

# The Bottom Line on Energy Management

Making Ontario's Electricity Market  
Work for Your Business



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## MANUFACTURING COMPANY XYZ

Billing Date: July 20  
Your Service Type: General Service - Demand  
Your Local Hydro Company

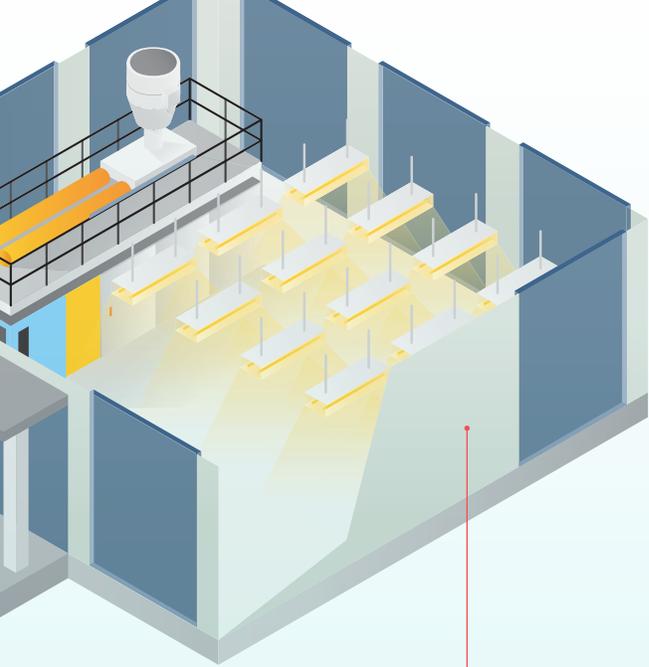
Account Number  
0000 0000 0000  
Meter Number  
000 000

## HOW WE CALCULATED YOUR CHARGES

Metered Values	
Metered Consumption	45,000 kWh
Metered kW Demand	150 kW
Metered kVA Demand	161 kVA
Loss Adjustment Factor	4.8%

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## WHY GERDAU STEEL IS FIRED UP ABOUT DEMAND RESPONSE



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**GREAT RESULTS START WITH THE RIGHT TOOLS**

Every energy manager has their own tricks of the trade. Here are four basic tools you'll want up your sleeve.

# BROUGHT TO YOU BY THE IESO

The Independent Electricity System Operator (IESO) manages Ontario's power system so that customers receive the power they need when and where they need it. It also operates the province's wholesale electricity market, where the hourly price of electricity is set, plans for Ontario's future electricity needs and guides the province's energy efficiency efforts through a wide variety of Save on Energy programs.

This booklet was designed to help your business manage its energy needs and meet its energy efficiency targets.



**CASE STUDY:**

## ENERGY MANAGEMENT CHALLENGES TRIGGER CULTURAL SHIFT

Brampton Brick actively engaged its employees when developing a strategy for reducing energy use on peak demand days. Find out how they did it, and why it's working so well.



**BACK PAGE**

Get more energy management know-how with help from this list of industry resources.

# CONTROL YOUR USE, CONTROL YOUR COSTS



**ABOVE** Savings from previous energy-efficiency investments allowed the City of Burlington to invest in new variable frequency drives on pool filtration pumps at three swimming pool facilities. The City also introduced sub-metering at the Tansley Community Centre (shown here), the Appleby Ice Centre and the Mainway Recreation Centre.

Companies across Ontario, big and small, all have one thing in common when it comes to managing electricity costs.

For several years now, they've used energy efficiency as a way to reduce their energy costs - whether it's something as simple as swapping out energy-intensive lighting or something as complex as installing variable speed drives on energy-wasting equipment motors.

The case for energy conservation is clear: energy-efficient technology saves money.

But it's not the only way. According to energy consultant Stephen Dixon, Principal of TdS Dixon Inc., Demand Response is another excellent option. "If companies are using lots of electricity during on-peak times, they can

try to shift consumption to non-peak times when electricity is cheaper. Depending on the nature of the business, this may not always be possible. But if it can be done without jeopardizing health, safety, product quality or end-user experience, the savings can be considerable."

ArcelorMittal Dofasco and the City of Burlington use a combination of energy-efficiency and demand-curbing techniques to control their costs. So does Nema Canada. Central Maintenance Facilities and Engineering Manager Mario Ricci says his team routinely monitors the IESO website for peak demand information and has used the data to shut down the plant's operations on high demand days in order to reduce costs.

# WORDS FROM THE WISE

There is no one-size-fits-all approach to energy management. Every business has a different energy profile and different operating needs.

But according to energy consultant Stephen Dixon of TdS Dixon Inc., there are some basics to keep in mind as you're planning your company's energy management strategy.

It all starts with understanding how you're billed for your company's electricity use. "Figuring out how much electricity you use, and when, is critical. That's the basis for your energy management plan. It allows you to monitor results, and it will also point you in the right direction for any available demand response and energy-efficiency programs."



**LEFT AND ABOVE** Adam Murree, embedded energy manager at Atlantic Packaging, has helped his company reduce consumption by two per cent annually.

"We learned how to stagger our equipment starts so we're always within the range of our one megawatt baseline. We do what needs to be done, whether it's energy-efficiency strategies or demand response, in order to keep our business competitive," said Ricci.

And there's help available. Businesses can look to Save on Energy programs to help invest in energy-efficiency projects. For more information about Save on Energy programs, visit [saveonenergy.ca](https://saveonenergy.ca) or contact your local hydro company. Transmission-connected customers can visit [ieso.ca/iap](https://ieso.ca/iap) for more information about the Industrial Accelerator program.

## DID YOU KNOW?

Save on Energy programs offer financial support and technical expertise to help businesses across Ontario reach their energy management goals. Powered by the Independent Electricity System Operator (IESO) and offered by local hydro companies, Save on Energy supports businesses to realize the many benefits from using energy wisely.

Many energy management tools are eligible for funding and incentives through Save on Energy. For more information, please visit [saveonenergy.ca](https://saveonenergy.ca) or contact your local hydro company.



# MEET THE EXPERTS

## Energy Managers Play Critical Role in Reining in Costs

Just as every company's energy profile is different, so too are the ways to manage electricity costs. Here, four energy managers, all representing different sectors, comment on their roles, discuss their company's success in energy management, and provide insight for prospective energy managers.



Our goal is to reduce energy consumption by two per cent year-over-year for the next five years. ”

**Adrienne Cressman**, TD Centre, Cadillac Fairview



**Adrienne Cressman, P.Eng**  
TD Centre, Cadillac Fairview

### WHAT IS A TYPICAL DAY LIKE FOR YOU AS AN ENERGY MANAGER?

**Adrienne Cressman:** A typical day for me involves working in collaboration with the operations team, as well as departments across the entire organization, to understand how we can help each other reach our energy savings targets. With over four million square feet of leasable space, TD Centre is the largest office property in Canada and a recognized leader and innovator in sustainability. Our goal is to reduce energy consumption by two per cent year-over-year for the next five years. Last year, we reduced our energy consumption by 6.9 per cent, to approximately 166 million kilowatt-hours. We were able to do that by working together to understand the drivers of our business and achieve the goals set out in TD Centre's Green Team, through a shared commitment to provide value to our tenants' businesses by containing our operating costs.



