

The Bottom Line on  
Managing Your Electricity Costs:  
A Guide for

# Manufacturers



The Bottom Line on Managing Your Electricity Costs: A Guide for Manufacturers will help you learn to manage electricity costs by understanding how and when your business uses electricity. In addition, read examples of how four Ontario manufacturers have taken action to manage their electricity costs, with positive results on their bottom line.



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(Cover photo: Kuntz Electroplating Inc.)

The Independent Electricity System Operator (IESO) and Canadian Manufacturers & Exporters (CME) have joined together to provide manufacturers with information about the electricity market to help them manage their bottom line.

## Hourly Electricity Prices – A Competitive Advantage

In an intensely competitive global economy, with a strong dollar and rising fuel prices, more and more manufacturers are learning that there are some costs that they can control. Variable hourly electricity costs have been in effect for large volume users in Ontario since 2002 – offering manufacturers an opportunity to leverage their electricity consumption to improve their competitive edge.

In Ontario's wholesale electricity market, operated by the Independent Electricity System Operator (IESO), the price of electricity is determined by the forces of supply and demand. (For more information, see page 16.) For manufacturers, this concept drives their businesses day in and day out. By understanding how electricity consumption impacts your business, you can use it to your advantage and bring operational costs down.

Think of your electricity service much like any other supplier. You choose suppliers based on price, service, quality and product availability. Electricity supply also comes with a whole suite of options – it all depends on how flexible you are in the way you use it.

Hourly prices fluctuate, but tend to follow predictable patterns. By understanding when prices are likely to be at their highest – and lowest – you can start to look at your energy use from a new perspective, and you may find some unexpected savings.

### Leading the Way

Taking charge of your electricity use will also deliver other benefits. Businesses have a unique opportunity to set an example for all Ontarians of the value of being environmentally responsible and reducing their environmental footprint. For the electricity system operator, this is good news.

Any actions that are taken will help lower the overall demand of the province. In addition, they will provide for more efficient use of Ontario's electricity assets and help maintain a reliable system.

This brochure will provide you with the basics of electricity pricing, billing and efficiency programs – and help you take those first steps toward turning your electricity use into a competitive advantage.

## A CALL TO ACTION

### 1 KNOW HOW YOU ARE BILLED

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As a business that pays the wholesale price for electricity, your costs are based on: how much you use; the most electricity you draw at any one time; and whether or not you have an interval meter. There are also a number of different types of charges on your bill beyond the pure commodity cost. By understanding these basic components of your bill, you open the door to energy savings.

### 2 TAKE CONTROL OF YOUR ENERGY USE

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Do a top-to-bottom analysis of how your operation uses electricity, understanding how much energy is used by machinery and facilities. This will help you pinpoint where to start with energy efficiency initiatives.

Go for some easy, early wins to help build momentum. Maintaining and operating equipment properly will deliver energy efficiencies, as will eliminating waste by turning off equipment when not in use, or turning down temperatures to match actual operational needs.

### 3 FIND THE RIGHT TECHNOLOGY

page 12

There are a myriad of energy-saving technologies available. The challenge is to find the technologies that will deliver the most benefits for the investment and that will work for your organization. Do research; talk to others who have used new technologies; understand payback periods; and examine carefully how technology upgrades will contribute to your bottom line.

### 4 USE INCENTIVES TO YOUR ADVANTAGE

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There is a wealth of expertise available to advise you on the best approaches for your company. There are also incentive programs to help shorten payback periods for investments in energy efficiency. Natural Resources Canada (NRCAN), your local distribution company (LDC) or the Independent Electricity System Operator (IESO) can be your first stop for more information about incentive programs.



## Coyle and Greer Awards Canada Ltd.: Small changes yield big savings

▲ In the last year alone, Coyle and Greer has been able to shave eight per cent off their electricity costs by making some simple changes around the plant. Though their annual costs are quite low by manufacturing standards – total electricity costs hover near \$46,000 – they still represent a significant cost and the money saved on electricity can be reinvested in other areas.

In Brenda MacDonald's opinion, energy efficiency isn't "rocket science," but it can still have measurable results.

According to MacDonald, President and CEO of Coyle and Greer Awards Canada Ltd., energy efficiency improvements can be made almost anywhere. "You just have to start thinking about your products and your processes to see where you can find savings," she said. "If you're a small company, there's no need to use your hard-earned dollars to hire a consultant to do a full-out energy audit." Enlist the help of your own staff to come up with ideas.

