The Bottom Line on Energy Management

Making Ontario's Electricity Market Work for Your Business

INSIDE

- Why demand response is worth a second look
- Now is the time to take control of your electricity costs
- How Western University is investing in the future of higher learning

ieso
Connecting Today.
Powering Tomorrow.

IN THIS ISSUE

COVER PHOTO At Vision Extrusions, energy planning, persistence and patience are paying off big-time. After a series of 20 retrofits, energy costs are down roughly 15 per cent compared to three years ago.

MANUFACTURING COMPANY XYZ

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

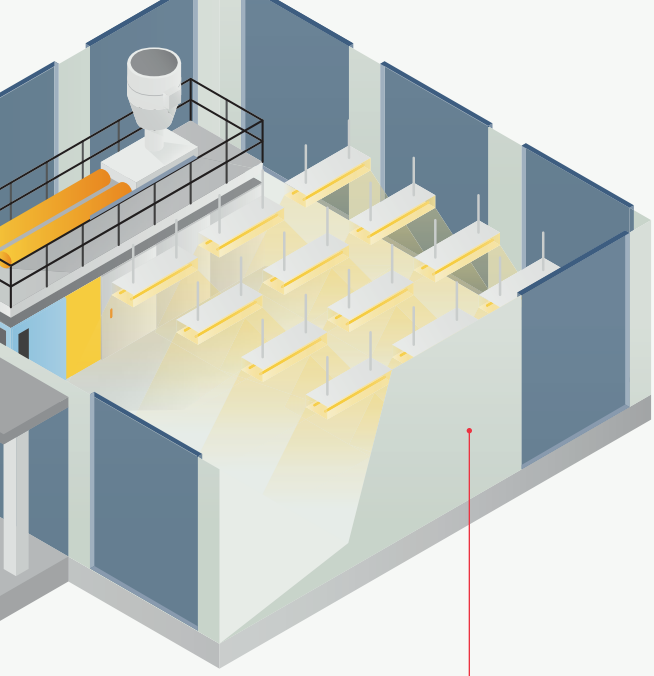
Account Number
0000 0000 0000

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%



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.

CASE STUDY

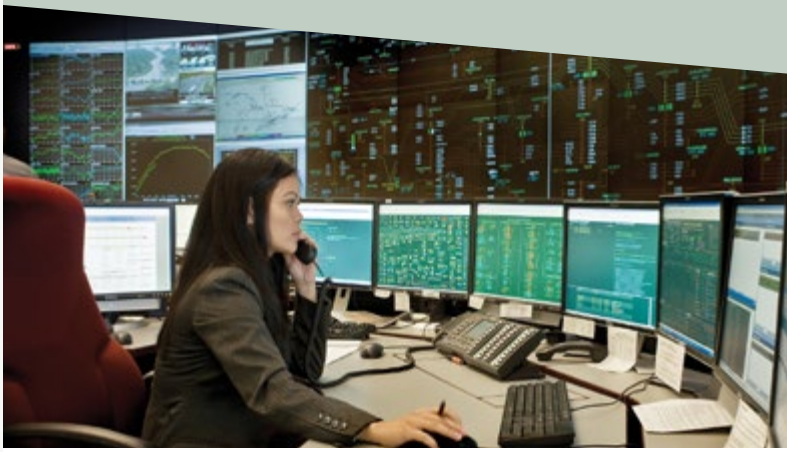
INVESTING IN THE FUTURE OF HIGHER LEARNING

Director of Business Operations, Paul Martin, explains what Western University is doing with the $2 million in energy savings it achieved over a two-year period.

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.

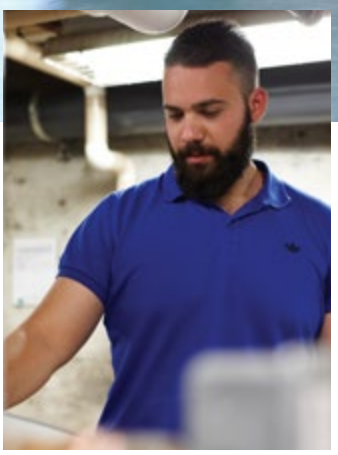
This booklet was designed to help your business manage its energy needs and meet its energy efficiency targets.