We take a portfolio approach to energy management that ties into our five-year facilities plan. ”

Ian Shaw, ArcelorMittal Dofasco

### DO YOU MONITOR ELECTRICITY PRICING AND, IF SO, WHY?

**Behdad Bahrami:** Yes, we keep an eye on the Hourly Ontario Energy Price and the Global Adjustment. This allows us to anticipate and understand how cost-effective we are and manage our energy costs in a proactive manner. Electricity pricing and conservation have factored into our planning process significantly. They have prompted the use of higher efficiency equipment and techniques to mitigate any cost increases. Vision is also part of the Industrial Conservation Initiative program, and so we proactively manage our peak demand on a real-time basis, striving to reduce it whenever possible.



**Behdad Bahrami, EIT, CEM, CMVP**  
Vision Extrusions Ltd.



**Ian Shaw, P.Eng**  
ArcelorMittal Dofasco

### HOW IMPORTANT IS IT TO HAVE AN ENERGY STRATEGY?

**Ian Shaw:** You can't do the job well without a strategy. We take a portfolio approach to energy management that ties into our five-year facilities plan. It's a highly integrated approach. It allows us to plan our capital expenditures and roll one project over into the next, financially, by factoring in the incentive and capacity payments we receive from the IESO for our participation in various conservation and demand response programs. Our goal is continuous improvement and energy projects that result in net-neutral cash flow.

### WHAT KIND OF RESULTS HAS YOUR COMPANY ACHIEVED THROUGH ENERGY MANAGEMENT?

**Ian Shaw:** Since 2011, we've achieved 125,000 megawatt-hours in recurring annual savings and reduced our electricity costs by more than \$10 million annually. We've also got other projects under construction currently, with a goal of achieving demand savings of 270,000 megawatt-hours by 2020.

## HOW IMPORTANT IS IT TO HAVE SUPPORT FROM SENIOR MANAGEMENT?

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**Adam Murree:** The company's owner takes a big interest in energy management. I would say I have more support now than when I started in my role as an energy manager.

## DO YOU THINK THERE IS VALUE IN HAVING AN IN-HOUSE RESOURCE WHO IS DEDICATED TO ENERGY MANAGEMENT?

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**Adam Murree:** Absolutely. I've been an energy manager with Atlantic Packaging since 2012. Since I joined the company, we've reduced our electricity costs by 10 per cent and lowered the Global Adjustment by almost 50 per cent.

My employment contract requires me to reduce consumption by two per cent annually at each of our facilities, and that means I'm accountable every day for delivering results based on our company's energy strategy.

**Behdad Bahrami:** I've been working as an energy manager for Vision Extrusions Ltd. since 2012. During the past three years, we've completed more than 20 retrofit projects in our Woodbridge facilities. Using energy management practices and projects, we've been able to reduce our Global Adjustment costs by 30 per cent, and that reduction means we are paying 15 per cent less on our total electricity bill. These are significant savings when you consider that Vision's manufacturing facilities take up over one million square feet of space. I would say that having an in-house energy manager really helps Vision stay ahead of the competition and manage energy costs.



**Adam Murree, CEM, CEA, CMVP**  
Atlantic Packaging

## WHAT ADVICE CAN YOU OFFER COMPANIES THAT DON'T HAVE AN ENERGY MANAGER IN PLACE?

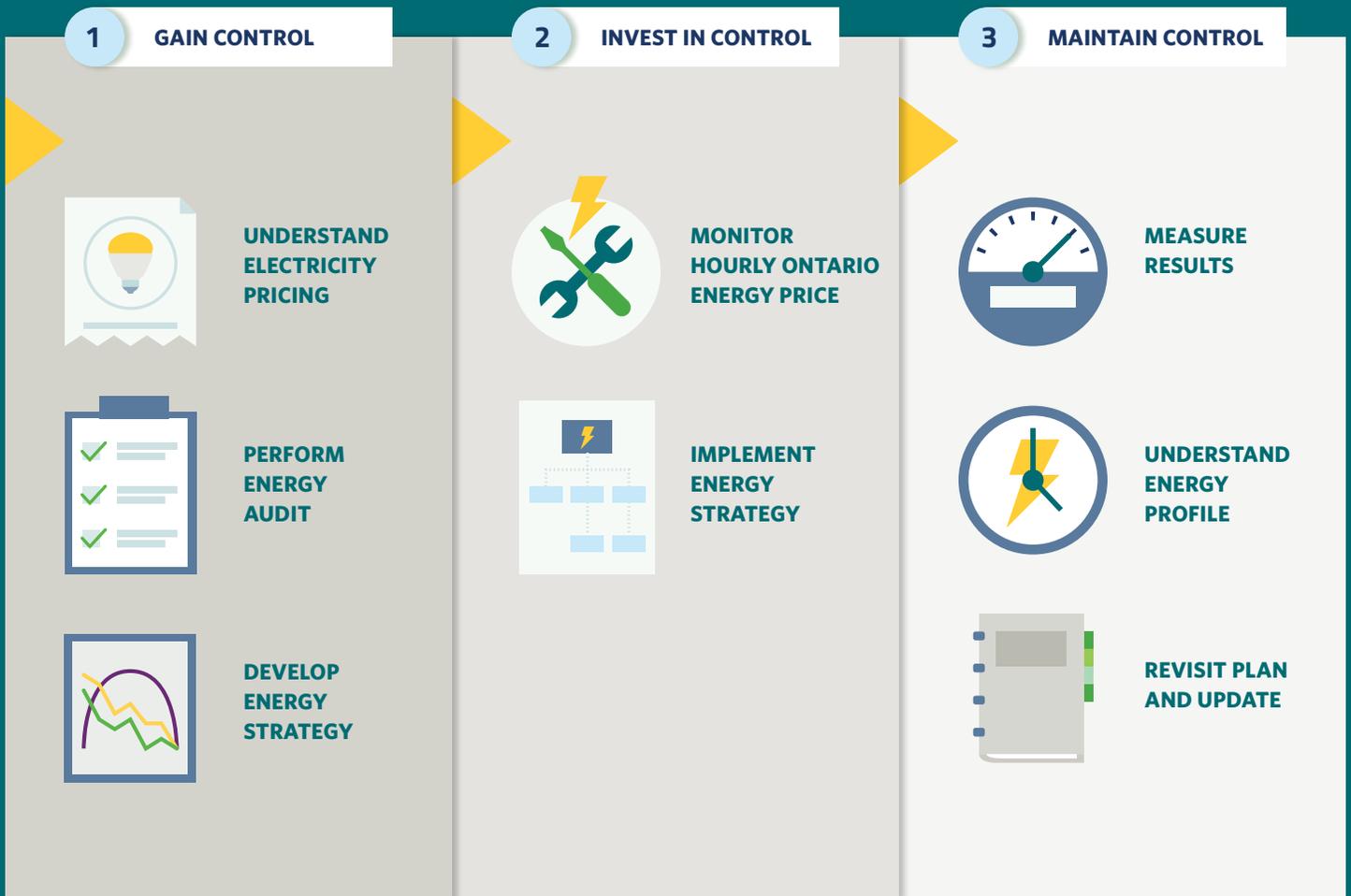
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**Adam Murree:** So many companies are losing money because they're not managing their electricity costs. I think it's important to have someone assigned to the task, someone who's accountable. My job basically pays for itself when we achieve our targets, and in my case that typically happens within the first two months of the year.