MacDonald and her staff work in a 27,000 square foot school that's been converted into a factory that produces recognition awards like lapel pins, cast products such as medallions and keyfobs in base metal, pewter and zinc as well as 10 and 14 karat corporate jewellery. Located on the outskirts of a small town between London and Woodstock, the facility is bright and spacious. Its rooms are flooded by natural light thanks to the many windows installed in this 1963-vintage school.

In the last year alone, MacDonald has been able to shave eight per cent off her electricity costs by making some simple changes around the plant. Though her annual costs are quite low by manufacturing standards – total electricity costs hover near \$46,000 – they still represent a significant cost and the money saved on electricity can be reinvested in other areas.

One of the most important changes was the replacement of an outdated, inefficient air compressor, which runs the hot stamping machines. The existing 20-tonne compressor was replaced with a high-efficiency five-tonne compressor which meets the needs of this small manufacturer much more effectively.

Similarly, MacDonald recognized the plant's burn-out oven, used to make castings, was rarely operating at full capacity. As a result, she was able to replace the larger oven with one more appropriately sized, which uses two-thirds less energy than the larger oven.

"It's not complicated stuff," MacDonald said of the energy efficiency improvements she's made to date, "and it's not expensive."

Over the years, she has invested in caulking, insulation, window film, programmable thermostats and motion sensors. While these are not large capital expenditures, they all play an important role in helping MacDonald keep her costs down – and her profit up.

Two summers ago, during the record-breaking heat and humidity of 2005, the facility's air conditioning system failed. That's when MacDonald introduced a new rule around lighting: to prevent heat gain, all the lights in the facility were turned off until the AC was repaired. Because of the many windows in the building, enough natural light filtered in to allow employees to carry on working without interruption. To this day, overhead lights are rarely turned on in the summertime.

MacDonald is an active member of the Executive Committee of CIPEC, the Canadian Industry Program for Energy Conservation, a partnership between the federal government and industry associations/companies representing some 98 per cent of all industrial energy use in Canada.

Despite this role, MacDonald's interest in energy efficiency is grounded in her own company's operations. She is characteristically blunt in her assessment of the benefits of good energy management practices. "You don't do this for fun," she said. "It's all about money."

# 1

## KNOW HOW YOU ARE BILLED

It's not simply a matter of the more electricity you consume the more you pay. When you consume electricity – and how much electricity you consume at the same time – can also have a significant impact on your bill.

There are two main drivers that influence the final price you pay – consumption and peak demand.

These two variables are used as multipliers on the electricity bill – which means that you will need to manage both consumption and peak demand in order to bring costs down.

### Consumption: How Much Energy You Use

The number of kilowatt hours on your bill shows how much electricity was consumed within each billing period. This is your **consumption** or **energy** charge. Consumption is the basis for commodity, regulatory and debt retirement charges. The regulatory charge covers the cost of operating the power system reliably; and the debt retirement charge is used to pay down the former Ontario Hydro debt.

### Peak Demand: How Fast You Consume

**Demand** is a measure of how fast energy is consumed at any one time. The highest level of demand during a billing period is **peak demand**. LDCs use demand as the multiplier for transmission and distribution charges. These charges cover the cost of building and maintaining the distribution and transmission systems that deliver electricity to your facilities.

### Energy Consumption – Kilowatt hours

The energy charge is based on how many kilowatts are used each hour, kilowatt hours (kWh). If you pay the hourly price, there are three different pricing options for the energy charge:

#### Hourly Ontario Electricity Price

Companies pay the hourly price if they have an **interval meter** that electronically tracks their electricity use every 15 minutes. The hourly price of electricity is determined in Ontario's wholesale market, managed by the IESO. This price fluctuates according to the availability of supply, the weather, the time of day, week or year – and the demand for it.

LDCs download consumption information from each customer's interval meter and use it to calculate that company's average hourly price. This is the price that appears on the bill as the "energy" or "consumption" charge. Most LDCs

offer more detailed daily, weekly and monthly energy profiles in customized and password-protected web pages.

More information about the hourly price is available on page 9.

#### Weighted Average Price

Companies that use a conventional meter pay a weighted average price based on the consumption patterns of all the LDC customers who also don't have interval meters. This means the price will be weighted by a broader group of customers. If your operations consume more electricity during the lower-priced periods, it may mean that you are paying more for electricity than you need to.