BACK PAGE

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

CONTROL YOUR USE, CONTROL YOUR COSTS



TOP Savings from previous energy-efficiency investments mean the City of Burlington can invest in new variable frequency drives on pool filtration pumps at three swimming pool facilities.

ABOVE The City of Burlington's Ahmed Azhari says energy savings are good for taxpayers because it's money the city can re-invest in the community.

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 all used energy efficiency as a way to reduce their energy costs – starting with something as simple as swapping out energy-intensive lighting to 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."

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, which 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 facilities reduce consumption by two per cent annually.

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

"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** or contact your local hydro company. Transmission-connected customers can visit **ieso.ca/iap** for more information about the Industrial Accelerator program.

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, five energy managers, all representing different sectors, comment on their role, discuss their company's success in energy management, and provide insight for prospective energy managers.

Adrienne Cressman, P.Eng
TD Centre, Cadillac Fairview

> "We are accountable not just for our energy savings results but also for raising awareness about energy conservation and training on best practices."
>
> **Ahmed Azhari,** City of Burlington

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.

> 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

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

Ahmed Azhari: Yes, we keep track of pricing on a regular basis. It helps us to manage costs like the Global Adjustment and also is an incentive to try to schedule recreational programs during times when the market electricity price is low.

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 our peak 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?

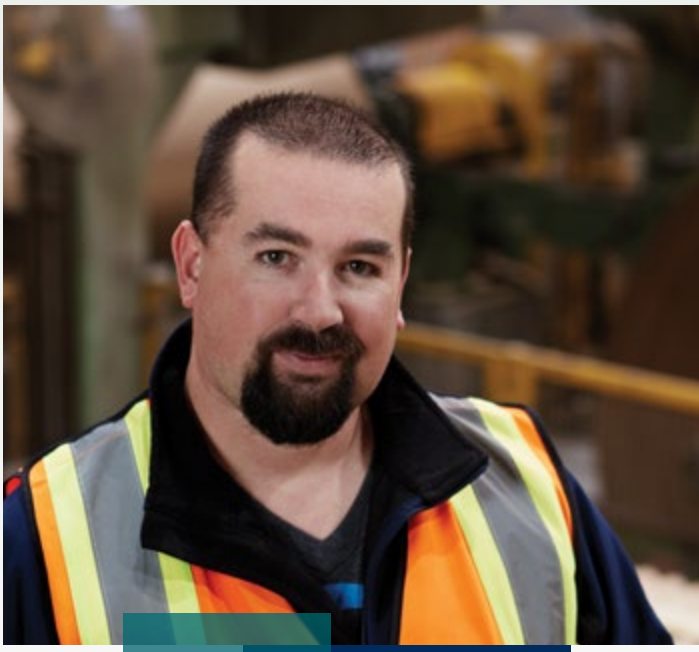
Ian Shaw: Since 2011, we've achieved 125,000 megawatt-hours in recurring annual savings and reduced our electricity costs by more than $10 million annually. We've also got other projects under construction currently, with a goal of achieving demand savings of 270,000 megawatt-hours by 2020.

Ahmed Azhari, P.Eng., CEM, LEED AP
City of Burlington

HOW IMPORTANT IS IT TO HAVE SUPPORT FROM SENIOR MANAGEMENT?

Ahmed Azhari: The City of Burlington is 100 per cent committed to energy management. We are accountable not just for our energy savings results but also for raising awareness about energy conservation and training on best practices. If the direction doesn't come from the top, it's extremely difficult to get buy-in and achieve meaningful results.

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.



Adam Murree, CEM, CEA, CMVP
Atlantic Packaging

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

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 ten 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 cost 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.

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

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 and 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.

1 GAIN CONTROL

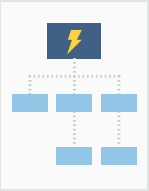
UNDERSTAND ELECTRICITY PRICING

PERFORM ENERGY AUDIT

DEVELOP ENERGY STRATEGY

2 INVEST IN CONTROL

MONITOR HOURLY ONTARIO ENERGY PRICE



IMPLEMENT ENERGY STRATEGY

3 MAINTAIN CONTROL

MEASURE RESULTS

UNDERSTAND ENERGY PROFILE

REVISIT PLAN AND UPDATE

SAVE ON ENERGY™
POWER WHAT'S NEXT

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 or contact your local hydro company.