# MAKE A PLAN, THEN MAKE IT HAPPEN

Most professional energy managers take a disciplined approach to energy management. **Step 1** is to gather information. **Step 2** involves developing and implementing an energy strategy. And **Step 3** focuses on analyzing results. It's a very methodical process of continuous improvement.

The important thing is to make a plan and follow it. Here are some ideas to help you reach your energy management goals.



# NOW IS THE TIME

to Take Control of Your Electricity Costs



## Electricity Bills Explained

Having the right electricity pricing information at the right time can be a competitive advantage for businesses that are looking to manage their bottom line.

Your electricity bill tells you more than you think. It's true it provides a calculation of your electricity consumption, but it also offers clues about where the opportunities lie for saving money.

### ELECTRICITY COSTS

Understanding how you're billed for electricity is the first step towards reducing your electricity costs.

As a starting point, you should know that electricity prices fluctuate depending on supply and demand. In Ontario, the price of electricity is determined through the wholesale electricity market, which is managed by the Independent Electricity System Operator. Known as the Hourly Ontario Energy Price (HOEP), this price changes on an hourly basis, depending on the availability of electricity supply and the demand for it. Customers with a peak demand of more than 50 kilowatts pay the HOEP.

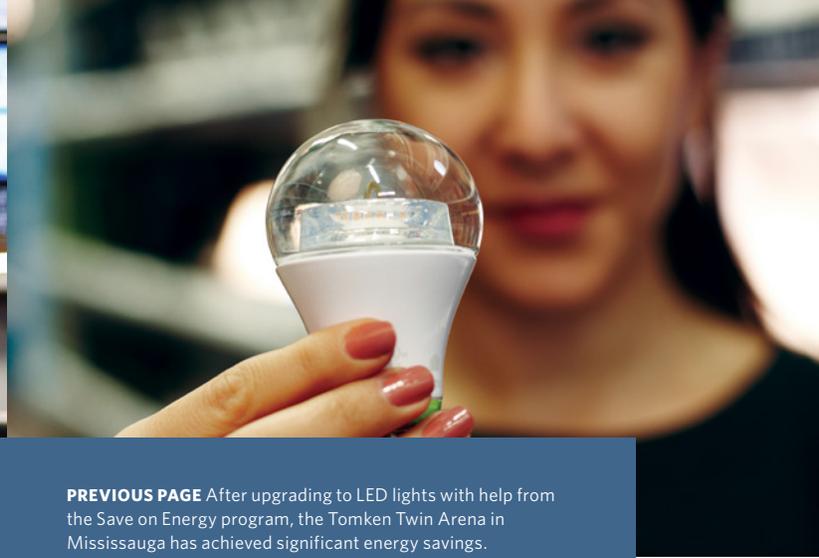
Typically, when demand for electricity is higher, more expensive forms of generation are required. This drives up the cost of power. Weather plays a significant role in electricity demand. On a typical hot summer's day, as temperatures rise, air conditioning use also rises from morning to late afternoon and can drive electricity demand up by as much as 25 per cent.

As a result, commodity prices change throughout the day, the week and even the season, providing businesses an opportunity to adjust their energy use to take advantage of lower prices.

Prices tend to be lower overnight and on weekends and holidays when power demand is typically lower. As a rule, supply is determined by how much generators can produce. Certain power sources are more expensive to run than others, and usually only run when demand is high relative to available supply.

Businesses can cut costs by using less electricity at times when the price is high. Shifting operations to cheaper times of the day, for instance, or running operations overnight will also reduce what your business pays for electricity. Scheduling equipment maintenance during the heat of summer when prices tend to be higher, rather than in the spring or fall when prices are typically lower, may also make sense for your business.

Hourly electricity demand is tracked and forecasted throughout the day at [ieso.ca/powerdata](https://www.ieso.ca/powerdata). The IESO also provides historical and real-time information about the wholesale price at [ieso.ca/price](https://www.ieso.ca/price). This information can help businesses to anticipate future electricity costs and plan their operations accordingly.



**PREVIOUS PAGE** After upgrading to LED lights with help from the Save on Energy program, the Tomken Twin Arena in Mississauga has achieved significant energy savings.

**LEFT** As members of ArcelorMittal Dofasco's energy management team, Hot Mill Operators Vaughn Pottruff and Dan Pauley are constantly monitoring the plant's performance for energy-efficiency opportunities.

**RIGHT** Energy-efficient technology continues to improve. This lightbulb can be controlled with a smart phone app.

## YOUR ELECTRICITY BILL

Electricity bills may vary slightly by utility, but the underlying principles are the same. Small customers with smart meters are billed based on either time-of-use rates or the rate agreed upon in a retail contract. Time-of-use rates are approved by the Ontario Energy Board, the provincial energy regulator.

Electricity costs for larger customers are based on two things: total consumption and peak demand.

**Consumption** refers to the amount of power your facility uses during a specific period of time. It is measured in kilowatt-hours (kWh). You are billed at the Hourly Ontario Energy Price for the kilowatt-hours you use during the billing period. In addition, you are charged a Global Adjustment cost (see page 10) based on your total consumption.

**Demand** is measured in kilowatts (kW) and refers to how quickly your facility draws electricity from the grid. Peak demand is the highest amount of demand during the billing period. If your facility's demand was consistent but suddenly spiked, you will pay a higher price for the entire billing period, based on this peak, rather than a lower price for the time when your demand was stable.

**Peaks** can be costly. To help manage your energy costs, try to keep your demand as consistent as possible during the billing period. The case study on Gerdau Steel on page 14 cites a good example of a company that has learned how to manage peak demand.

## FINDING YOUR PEAK

Your peak demand determines your delivery charges for the billing period. Peaks can be costly. Knowing when your peak demand occurs can provide an opportunity to modify your equipment and processes, and save money.



# What it Means When Your Bill Says...

Your electricity bill consists of several charges, including those explained below.

1

## **HOURLY ONTARIO ENERGY PRICE:**

The Hourly Ontario Energy Price (HOEP) is set based on the bids and offers that are settled in the electricity market. This price varies on an hourly basis depending on demand. The price also takes into account factors such as weather, time of day, day of week and economic conditions. Your business has the option of buying electricity through your local utility and paying the HOEP, or paying a fixed rate through an energy retailer licensed by the Ontario Energy Board.