#### Fixed Price Contracts

Some manufacturers prefer price stability and sign a contract for fixed rates with retailers for some or all of their electricity consumption. There are a variety of options available. You can contract for all your

*"You can't make good decisions without good data. Once you have it, use the data to identify a good roadmap to future energy savings."*

**Brian Cross, Manager, Technical Services, Zochem**



consumption 24 hours a day, seven days a week, or for specified periods of time, such as for 24/5 (weekdays only) or 16/5 (two shifts on weekdays) and pay the hourly price during off-peak periods.

While fixed-price contracts allow companies to mitigate any potential price risks, they do so at a premium. Before signing a contract, be sure to compare the prices being offered against the price you are currently paying, and balance the value of secure pricing against the extra costs you may incur in a contract.

### Energy Demand – Kilowatts (kW) or Kilovolt-ampere (kVA)

How fast you consume electricity also has an important influence on electricity costs. Operating a lot of equipment simultaneously, even for a short period of time, may spike your peak demand, resulting in unnecessary charges. Running machinery in sequence will help keep demand charges down even though you are consuming the same amount of electricity.

The chart on the left shows how stacking up electricity use at one particular point in time can be costly. While this company's overall demand levels are low, they had an energy use spike that increased their demand costs by 27 per cent.

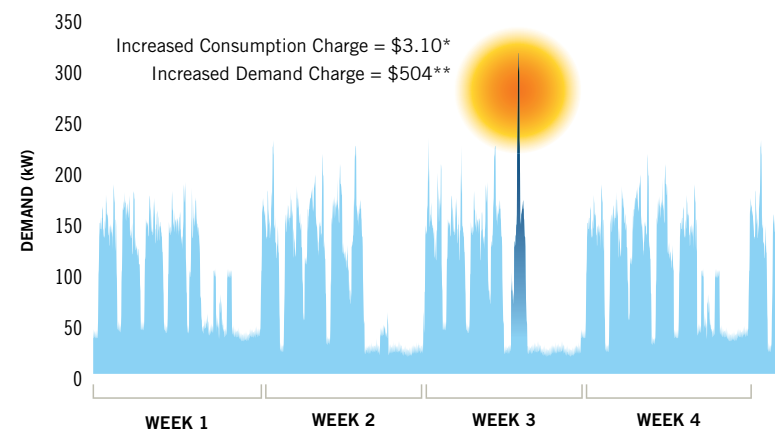
By smoothing out demand levels, you will help reduce your distribution and transmission charges. As these systems must be built with enough capacity to meet the highest levels of demand, these charges are multiplied by your demand levels, not consumption.

### A Word About Power Factors

If you have a low power factor (usually anything below 90 per cent), you are incurring losses along the power distribution system. LDCs will levy a charge on its customers to account for these losses. Your electricity bill will indicate what your current power factor level is. Identifying ways to improve your power factor could open up another area for potential savings. (See Power Factor Correction on page 12.)

#### Smooth Out Demand Peaks and Save

Consider the load profile of this company. By eliminating the spike in consumption, they could have saved over \$500 on their electricity bill for the month.



\* Consumption charge includes regulatory and debt retirement charges.  
\*\* Demand charge based on a charge of \$6.00 per kilowatt.



## Zochem: Process automation supports energy conservation measures

▲ Zochem is installing sophisticated control systems and devices at the company's Brampton plant. These technological enhancements are already resulting in significant process improvements, output increases and energy savings.

Unlike most people, Brian Cross doesn't mind being called a control freak.

In his capacity as Manager of Technical Services for Zochem, Canada's largest zinc oxide manufacturer and distributor, Cross is overseeing the installation of sophisticated control systems and devices at the company's Brampton plant. And according to Cross, these technological enhancements are already resulting in significant process improvements, output increases and energy savings. "We started by analyzing our processes and then investing in the best technology available," he said. "These can be high-cost items, but they give excellent process control capability."

Established in 1933, Zochem is a division of an integrated copper and zinc company, Hudson Bay Mining and Smelting Co. Limited, which began mining and smelting operations in Flin Flon, Manitoba in 1927. Capable of producing a number of oxide grades, Zochem supplies a broad range of industry sectors. Its products are used to manufacture everything from rubber tires, brake pads and industrial lubricants to animal feed, crop fertilizers and surgical tape.

