controllers
- Capital Investment - \$148,500
- Utility Rebate Incentive - \$69,200
- Annual savings - \$49,000
- Simple Payback – 1.6 years



## High-Efficiency Heating Units

- Installation of 2 Cambridge Air high-efficiency heating units to replace 11 unit heaters
- Capital Investment - \$26,500
- Utility Rebate Incentive - \$6,000
- Annual savings - \$12,600
- Simple Payback – 1.6 years



## Advanced Technology Center Free Cooling

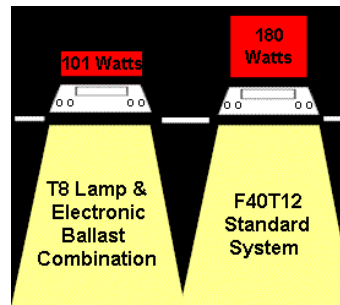
- Installation of a Plate and Frame heat exchanger to produce chilled water during winter months
- Capital Investment – \$128,000
- Utility Rebate Incentive – \$52,000
- Estimated annual savings– \$32,000
- Simple payback – 2.4 years



## Warehouse Lighting

- Replace high pressure sodium lights with 6 lamp fluorescent lights
- Capital Investment – \$65,300
- Utility Rebate Incentive – \$22,000
- Annual Savings - \$36,400
- Simple payback – 1.2 year

### T8 Lamp and Ballast Saves Energy



## EPA's National Performance Track

Participating in EPA Region 1's Energy Challenge as part of the National Performance Track program played an integral part in moving our energy conservation programs to the next level. The Energy Challenge called for a 5% absolute reduction in greenhouse gases (GHG) between 2004 -2006 using 2003 as a baseline. This commitment made us take a closer look at our energy profile and evaluate any and all opportunities for reducing our energy demand. One of our largest reductions in GHGs came from re-permitting our thermal oxidizer to allow for intermittent use. Rohm and Haas Electronic Materials implemented several pollution prevention measures, including material substitution and processing changes, which resulted in the actual emissions from our pilot plant operations being much lower than when the oxidizer was initially installed. In-line condensers were also added to minimize the impact of slug emissions hitting the oxidizer. These condensers are effective at reducing process emissions and also minimize the need for a thermal oxidizer on most pilot plant batches. With assistance from the pilot plant engineers, the Environmental Health and Safety group conducted extensive stack testing to confirm our emissions were well below initial estimates used to originally permit the thermal oxidizer. We worked closely with the Central Region DEP to re-permit the oxidizer to allow for its use only when high-emitting materials are being processed. We conservatively estimate the resulting savings from this project to be \$170,000 in natural gas costs and more than 1,000 tons of greenhouse gases (CO<sub>2</sub> equivalents).

## Renewable Energy

An emerging market for our Circuit Board Technologies group is providing products to solar cell manufacturers. Our **Enlight**<sup>™</sup> products for light induced plating are designed to improve the cell efficiency, which could ultimately make a solar cell available at a lower cost. We are also working on

cyanide-free silver plating product for this industry as a more environmentally preferable option for our customers. To further demonstrate our commitment to renewable energy, the Marlborough site installed a 7.6 KW solar array on our Advanced Technology Center roof. The solar installation is outlined below:



- 7.6 KW photovoltaic system – Borrego Solar Systems
- Evergreen Solar panels (customer of our CBT business using our Enlight™ products)
- Reduced CO2 emissions by 13,000 pounds annually
- Initial Cost \$60,000
- \$23,800 installation rebate from MTC
- \$2,600 in production rebate in a year from MTC
- Federal and State tax credits
- Net investment after incentives: \$10,000

## Employee Awareness

The Marlborough site hosted its first Energy Fair in September 2006 to increase employee awareness on energy conservation issues throughout the site. Local vendors such as National Grid, NStar, Alternative Energy Store, and Mass Technology Collaborative came to the site with educational materials as well as discounted energy-efficient lighting for employees to purchase for their homes. Over 700 energy-efficient bulbs and 100 light fixtures were purchased by employees in less than 2 hours. Our employees learned about the Marlborough site utility costs, conservation projects, and how their individual actions help make a difference for their business, their wallets and their planet. We also ran a contest to find the best energy conservation idea for our site. The winning idea, shutting off several laboratory ovens when not in use, was estimated to save 30,000 kWh of electricity per year.

## Summary

Energy conservation programs are a critical piece for sustainable business growth at the Marlborough facility. As a Responsible Care® company, we are obligated to make health, safety, the environment, and resource conservation critical considerations for new and existing products and processes. Our conservation programs have resulted in significant energy savings as well as a reduction in our greenhouse gas emissions. We estimate our annual savings to be \$430,000 and have shown a consistent

reduction in our overall energy usage for the past several years. We will build on our past success and continue to explore conservation opportunities at our site.