2

## **GLOBAL ADJUSTMENT:**

The Global Adjustment covers the cost of building new generation and other forms of supply to ensure enough electricity supply is available over the long term. The charge accounts for the difference between the market price of electricity and the rates paid to various contracted and regulated generators and other suppliers across Ontario. (See Managing the Global Adjustment, page 12.)

3

## **REGULATORY (WHOLESALE MARKET SERVICES):**

This charge provides for the reliable management of the power system and the wholesale electricity market. It is approved by the Ontario Energy Board.

4

## **STANDARD SUPPLY SERVICES (SSS) ADMINISTRATION:**

This \$0.25 charge per month covers a portion of the administrative costs that your utility incurs.

5

## **CUSTOMER CHARGE\*:**

This fixed monthly charge covers administrative costs such as meter reading, billing and customer services.

6

## **DELIVERY-DISTRIBUTION\*:**

This is a variable rate that is regulated by the Ontario Energy Board. It reflects the cost of delivering electricity from the transmission system to your business. The charges are used to build and maintain distribution lines, towers and poles.

7

## **DELIVERY-TRANSMISSION\*:**

Transmission rates vary. They are regulated by the Ontario Energy Board and allow the electricity transmission company to recover the costs of operating and maintaining the high-voltage system that carries electricity from generating stations to your local utility.

8

## **POWER FACTOR:**

Power factor is the measure of how effectively equipment converts electric current into useful power output, such as light, heat or mechanical motion. Power factor matters because it can cost your business money. A low power factor means your business is drawing significantly more power than it is actually using. This results in additional charges on your electricity bill and increases the amount of energy demanded from the power grid. To improve a low power factor, businesses can install power factor correction capacitors or harmonic filters.

**\*NOTE** Your electricity bill may or may not reflect all the charges outlined here; sometimes charges are bundled. To see the rates your local hydro company uses to bill your company, visit [oeb.ca](http://oeb.ca)

# MANUFACTURING COMPANY XYZ

**Billing Date:** July 20  
**Your Service Type:** General Service – Demand  
**Your Local Hydro Company**

**Account Number**  
0000 0000 0000

**Meter Number**  
000 000

## HOW WE CALCULATED YOUR CHARGES

### Metered Values

Metered Consumption	45,000 kWh
Metered kW Demand	150 kW
Metered kVA Demand	161 kVA
Loss Adjustment Factor	4.8%

### Calculated Values

Adjusted Consumption	47,160 kWh
8 Power Factor	93.2%
Billing Demand	150 kW

Line Item	Rate (\$)	Amount	Total
Hourly Ontario Energy Price	0.0136	47,160 kWh	\$641.38
2 Global Adjustment	0.1128	47,160 kWh	\$5,319.65
Regulatory: Wholesale Market Service	0.0057	47,160 kWh	\$268.81
Standard Supply Services	0.25	—	\$0.25
Delivery: Monthly Service Charge	150.00	—	\$150.00
6 Delivery: Distribution Charge	5.00	150.0 kW	\$750.00
7 Delivery: Transmission Network	2.75	150.0 kW	\$412.50
Delivery: Transmission Connection	2.00	150.0 kW	\$300.50

**Total Monthly Electricity Charges**

**\$7,843.09**

# Managing the Global Adjustment

The Global Adjustment covers the cost of building new generators and providing other forms of supply to meet the province's long-term energy needs. Here's a guide to ways in which you can manage Global Adjustment costs.



## ELECTRICITY PRICING TRENDS

This chart shows the relationship between Hourly Ontario Energy Price (HOEP) and the Global Adjustment.



## TOOLS TO TRACK THE PEAKS

By shifting energy use away from peaks, consumers can lower their energy costs. The IESO provides tools to help large consumers and organizations predict periods of high demand and monitor hourly prices.

### 1. TIME OF YEAR

Ontario is generally a summer-peaking province, meaning the times of highest peak demand are usually during hot, humid days.

### 2. TIME OF DAY

The times of the highest demand in a day vary by season. For example, peaks in the winter tend to be in the early evening when electricity consumers across the province are turning their lights on and making dinner. In the summer, demand tends to be higher in the early to mid-afternoon when air conditioners are turned up.

### 3. PEAK TRACKER

The Peak Tracker tool, available at [ieso.ca/peaktracker](http://ieso.ca/peaktracker), shows the top 10 peaks for the current base period updated in real time. This tool is for Class A customers participating in the Industrial Conservation Initiative.

### 4. IESO WEBSITE

The IESO provides demand and price tracking in real time as well as an archive of historical data. Use the IESO's Power Data page to help anticipate future peaks at [ieso.ca/powerdata](http://ieso.ca/powerdata) and monitor the Hourly Ontario Energy Price.

## CLASS A CUSTOMERS AND THE INDUSTRIAL CONSERVATION INITIATIVE

If your business is classified as a large energy user, you may be eligible to participate in a Demand Response program that's designed to help reduce your energy and Global Adjustment costs and provide substantial benefits to the power system as a whole.

It's called the Industrial Conservation Initiative (ICI), and the good news is that large energy users (Class A customers) who participate in the program pay Global Adjustment based on their "percentage contribution" to the top five peak Ontario demand hours over a 12-month base period. This means that if your business has some flexibility when it comes to reducing demand during peak periods, as an ICI customer you can also reduce your Global Adjustment costs.

To calculate your percentage contribution, the IESO measures your business's peak consumption during each month of the base period and calculates the average over 12 months.

### Eligible ICI customers include:

- Customers with an average peak demand of over 1 megawatt (MW), and up to and including 5 MW.
- Customers with an average peak demand greater than 5 MW are automatically included in the program and also have the option of opting out.
- Customers in the manufacturing and industrial sectors, including greenhouses within specific sectors of the North American Industry Classification System, with an average monthly peak demand greater than 500 kW and less than or equal to 1 MW are eligible to opt in.

For more information about Class A eligibility and the rules for opting in and out of the ICI, visit [ieso.ca/global-adjustment](http://ieso.ca/global-adjustment).

## RETAIL CONTRACTS

When you sign a retail contract, the electricity rate you agree to pay will appear in the commodity portion of your bill. All other charges on your bill, including the Global Adjustment, will continue to apply.

If you are considering a retail contract, understand your demand profile so that you can weigh the most cost-effective option and determine whether to contract for all or part of your load. Also, make sure to compare historical market prices to the contract price and account for the Global Adjustment. Ask questions and compare offers before signing a contract. For a detailed list of questions to ask, see [oeb.ca](http://oeb.ca).