Like most manufacturers, Zochem is always on the look-out for ways to improve the efficiency, and cost-effectiveness, of its operations. While natural gas fuels most of Zochem's production stages, nearly 70 per cent of its electricity consumption stems from the use of induction fans and air compressors used to clean filter cartridges. One major change implemented in recent months is the replacement of five large fans with 23 smaller ones, which allow Cross's team to focus the air flow exactly where it's required. More targeted air delivery has already translated into reductions in energy consumption.

Traditional polyester felt filters in the "baghouse" have also been replaced with Gore-Tex. Rather like a glorified vacuum, the baghouse is simply a device that removes solid particles from exhaust gases as they flow through a large cloth bag. A durable, breathable, easy-to-clean material that resists degradation at high temperatures, Gore-Tex has improved the overall effectiveness of the filtration process, resulting in better efficiency and fewer emissions.

Control of all major production equipment at Zochem has also been shifted to programmable logic controllers (PLCs). These specialized computers are typically used in the automation of industrial processes, and allow components to be turned on and off remotely. "It's extremely wasteful if you have machines running when they're not required," Cross said. "PLCs have allowed us to reduce our electricity usage as well as our equipment maintenance and repair costs."

Cross is also installing variable frequency drives (VFDs) on the facility's induction fans and air compressors. VFDs are electronic controllers that adjust the speed of an electric motor by modulating the power being delivered. They provide continuous control, matching motor speed to the specific demands of the work being performed and allow operators to fine-tune processes while reducing costs for energy and equipment maintenance. After a two-year payback period, Cross expects to see annual electricity cost reductions in the range of \$30,000, for a typical 100 horsepower (hp) compressor – substantial savings for a company with annual electricity costs in excess of \$700,000. Similar results will be expected when this is applied to induced fans (greater than 900 hp).

Plant operations will soon be controlled by a SCADA (Supervisory Control and Data Acquisition) system, which will allow Cross to monitor equipment status and measure electricity consumption at key points in the system. While the cost of the SCADA system is not insignificant, Cross feels the investment is worthwhile. "You can't make good decisions without good data," said Cross. "By identifying which processes consume the most energy, the SCADA system will give us a good roadmap for how to pursue future energy savings opportunities."

Energy conservation and waste reduction are absolute priorities for the company and its management team. "Environmentally, financially and ethically we must take energy efficiency seriously," Cross said. "We cannot continue to take this critical resource for granted."

# 2

## TAKE CONTROL OF YOUR ENERGY USE

Pretend you are visiting your operations for the first time and go for a walkabout. Look around and you may find some very easy energy savings just by making some small changes.

How are you actually using electricity? Understanding this simple question will drive all your energy management initiatives.

Identify what machinery and processes are the main consumers of electricity and determine how much they cost to operate. Find out when machines are running – what time of day they operate and whether their running times overlap unnecessarily. There are likely some savings that can be achieved with little effort or investment.

Here are some examples of how you can make small energy savings\* add up:

- If you are using an air compressor to sweep the floor, an industrial vacuum cleaner will do a better job at less than 10 per cent of the cost.
- That old, dirty pop vending machine in the cafeteria could be costing you \$550 a year in electricity alone.
- 10 four-foot fluorescent tubes running 24/7 cost more than \$300 a year – do they really need to be on all night?

(\*costs are based on 2006 prices – including both demand and energy charges)

Awareness of your energy costs can be a significant contributor to further savings. Perform an audit of all equipment and processes so you know where your energy dollar is being spent. Even posting operation costs on each piece of equipment sends the signal to employees to think about how electricity is used throughout the facility. You may consider metering within your operations to get an ongoing picture of where the highest levels of electricity are being used.

Take a look at the big picture. If you have an interval meter, your LDC can provide a demand profile that will tell you when you are using the most electricity which you can compare with your operation schedules. Many LDCs provide these profiles online, so you can check in on a regular basis between billing periods to evaluate progress.

### Match the Need

The key to energy management is to make sure you use only the electricity you need and then get the most out of the energy that you are using.

Get started by cutting out waste. Turn off equipment that's not needed. For example, you may be running lights, pumps, conveyors and other equipment that aren't actually being used. You may also be losing energy through poor maintenance. There may be leaks in your systems that are forcing your equipment to work harder and use more electricity just to maintain required output levels. For example, a one-quarter inch air leak in a compressor system could drain enough energy to run 300 60-watt lamps.