NOW IS THE TIME

Take Control of Your Electricity Costs

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.

Electricity Bills Explained

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 operated 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 Hourly Ontario Energy Price.

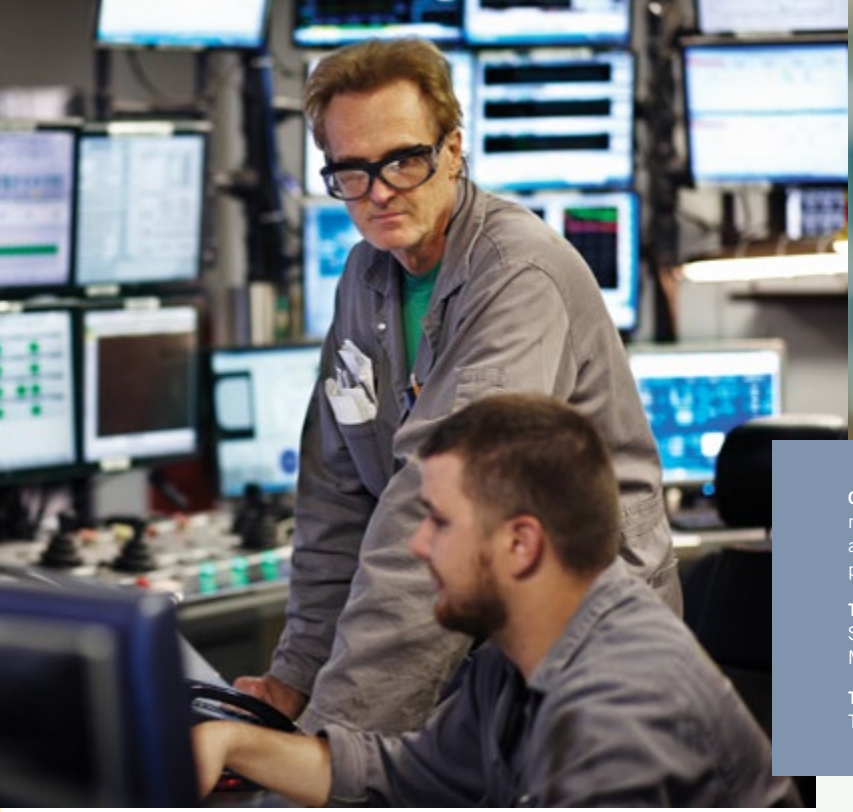
Typically, when demand for electricity is higher, more expensive forms of generation are required. This drives up the cost of power. Weather plays a significant role in electricity demand. On a typical hot summer's day, as temperatures rise, air conditioning use also rises from morning to late afternoon 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**. The IESO also provides historical and real-time information about the wholesale price at **ieso.ca/price**. This information can help businesses to anticipate future electricity costs and plan their operations accordingly.



CENTRE 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.

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

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

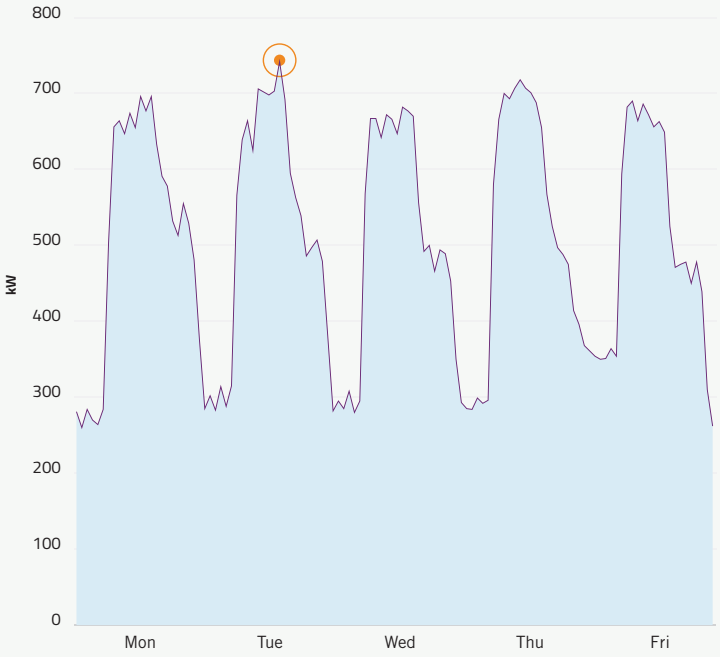
YOUR ELECTRICITY BILL

Electricity bills may vary slightly by utility, but the underlying principles are the same. Your electricity costs are based on:

TOTAL CONSUMPTION: How much electricity you consume, measured in kilowatt-hours (kWh). Charges you will see in this section of your bill include:	PEAK DEMAND: How quickly you draw electricity from the system, measured in either kilowatts (kW) or kilovolt-amperes (kVA). These charges include:
Electricity/Commodity	Delivery-Distribution*
Global Adjustment	Delivery-Transmission* » Transmission Connection » Transmission Network
Wholesale Market Services	Power Factor
Debt Retirement	
SSS Administration	
Customer Charge*	

FINDING YOUR PEAK

Your peak demand determines your delivery charges for the month. Seeing when your peak demand occurs will give you an opportunity to see what equipment or processes you can modify.



***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 **ontarioenergyboard.ca**

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 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 Hourly Ontario Energy Price, 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 infrastructure and providing conservation programs 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

Debt Retirement Charge:

This 0.7¢/kWh charge is set by the Ontario Ministry of Finance and is used to pay down the residual stranded debt of the former Ontario Hydro.

5

Standard Supply Services (SSS) Administration:

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

6

Customer Charge*:

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

7

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.

8

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.

9

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 capacitators 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 ontarioenergyboard.ca

MANUFACTURING COMPANY XYZ

Billing Date: November 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
9	Power Factor	93.2%
	Billing Demand	150 kW

	Line Item	Rate($)	Amount	Total
1	Hourly Ontario Energy Price	0.03	47,160 kWh	$1,414.80
2	Global Adjustment	0.08	47,160 kWh	$3,772.80
3	Regulatory: Wholesale Market Service	0.0057	47,160 kWh	$268.81
4	Debt Retirement	0.007	45,000 kWh	$315.00
5	Standard Supply Services	0.25	—	$0.25
6	Delivery: Monthly Service Charge	85.00	—	$85.00
7	Delivery: Distribution Charge	4.00	150 kW	$600.00
8	Delivery: Transmission Network	3.65	150.0 kW	$547.50
	Delivery: Transmission Connection	2.45	150.0 kW	$367.50

Total Monthly Electricity Charges **$7,371.66**

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. The Global Adjustment is set to reflect the differences between the market price and:

Regulated Rates

The regulated rate for Ontario Power Generation's (OPG) nuclear and hydro-electric generating stations.

New Infrastructure & Contracted Rates

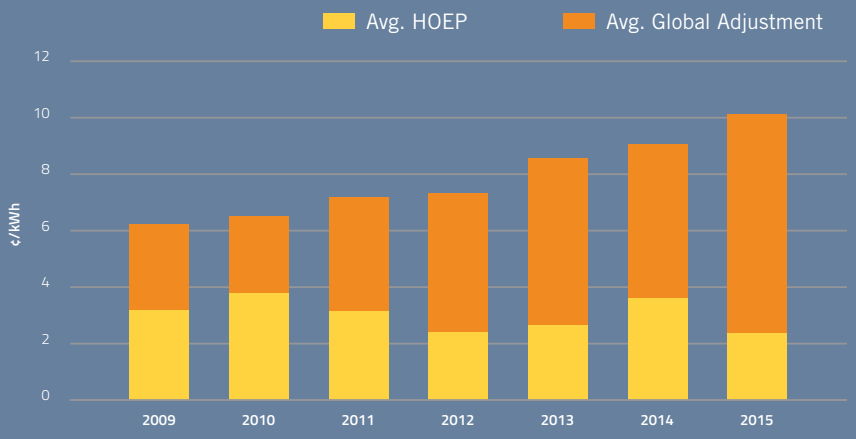
Payments for building new infrastructure or refurbishing such as other nuclear, gas-fired and renewable facilities. Also includes the contracted rates paid to a number of small generators operating in the province.