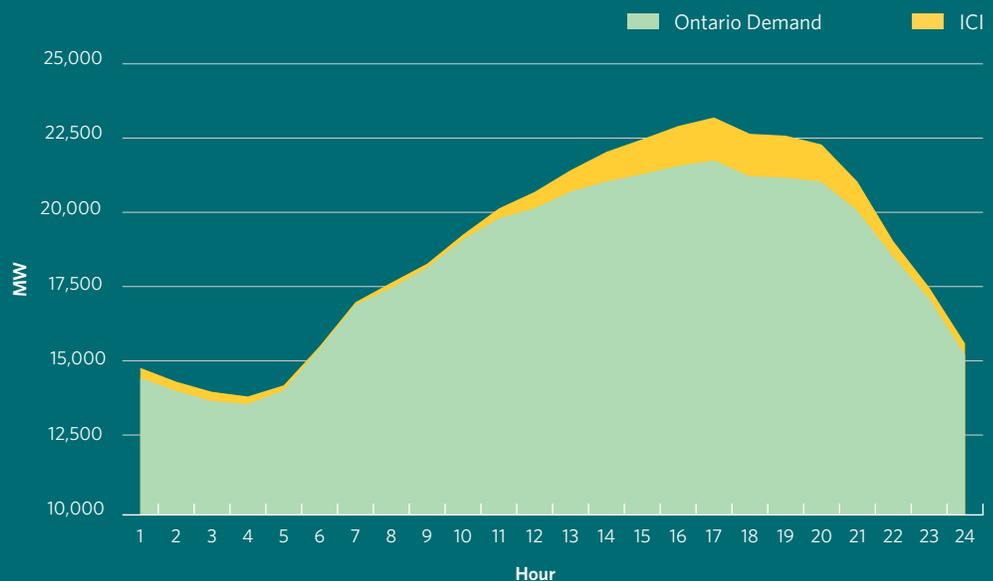
## QUESTIONS?

If you have questions about how your bill is calculated or don't understand the cost breakdown, talk to your local hydro company. They can explain your demand and energy charges, as well as the rates your business is paying for electricity.

### Industrial Conservation Initiative

Ontario's electricity system is built to meet the highest demand periods of the year. By reducing demand during peak periods, ICI participants can both reduce their Global Adjustment costs and help defer the need for investments in new electricity infrastructure that would otherwise be needed.

This graph is a representation of the ICI response from Class A customers on the peak day in 2017, which is estimated to have reduced provincial demand by over 1,400 MW.



# WHY GERDAU STEEL IS FIRED UP ABOUT DEMAND RESPONSE

**RIGHT** Every employee at Gerdau Steel's Whitby plant understands how demand response helps to keep energy costs in check and why it's important to the company's overall competitiveness.



In the Gerdau Steel plant in Whitby, Ontario, temperatures in the arc and ladle furnaces that produce some of the world's greenest steel reach temperatures exceeding 1600 degrees Celsius. The significant energy required to melt 700,000 tonnes per year of scrap metal, and then roll it into recycled steel products such as rebar, is the main reason why Gerdau's energy team decided the time was right to participate in the IESO's Demand Response (DR) auction.

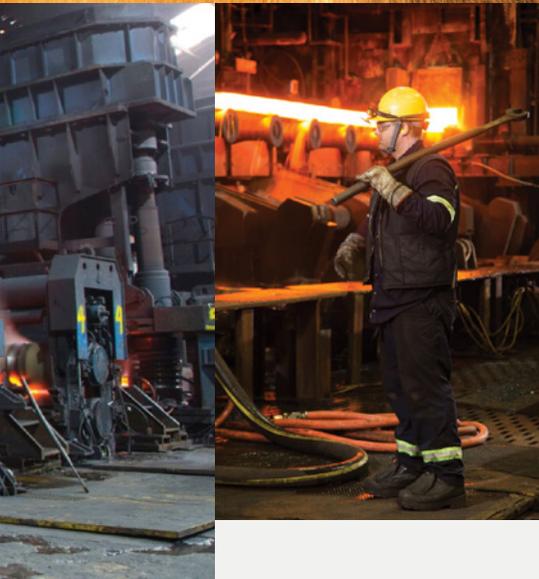
Gerdau is one of the largest steel recyclers in North America. Its winning bid in the IESO's third DR auction makes it one of a host of DR providers that curtail energy usage when called upon to do so during peak periods by the IESO. "Availability" payments help auction participants like Gerdau to offset

their overall electricity costs, in exchange for providing the IESO with a cost-effective energy resource.

Even before the first competitive auction, Gerdau was on board with Demand Response as a tried-and-true strategy. "Steel manufacturing is both energy intensive and trade exposed, which means any increase in our costs compared to our global competition can result in lost sales and a much-reduced contribution to Ontario's economy," said Darren MacDonald, Director, Energy and Environment, Gerdau Long Steel North America.

The DR auction, however, is not the only strategy Gerdau uses to manage energy costs. Despite its proven expertise in reducing the amount of energy it consumes,

the Whitby plant still has a demand load of over 100 megawatts (MW). That's why staff are constantly on watch for any and all other opportunities to manage this significant operating cost. Teams of people monitor electricity grid information and stay on top of prices, weather systems, Ontario demand, dispatch signals from the IESO and the plant's own demand peaks. "It's like operating our very own system control room," said MacDonald. "Coordinating and optimizing our response requires time and resources to plan the strategy, train our managers and operators, monitor and respond, all while planning production, managing inventory and meeting our customers' expectations. It's definitely a challenge. Using all of the tools available is the only sure way to get results."



## DEMAND RESPONSE AUCTION 101

The DR auction is an annual competitive process through which the IESO selects participating resources, such as residential, commercial and industrial consumers, to be available to reduce their electricity consumption as needed. The auction enables the IESO to acquire the electricity that is curtailed through these contracts at the lowest cost possible, which in turn ensures the wholesale electricity market operates cost-effectively.

Successful DR providers are integrated into the electricity market along with generators and help provide capacity when required

to ensure the province's energy needs are met during peak hours, when the cost to generate electricity can be high.

The auction is held on an annual basis in December, and the IESO procures capacity for two seasonal commitment periods:  
Summer – May 1 to October 31  
Winter – November 1 to April 30

For more information about the DR auction, visit: [ieso.ca/sector-participants/market-operations/markets-and-related-programs/demand-response-auction](https://ieso.ca/sector-participants/market-operations/markets-and-related-programs/demand-response-auction).

Every employee at Gerdau's Whitby facility is aware of the important role that demand response plays in keeping energy costs in check. They all receive intensive training and participate. Even the executive team in Tampa understands the Whitby plant's demand response commitments, performance and its impact on production. Sharing information among Gerdau subsidiaries helps the entire organization pull in the same direction. It also explains why as a global company, Gerdau has embraced the opportunity to develop demand response programs in markets around the world.

"We are really proud to be a sustainable steel company," said MacDonald. "Ontario's energy is now 96 per cent carbon-free, but this comes at a cost because we compete with countries where steel has a much larger environmental footprint than ours and can be sold more cheaply. The onus is really on us, in each of our subsidiaries, to tightly manage our costs. Maximizing our participation and performance in demand response programs has been an excellent way to maintain a competitive edge, allowing Gerdau to compete and provide "Green Steel" to Ontario businesses."

## THE MARKETPLACE OF TOMORROW



The IESO is redesigning the wholesale electricity market to ensure that it will be better able to adapt to the changes that are rapidly transforming the sector and better serve consumers and market participants.