You can also cut waste by using the correct equipment settings for the job. Air compressors are often set at the level to meet the highest need and, as a result, produce far too much pressure for most other applications. Refrigeration can also be a common culprit of energy overuse. Make sure you're not overcooling the space – and not working against yourself by using lighting that creates heat, making the refrigeration equipment work even harder.

*“The very best way to get buy-in from our operators is to put control of electricity in the hands of those who use it.”*

**Al Fiacco, Facilities Manager, Husky Injection Molding Systems Ltd.**



Check that as your processes change, you adjust energy requirements accordingly. For example, it may be that you don't need to exhaust as much air because new processes have become more effective at managing contaminants.

### Maximize Energy Efficiency

Once you've matched your energy use to the need, make sure you do this in the most efficient way possible. For example, if you want to slow the output from a pump or a fan, slow the motor down, rather than restricting the flow as this would still require the motor to keep working at previous levels.

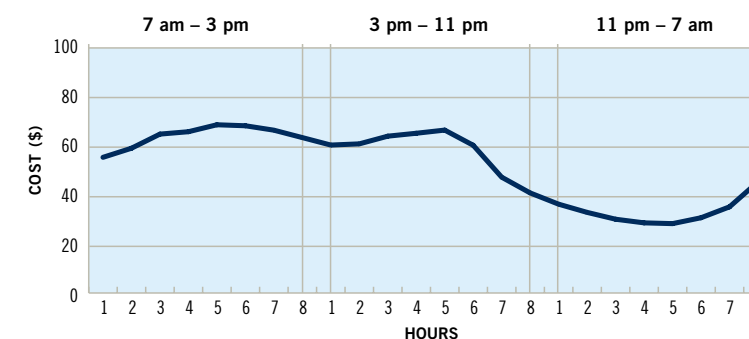
It's also important to maintain and operate equipment according to manufacturers' specifications. Simple things such as cleaning heat exchangers, pipes and ducts regularly reduce energy use and increase reliability.

Once you've covered the basics, you can start to explore what retrofits or new equipment are needed to improve efficiency. Lighting retrofits are one of the most common energy projects. Variable speed motors and compressors give you more control over your energy use – and hence more control over your costs. More information about energy efficient technology is on page 12.

### Be Aware of the Peaks

Your production schedules may also have an unwitting impact on your bill if you schedule more electricity consumption during on-peak periods than off-peak periods. If this is the case, you may want to look at shifting some energy use to lower-priced times of the day. For example, heating, ventilation and air conditioning (HVAC) controls can be programmed to take advantage of off-peak hours. Or, as prices tend to be lower in the morning than in the afternoon, there may be some processes that could be performed earlier in the day – or even overnight.

**Average Hourly Cost to use 1 MW (including daily totals) from November 2006 to October 2007**



This example compares the cost of consuming 1MW during three eight-hour shifts.



## Husky Injection Molding Systems Ltd.: New energy technologies support sustainability

▲ Together with lighting and HVAC retrofits, equipment upgrades and control system improvements, the introduction of a power conditioning system has helped Husky shave 13.7 million kWh off its annual energy consumption.

Ask Al Fiacco what it takes to implement a major change in energy management processes and he'll give an unequivocal response: support from the top. "Having the commitment of the president is absolutely essential," he said. "If the president doesn't stand by the project and make it a priority for the entire senior management team, it will never trickle down to the plant floor."

Fiacco is the Facilities Manager for Husky Injection Molding Systems Ltd., a Bolton-based manufacturer of injection molding machines and components, hot runners, robotics and integrated systems. Founded in 1953 by Robert Schad, Husky is one of the world's leading suppliers of injection molding equipment and services to the global plastics industry. Since the late 1990s, Husky has broadened and diversified its offerings to include solutions for the packaging, automotive and telecommunications markets.

With annual electricity costs totalling several million dollars, good energy management practices are an absolute priority. In fact, energy efficiency is entrenched in the company's Guiding Principles. "We practice proactive environmental responsibility," the sixth principle reads. "Energy efficient buildings, comprehensive programs to minimize waste and other highly visible practices demonstrate our commitment to the environment."

This focus on environmental responsibility has earned Husky considerable recognition in Canada, the United States and Europe. The company was also featured in Report on Business Magazine's "50 Best Companies To Work For In Canada" for five years since 2000 alone.

Husky's Canadian headquarters are spread across a 54-acre campus with five buildings and a total area of 863,000 square feet. Total demand at the site is seven megawatts (MW), with the three testing and machining buildings consuming the lion's share of electricity.

