

## **Eco-efficiency opportunities fact sheet**

### **Manufacturers and Processors: Operational Electrical Changes**

#### **Introduction**



The Eco-Efficiency Program for Manufacturers (E2PM) was created by Dalhousie University's Eco-Efficiency Centre to help small- to medium-sized manufacturers and processors, across Nova Scotia, identify eco-efficiency and pollution prevention opportunities. The program focused on

business initiatives to reduce costs by utilizing energy, water, and materials more efficiently. The program consisted of four components, two offered by Eco-Efficiency Centre staff and two by private consultants. Both Eco-Efficiency Centre staff and consultants conducted site visits of local manufacturers and prepared recommendations on opportunities available. Formal opportunity and implementation assessment reports were prepared by the consultants for participating companies.

Before the program ended in March 2009, data was collected from 70 Nova Scotian companies on various eco-efficiency and pollution prevention opportunities. A survey of a subset of these 70 companies, that recorded savings from implemented opportunities, identified \$2.8 million saved and over 8000 tonnes of greenhouse gas reductions annually over the life of the project. It should be noted that these numbers show only quantifiable results. Additional companies benefitted from the program but were unable to quantify their savings at the time of the survey.

To demonstrate common trends found in opportunity and implementation assessments, data was compiled and sorted to identify the top five most common recommendations with examples of specific recommendations from each category.

#### **Recommendation**

Operational electrical changes to reduce energy usage.

#### **Rank**

This recommendation was suggested to 61% of E2PM participants, making it the third most common recommendation.

#### **Details**

The consumption of electricity is a large portion of every company's costs and operational changes are often the easiest way of reducing these costs. Operational electrical changes include behavioural and control changes to the existing electrical system to reduce energy costs. There are numerous opportunities available for energy savings, ranging from turning off lights in unoccupied rooms to modifying equipment to increase power factors.



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Many businesses spend a significant amount of money each year on their demand charges. Demand charges are a fee charged to businesses based on the peak kW demand drawn during any 15 minute period over the billing period; these fees can be quite large and are often easily limited. Many businesses simply turn on all of their equipment each morning, causing a brief spike in electrical consumption. This brief spike occurs because many pieces of equipment, particularly mechanical equipment, have a short-lived period of high demand as they are turned on. Staggering the activation of any large pieces of equipment can have dramatic effects on energy costs. Nova Scotia Power also offers their Smart Energy Information System (SEIS) program, which helps companies monitor in detail their demand charges.

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Many pieces of electrical equipment, such as motors and transformers, have a ratio known as the power factor. This factor is the ratio between theoretical power and actual power, and falls between a value of zero and one. Businesses with large pieces of electrical equipment should consider assessing their power factors and determining if it is feasible to have them adjusted. An electrician can be contacted to provide further consultation on power factor correction. Applicable commercial and industrial businesses can find their power factors on their electricity bills.

Lighting, as discussed in another fact sheet, is a large portion of any businesses electrical bill. Fortunately, there are other methods of reducing lighting costs beyond replacing the lighting itself. Lighting in businesses is often left on for extended periods of time when the area is unoccupied, which wastes valuable energy. Employee training and the installation of control systems such as occupancy sensors can help save energy. A lighting audit may also be beneficial, as unnecessary lights can be removed to save energy and improve lighting conditions.

#### **Payback Period**

Payback periods for operational changes are difficult to quantify as they tend to be case specific. Behavioural changes have instantaneous benefits, as there is no capital cost beyond the time spent training employees to be more energy conscious. Demand charges, similar to behavioural changes, have very little capital investment. Nova Scotia Power's SEIS program does have some fees associated with it, but they are generally minor compared to the potential savings. There may be associated costs with controlling your demand, such as control systems.

The correction of power factors is considered the major retrofit associated with this recommendation. While this project would have a larger capital requirement, the savings can also be substantial if there are many pieces of equipment bringing the power factor down. Many power companies also charge a fee if the power factor drops too low, adding to a business's expenses.

#### **Company Examples**

A food processor had a report completed by Nova Dynamics and their consultant recommended a reduction in demand using either the SEIS program or a power analyzer. The demand charges made up a significant portion of the company's power bills. Even a 10% reduction in demand would have resulted in savings of \$4500 per year. The cost for a power analyzer is approximately \$4500, where the SEIS program costs \$300 initially and around \$100 per month. This means the payback period is between a few months and a year.

Nova Dynamics also completed a report for a food processor in which they recommended the increase of power factors in a series of motors. The project included hiring an electrician to install several capacitors and monitoring the motors to ensure that the power factor had increased. This retrofit had an estimated cost of \$7000 and an annual savings of \$3412.80, giving it a payback of approximately 2 years.

This eco-efficiency opportunities fact sheet was prepared by the *Eco-Efficiency Centre*, a non-profit, non-government educational and environmental management support centre for small- and medium-sized enterprises in Nova Scotia. The Eco-Efficiency Centre was established in 1998 as a partnership between Dalhousie University and Nova Scotia Power Inc., and is supported by private corporations, governments and foundations. The Centre assists companies to achieve better environmental and economic performance through resource conservation, pollution prevention, recycling, reuse, and general good environmental practices.