"The Market Renewal program is about improving the way electricity is priced, scheduled and procured in order to meet Ontario's current and future energy needs reliably, and to efficiently reduce overall system costs," said Leonard Kula, the IESO's Vice-President, Planning, Acquisition and Operations and Chief Operating Officer.

The initiatives will unlock as much as \$5.2 billion in savings and create a solid foundation, from which the market can manage a range of possible energy futures driven by decentralization, digitization, and decarbonization.

### Market Renewal has four initiatives

- A day-ahead market to provide financially-binding prices and schedules ahead of real time – allowing producers and consumers to manage risk and helping the IESO to manage the grid more effectively.
- A single schedule market to ensure that there is a pricing system that more accurately reflects the cost of producing or consuming electricity at a given place or time.
- An enhanced real-time unit commitment mechanism to improve resource scheduling and commitments in real time, addressing system and resource changes arising after the day-ahead market has concluded.
- Incremental capacity auction to improve the way Ontario acquires supply to meet medium and long-term needs.

# GREAT RESULTS START WITH THE RIGHT TOOLS

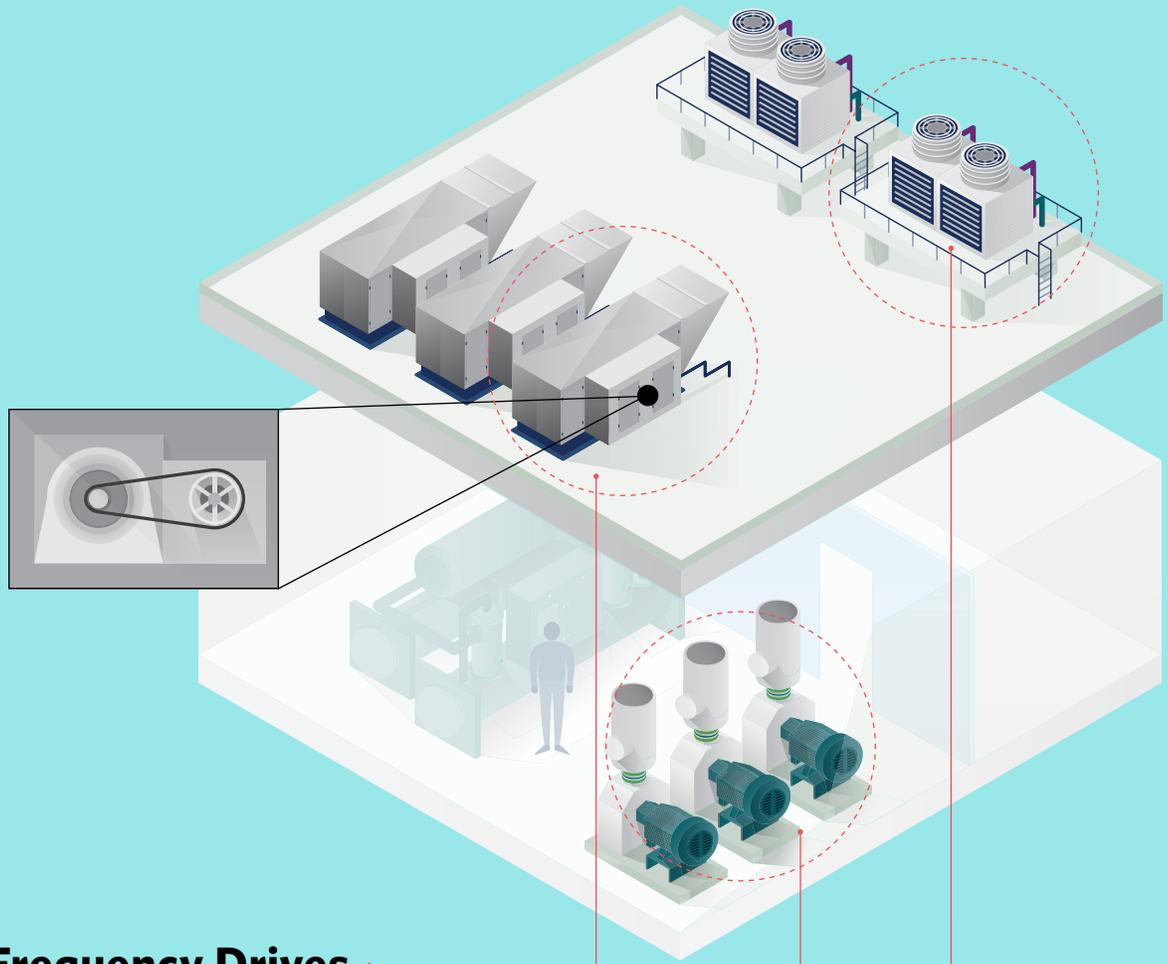
Ever wonder why some companies reach their energy management goals and others don't?

It takes energy-efficient technologies – and an energy savvy team – to get results.

Find the combination that works best for your organization.



# Start with the basics, then mix and match



## Variable Frequency Drives

Electric motors on pumps, blowers, compressors and conveyors can be energy guzzlers. To manage the amount of electricity they consume, consider adding a variable frequency drive (VFD) to the motor.

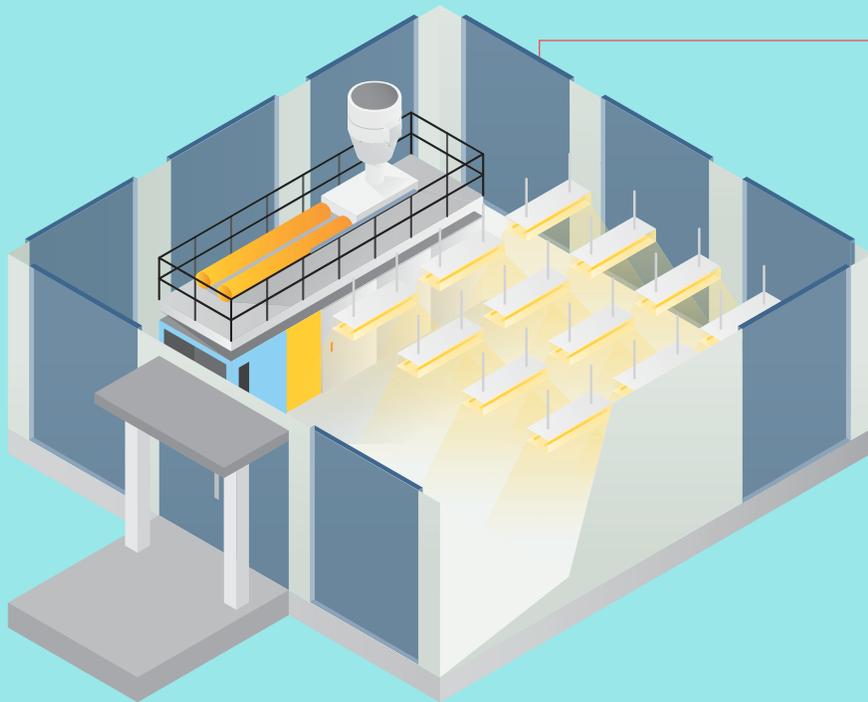
A VFD modulates the frequency and voltage supplied to the electric motor. If the equipment does not require an electric motor to run at full speed, the VFD can be programmed to slow down to meet the requirements of the electric motor's load. VFDs can be installed on a variety of equipment with motors to help reduce energy costs, control startups and shutdowns, and adjust operating speeds.