Fiacco says Husky has taken a proactive approach to managing its electricity consumption and costs. The company recently

purchased and installed an engineered power conditioning system that is showing tremendous results. The system has several important features:

- It improves and stabilizes voltage supplied, which results in improved energy quality, equipment efficiency and longevity, and energy savings.
- It shields against surges, transients and spikes, which protects equipment at the plant.
- It filters broadband harmonics, which reduces line losses, demand and consumption.
- It improves the power factor, which optimizes electricity quality and eliminates charges from the LDC.

Together with lighting and HVAC retrofits, equipment upgrades and control system improvements, the introduction of a power conditioning system has helped Husky shave 13.7 million kWh off its annual energy consumption. With a total investment of less than \$2 million in this program, the various energy projects have paid for themselves in less than two years.

While technology is absolutely critical to the new-found energy savings at Husky, there are other factors. Fiacco and Husky's Global Asset Management team launched a multi-faceted training initiative in late spring to help front-line equipment operators understand energy efficiency opportunities at the plant. One of the products emerging from the training was a detailed checklist of things to do before leaving for the night – including such obvious things as shutting off equipment not required for the next shift, turning off unnecessary lights, and shutting off the exhaust and air conditioning systems.

"We said to our employees, 'Here's where you can help,'" Fiacco explained. "The very best way to get buy-in from our operators is to put control of electricity in the hands of those who use it."

# 3

## FIND THE RIGHT TECHNOLOGY

Once you have addressed all the operational changes that can be made to improve efficiency, you can begin to look at more substantial investments in new technologies.

Whether it's new equipment or retrofitting existing facilities, manufacturers have a number of options they can pursue.

Finding the right technology to fit your need can be a challenge, but can bring with it significant payback in terms of costs savings and environmental benefits. Do your homework to find the technologies that will help you on your way to achieving your energy savings targets.

Here's a checklist of some of the technologies you may want to consider as part of an energy management plan:

**Lighting Retrofits:** Industrial lighting applications are becoming increasingly sophisticated – offering significant savings and improved illumination. Switching from T12 to T8 fluorescent lightbulbs can shave 20 per cent off your lighting bill. Automated controls can add to your savings by “light-harvesting” or switching off or dimming lights when natural light is available.

**Adjustable Speed Drives:** Control pumps, fans and conveyors at the source by installing adjustable speed drives (ASD) on the motors. ASDs can amplify your savings. A centrifugal fan or pump operating at half speed and half flow will require less than a quarter of the energy of a fixed speed fan or pump that is dampered or throttled to the same flow.

**Variable Speed Air Compressors:** Air compressors are chronically inefficient machines. They require a lot of energy for a relatively small output. Tackle this challenge by using a variable speed air compressor. A variable speed air compressor at minimal air delivery would use a quarter of the power of a fixed speed air compressor.

**HVAC Controls:** Heating and cooling systems can be amongst the most energy intensive aspects of your business. Upgrade heating, ventilation and air conditioning systems so that you use no more or no less than needed. Chillers and other HVAC equipment can be pre-programmed to gear up during off-peak times to take advantage of lower prices, or scale down during price spikes to lessen the impact of higher prices.

**Refrigeration:** Refrigeration machines that provide cooling for manufacturing processes and facility space can be significant consumers and wasters of energy. When it's time to replace this equipment, modern chillers can offer attractive efficiency improvements. As with other equipment, refrigeration chillers can benefit from controls that sequence multiple smaller compressors in order to moderate demand or use speed control to vary the capacity of the whole refrigeration system according to the need.

**Power Factor Correction:** Investments in capacitors and other equipment to improve the power factor can reduce demand charges. This equipment helps align current and voltage so that your facility draws electricity more effectively from the distribution system. Power factor correction projects often result in 10 to 15 per cent reductions in demand charges.

Energy management is not about compromising – it can enhance your processes. Nowhere is this more evident than in adopting new technologies to increase energy efficiency.

# 4

## USE INCENTIVES TO YOUR ADVANTAGE

Reduce the payback period for your energy efficiency projects by participating in incentive programs. Or better yet, create your own incentives by taking part in demand response programs that reward load-shifting efforts.

### Incentive Programs

There are many options when it comes to energy efficiency incentive programs. Some are designed to get you started, others support more costly, sophisticated energy management initiatives. Here are a few that will help you reduce payback times for your energy efficiency projects.