3

## Lighting and Lighting Controls

Lighting retrofits using energy-efficient lighting such as LED bulbs are a simple way to manage electricity costs. Typically, they will also improve the quality of light and reduce maintenance requirements due to their longer life spans. Depending on their location, energy-efficient lighting can also improve productivity and enhance the overall customer experience. With energy-efficient lights, most facilities will be able to reduce the number of fixtures required, or add controls like occupancy sensors to further reduce energy usage.

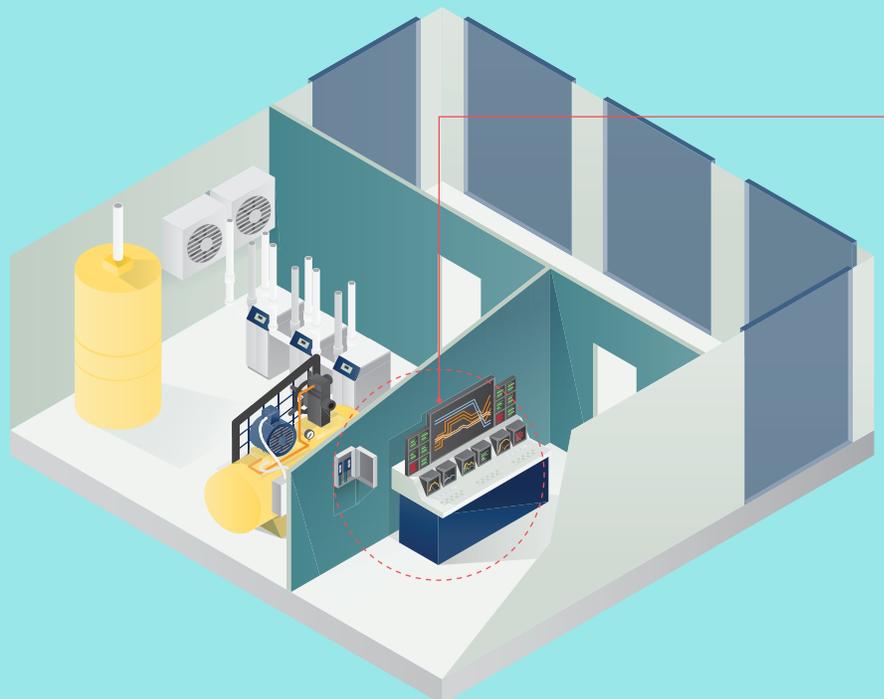
During the past two years, Vision Extrusion Ltd. has made significant investments in energy-efficient technology, according to Energy Manager Behdad Bahrami. Projects include a facility-wide upgrade to LED lights as well as pumps retrofitted with more efficient models and VFDs. "These upgrades increased the efficiency of each line significantly without affecting production," said Bahrami. "When the facility was expanded, the company installed the highest efficiency equipment possible. We've found that it's worth going for the more efficient models right from the get-go."



### DID YOU KNOW?

All of these energy management tools are eligible for funding and incentives through Save on Energy. For more information, please visit [saveonenergy.ca](https://saveonenergy.ca) or contact your local hydro company.

**SAVE ON ENERGY**  
POWER WHAT'S NEXT

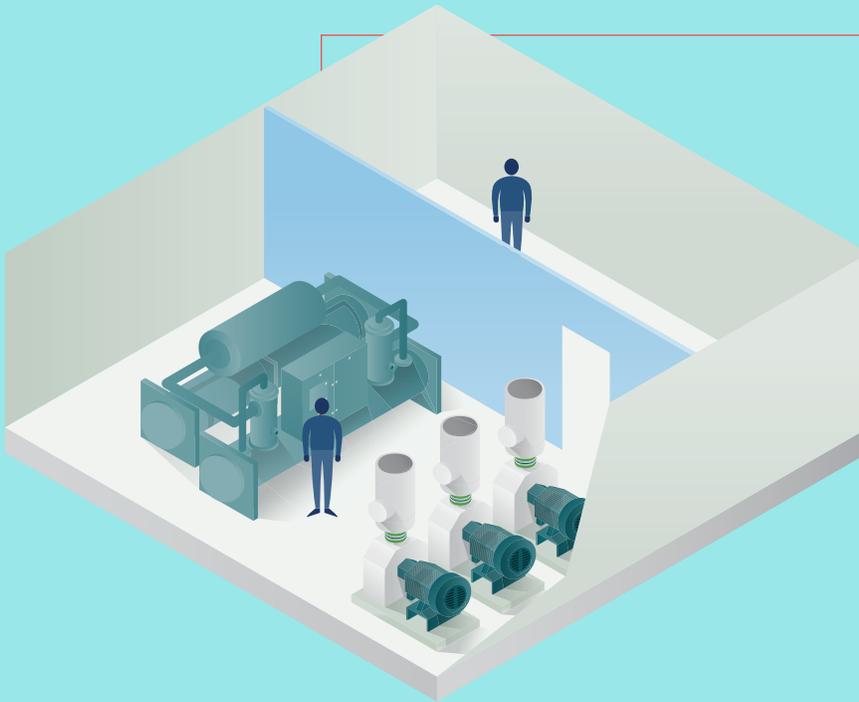


## 4

### People

Professional energy managers can play a significant role in helping businesses to manage their electricity costs. Whether they're part of your in-house team, act as external consultants or work for your local hydro company, professional energy managers will be able to discuss options, programs and strategies to help your business reach its energy management targets.

According to Adam Murree, Atlantic Packaging's dedicated energy manager, when it comes to energy management it's important to have leadership from the top. "Our owner takes a big interest in energy management, and that really helps. For myself, I've learned that in addition to the technical skills, there's a lot of relationship-building in this job. I work hard to provide decision-makers with the information they need in order to get behind the energy technology investments I think will help Atlantic save money. It's really important for energy managers to be able to explain what they do in simple terms, but also to act as a bridge so that everyone understands the benefits and is working towards the same goals."



## 2

### Building Automation Systems/Controls

Building automation systems allow for control and integration of the building's heating, ventilation and air conditioning (HVAC) equipment. They schedule, adjust and monitor the major mechanical plant equipment, as well as provide feedback that can help to reduce energy consumption and demand. Although most building automation systems are designed for HVAC, many systems can also be programmed to manage lighting control, computerized maintenance scheduling, life-safety functions and security access control.

Some organizations, including the City of Burlington, use their building automation systems to model different demand response scenarios and establish detailed plans for staff to follow when demand is curtailed. Others use it to monitor how much electricity is being used at any point in time and store the information so it can be analyzed when needed.