#### Electricity Retrofit Incentive Program (ERIP)

This program, offered by LDCs in partnership with the Ontario Power Authority (OPA), provides funding for the purchase of energy-efficient technologies. Eligible technologies include lighting retrofits, premium efficiency motors, and ENERGY STAR® rated power transformers and air conditioning units. Custom projects are also eligible for incentives of \$150 for each kilowatt of demand reduction.

#### ecoENERGY Retrofit Incentive for Industry

Natural Resources Canada will provide small and medium-sized businesses with up to 25 per cent of the cost of retrofitting the building envelope or existing systems and equipment, with a maximum of \$50,000 per application. Projects must have a simple payback period of more than a year.

### Demand Response

In recent years, demand response has emerged as another avenue for businesses to leverage their electricity use to improve their bottom line. Today, there are a number of demand response programs that provide incentives for companies to reduce

demand during peak periods. Ultimately these programs contribute to the overall reliability of the system and reduce the need to build additional generation capacity just to meet isolated spikes in demand.

Most companies participate in demand response programs through aggregators as their individual contribution might not be large enough to meet eligibility requirements.

#### Emergency Load Reduction Program (ELRP)

The IESO provides incentives for demand reduction during critical peak periods. Participants in the ELRP are notified when they are needed to be on standby to reduce energy and will receive payment of \$15 per MW. And if called upon, they can receive up to \$600 per MW for actual measured and verified reductions. This program reduces the need to make emergency energy purchases and voltage reductions when the power system is strained.

#### Demand Response 3

The Ontario Power Authority (OPA) offers contracts to companies to reduce load during the most valuable 100 to 200 hours of the year. Participants make themselves available during those hours for potential notices to reduce load and receive payments for both availability and actual energy reductions, in return.



## Kuntz Electroplating Inc.: Generating new revenue through demand response

▲  
It is essential for Kuntz Electroplating Inc. to have a reliable supply of energy at all times. This need prompted them to invest in back-up generation which is paying off in more ways than one.

It's not every day you have the opportunity to earn up to \$800,000 annually by not consuming electricity – but Kuntz Electroplating Inc. is facing that very scenario.

A family-owned and operated business since 1948, Kuntz is one of North America's premier metal finishing operations for original equipment manufacturers of steel and aluminum products. Headquartered in Kitchener, Kuntz has 600 employees responsible for the design, development and application of electroplating products and specialized performance coatings for clients like Harley-Davidson, General Motors and Ford.

"Our business is very energy-intensive, so electricity is a considerable cost," said Robin Leach, Environmental Manager for Kuntz. "It is absolutely essential that we have a reliable supply of energy at all times."

This need for reliability prompted the company to invest heavily in back-up generation in the mid-'90s. Since that time, further investments have been made, and the facility now has five clean-burning natural gas-fired generators with a total installed capacity of 4.1 MW. Waste heat from the electricity-generation process is captured through low-pressure boilers that produce steam used for their plating process.

The generators were first installed at a time when natural gas was relatively inexpensive. Since that time, Kuntz's calculations have indicated that generating their own electricity no longer made financial sense. A new approach was needed, which was provided by the OPA's Demand Response 1 (DR1) program.

DR1 empowers customers to reduce their electricity consumption in response to high price conditions which can be indicative of system peak loads or tight supply conditions on the electricity grid. Under DR1, Kuntz generates electricity only when asked to by the OPA, based on price and demand. The net benefit to Kuntz in the first eight months has approached \$250,000.

After months of participation in the program, Kuntz is now investigating DR3, the latest initiative in the OPA's ongoing efforts to stimulate demand management, conservation and generation among Ontario's high-volume electricity consumers.

DR3, "Contractual Response Peak Load Shedding," has been designed to provide the OPA with additional contractual demand response capability to reduce demand on the power system managed by Ontario's IESO.

Participants, not participating through an aggregator, must have a demand response capability in excess of 5 MW to receive payments for their ability to cut consumption, on demand, when the IESO identifies risks to local or general system reliability.

While Kuntz has not yet signed on the dotted line, Chief Operating Engineer Keith Laycock feels there is considerable upside to participating in DR3. "We have worked very closely with our demand response partners, Energent, to quantify the impact of participating in DR3," he said. "On the surface, the numbers are pretty compelling." According to Laycock's calculations, Kuntz stands to earn up to \$800,000 annually over a five-year term.