#### DID YOU KNOW?

The Industrial Accelerator Program (IAP) is designed to assist eligible transmission-connected companies to fast track capital investment in major energy-efficiency projects. The program provides financial incentives to encourage investment in innovative process changes and equipment retrofits. For more information, please visit [ieso.ca/iap](https://ieso.ca/iap)

**IndustrialAccelerator**

CASE STUDY:

# ENERGY MANAGEMENT CHALLENGES TRIGGER CULTURAL SHIFT

It's 8 a.m. in mid-August, and you can already feel the heat. At Brampton Brick all signs are pointing to another peak demand day. A day when everyone on the shop floor will spring into action in a well-orchestrated plan to beat the heat by shifting energy load and curtailing electricity consumption at the company's largest facility.

It wasn't always this way. Three years ago, Senior Vice President, manufacturing Brad Duke, in conversation with Energy Consultant Gary Last from GR Energy Management, were in the process of figuring out how to squeeze more efficiency out of the company's operating budget.

"Our annual electricity consumption was 22.3 megawatt-hours with a peak demand of 4.1 megawatts (MW). Our average annual electricity costs were well over \$2 million, including our Global Adjustment costs," said Duke. "We knew we needed to do something, it was just a matter of what."

The pair's first priority was to build an energy management roadmap. An integral part of that plan was to start raising energy awareness on the production floor by making energy management a shared responsibility.

**ABOVE RIGHT** Brampton Brick achieved energy savings of approximately 12 per cent annually through a variety of measures including load shifting during periods of peak demand. Everyone on the energy team has a specific role to play when the call to curtail is given.



“ I can't stress enough the importance of employee awareness. ”

**Brad Duke** (left), Senior Vice-President, Manufacturing, Brampton Brick

## SHARING THE ENERGY MANAGEMENT LOAD

Assembled in 2014, Brampton Brick's eight-member cross-functional team learned how their actions during peak demand days could help lower the company's Global Adjustment costs. They also discussed the province's Industrial Conservation Initiative (see sidebar) and how they could get involved. Designed for large customers with monthly peak demand exceeding 1 megawatts, the program provides an opportunity to lower Global Adjustment costs by shifting energy load during periods of peak demand.

"We wanted to take dead aim at our Global Adjustment costs, and the team was shown the way to do it," said Duke.

On peak demand days, each member of the energy team now has a specific task. The production team continues to feed bricks into the kiln, which operates 24/7 and produces about 450,000 bricks each day. Everyone on the energy team has a specific role to play when the call to curtail is given, from shutting down full production lines to turning off the lights.

"Rather than rely on a centralized building automation system, they do everything manually. Together, their actions add up to an average load reduction of 1.8 megawatts," said Last.

## BUILDING MOMENTUM

Taking a hands-on approach is an important point because it underscores the cultural shift that Duke and Last have worked hard to kick-start during the past three years.

In addition to load shifting, the company's lighting, heating and air conditioning and compressed air systems have also been upgraded. With each new project, the team prioritizes what needs to be done. In addition to load shifting, it has turned to the Save on Energy Retrofit Program ([saveonenergy.ca](http://saveonenergy.ca)), delivered by Hydro One Brampton, for financial incentives to offset some of the upfront costs. By replacing high-bay metal halide light fixtures with energy-efficient, occupancy-controlled LED fixtures at the company's 400,000 square foot facility, the team reduced Brampton Brick's lighting load by over 278 kilowatts and lowered annual consumption by about 2.3 megawatt-hours. An upgrade to the plant's rooftop unit yielded further savings of 2,187 kilowatt-hours. These energy reductions represent energy savings of approximately 12 per cent annually, not including the approximately 40 to 50 per cent the company is saving monthly on Global Adjustment costs.

"I can't stress enough the importance of employee awareness," said Duke. "Even before we installed the energy monitoring software we now use to create dashboards that show our real-time load and consumption patterns, we had a team of dedicated people who wanted to figure out how to make Brampton Brick more energy efficient. We started from scratch. Thanks to everyone's efforts, we now have targets and processes in place, and we're able to replicate our load-shifting plan with great success."

## WHAT IS THE INDUSTRIAL CONSERVATION INITIATIVE?

The Industrial Conservation Initiative (ICI) is a form of demand response that allows participating customers to manage their Global Adjustment (GA) costs by reducing demand during peak periods. These customers pay GA based on their percentage contribution to the top five peak Ontario demand hours (peak demand factor) over a 12-month base period. Eligible customers include:

- Customers in the manufacturing and industrial sectors, including greenhouses (with NAICS codes that begin with 31, 32, 33 or 1114), with an average monthly peak demand of greater than 500 kW and less or equal to 1 MW.
- Customers with an average peak demand of above 1 MW and up to and including 5 MW.
- Customers with an average peak demand greater than 5 MW are automatically included in the program and also have the option to opt out.

For more information, visit [ieso.ca/class-a-eligibility](http://ieso.ca/class-a-eligibility)



## KEY RESULTS

**4.1 MW**  
Peak demand  
before load-shifting

**1.8 MW**  
Average load reduction

**40-50%**  
Monthly savings on  
Global Adjustment costs

**12%**  
Savings from energy  
conservation projects

**22.3 MWh**  
Energy consumption  
before Save on Energy  
retrofits

**Independent Electricity  
System Operator**

1600-120 Adelaide Street West  
Toronto, ON M5H 1T1

Phone: 905.403.6900

Toll-free: 1.888.448.7777

Email: [customer.relations@ieso.ca](mailto:customer.relations@ieso.ca)

 [@IESO\\_Tweets](https://twitter.com/IESO_Tweets)

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 [linkedin.com/company/ieso](https://www.linkedin.com/company/ieso)

[ieso.ca](http://ieso.ca)

## Get started

There are many online tools that can help you get started with your energy management plans. The resources below are a good place to start.

**ELECTRICITY PRICES**

[ieso.ca/business](http://ieso.ca/business)

**PROVINCE-WIDE  
CONSERVATION PROGRAMS**

[saveonenergy.ca](http://saveonenergy.ca)

**INDUSTRIAL ACCELERATOR**

[ieso.ca/iap](http://ieso.ca/iap)

**DEMAND RESPONSE  
AUCTION**

[ieso.ca/dr-auction](http://ieso.ca/dr-auction)

**FEDERAL GOVERNMENT  
OFFICE OF ENERGY EFFICIENCY**

[nrcan.gc.ca/energy/efficiency](http://nrcan.gc.ca/energy/efficiency)

**YOUR LOCAL HYDRO COMPANY**

[ieso.ca/findutility](http://ieso.ca/findutility)

**RETAIL ELECTRICITY CONTRACTS**

[oeb.ca/consumer-protection/  
energy-contracts/licensed-energy-  
retailers](http://oeb.ca/consumer-protection/energy-contracts/licensed-energy-retailers)

**ONTARIO ENERGY BOARD**

[oeb.ca](http://oeb.ca)