For its part, Kuntz would agree to shed 5 MW of load from the provincial electricity grid, either through conservation or generation, when requested by the IESO for a maximum of 200 hours per year. The company would also agree to be on stand-by for up to 1,600 hours annually.

To achieve the 5 MW minimum generation required by DR3, a considerable investment in new generation would be required. "Even so, the financial side of DR3 looks very attractive," Laycock said.

# A LOOK INSIDE ONTARIO'S ELECTRICITY MARKET

Ontario's Independent Electricity System Operator (IESO) is responsible for managing the province's power system and operating the wholesale electricity market. It balances supply and demand throughout the province, 24 hours a day, seven days a week.

As a result, the price of electricity rises and falls based on a variety of factors – such as demand, the weather and the types of generation available. For example:

- Prices are generally lower on weekends and at night. On weekdays, the price of electricity usually peaks in the early evening as people arrive home from work.
- Weather can have a tremendous impact on demand. Extreme cold spells and heat waves often create surges in demand as people increase heating and air conditioning. For example, each degree above 16° C creates an additional 380MW of demand.
- The amount of electricity that is available in the market also influences the price. Some generation may not be available because of equipment maintenance.
- Price also depends on what types of generation are available – some cost more to operate than others. As demand for electricity increases through the day, the more expensive sources of electricity are called up to meet that need.

Realizing the full benefit of hourly prices will require a greater level of effort and understanding of electricity price patterns within your organization. For example, ensuring that staff can respond to extreme heat alerts when the price may spike will help insulate your facility from unusually high prices and help support reliability of the system.

The IESO provides a wealth of information about electricity demand and prices at [www.ieso.ca/business](http://www.ieso.ca/business). Here you will find current prices, as well as anticipated prices for the next day. You will also find historical information that will help you compare your costs to what they might have been on the hourly price.



## Hourly Price Adjustments

The hourly price is currently mitigated by a number of adjustments such as the Provincial Benefit and the Ontario Power Generation (OPG) Rebate.

The adjustments will impact your overall electricity costs, but you will retain the overall value of shifting or conserving energy during high-priced periods. More information about both adjustments is available on the IESO website at [www.ieso.ca/rebates](http://www.ieso.ca/rebates).

## An Extra 2,000 MW for 51 Hours

Ontario's electricity infrastructure is built so that there is enough available generation capacity to meet the highest demand. This feature is critical to ensuring reliability.

In 2006, for example, Ontario demand peaked at 27,005 MW, but exceeded 25,000 MW for only 51 hours over the past two years. And while the power system ably met these demand spikes, they did highlight the inefficiencies of having more than 2,000 MW of power generation capacity that is only called into production for those 51 hours – the equivalent of over two days. If these peaks in demand are reduced, so is the pressure on prices and the need to have extra generation capacity just to meet a few hours of demand.

# FOR MORE INFORMATION ON:

Your local distribution company  
[www.ieso.ca/findutility](http://www.ieso.ca/findutility)

Electricity price information for businesses  
[www.ieso.ca/business](http://www.ieso.ca/business)

Retail electricity contracts  
[www.ieso.ca/retailers](http://www.ieso.ca/retailers)

Joining the IESO's Emergency Load Reduction Program  
[www.ieso.ca/ELRP](http://www.ieso.ca/ELRP)

The Ontario Power Authority  
[www.powerauthority.on.ca](http://www.powerauthority.on.ca)

Conservation programs available province wide  
[www.conservationbureau.on.ca](http://www.conservationbureau.on.ca)

Natural Resources Canada Office of Energy Efficiency  
[www.oee.nrcan.gc.ca](http://www.oee.nrcan.gc.ca)



The Independent Electricity System Operator (IESO) manages the province's power system so that Ontarians receive power when and where they need it. It does this by balancing demand for electricity against available supply through the wholesale market and directing the flow of electricity across the transmission system. Visit the IESO at [www.ieso.ca](http://www.ieso.ca).

Canadian Manufacturers & Exporters (CME) is Canada's largest trade and industry association. It promotes the continuous improvement of Canadian manufacturing and exporting through engagement of government at all levels. Its mandate is to promote the competitiveness of Canadian manufacturers and enable the success of Canadian goods and services exporters in markets around the world. Visit the CME at [www.cme-mec.ca](http://www.cme-mec.ca).



Power to Ontario. On Demand.

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