Conservation

The cost of delivering conservation programs.

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**, 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** and monitor the Hourly Ontario Energy Price.

CLASS A CUSTOMERS AND THE INDUSTRIAL CONSERVATION INITIATIVE

Large energy users, known as Class A customers, are eligible to participate in a demand response initiative that can reduce their energy costs and benefits the power system as a whole.

Through the Industrial Conservation Initiative (ICI), Class A customers reduce their energy use during the top five hours of peak demand in a year-long "base" period, which in turn reduces the need to build additional infrastructure to support growing electricity demand. In turn, participants are charged the Global Adjustment based on their percentage contribution to these peaks.

Any organization with a peak demand of more than 1 MW is eligible to participate in the ICI.

A customer's peak demand threshold for Class A eligibility is measured by taking their facility's highest hour of demand for each month of the base period and averaging it out over that year.

Customers that have peak demand greater than 1 MW and less than or equal to 5 MW need to opt in every June 15, signalling their intention to participate in the program. Customers over 5 MW are automatically enrolled and must opt out if they do not want to participate.

For more information about Class A eligibility and the Global Adjustment, visit **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.

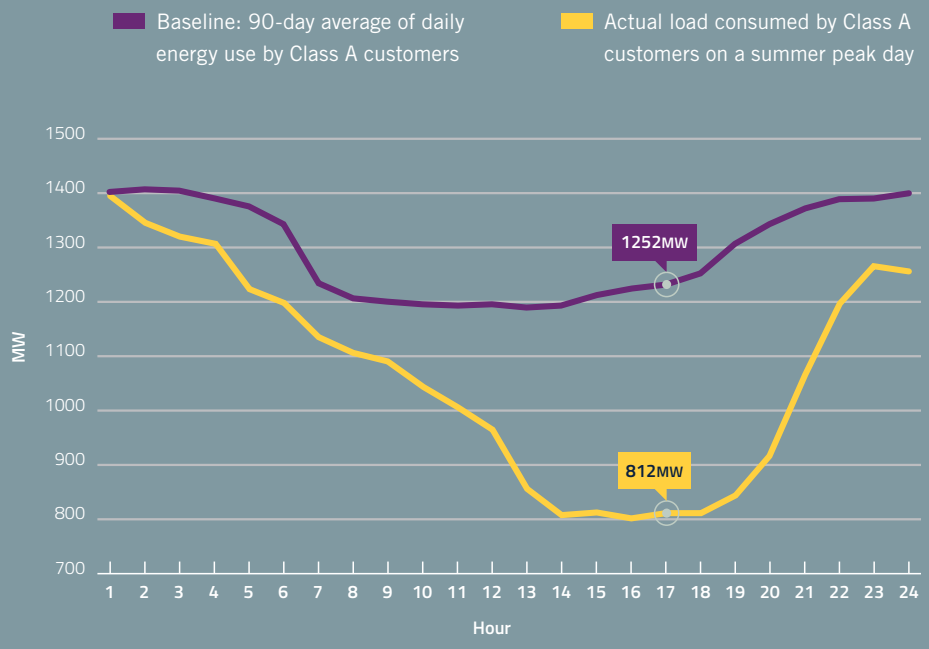
If you are considering a retail contract, understand your demand profile so that you can weigh the most cost-effective option and determine whether to contract for all or part of your load. Also, make sure to compare historical market prices against the contract price and account for the Global Adjustment. Ask questions and compare offers before signing a contract. For a detailed list of questions to ask, see **ontarioenergyboard.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: SUMMER LOAD CURTAILMENTS

This graph is a representation of a summer peak day with an ICI response from Class A customers. The load consumed by Class A customers is 440 MW less than the baseline established from previous 90 days.



DEMAND RESPONSE

Makes Sense in More Ways Than One

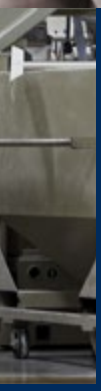
RIGHT Vision Extrusion has implemented more than 20 energy retrofit projects at its state-of-the-art facility in Woodbridge.

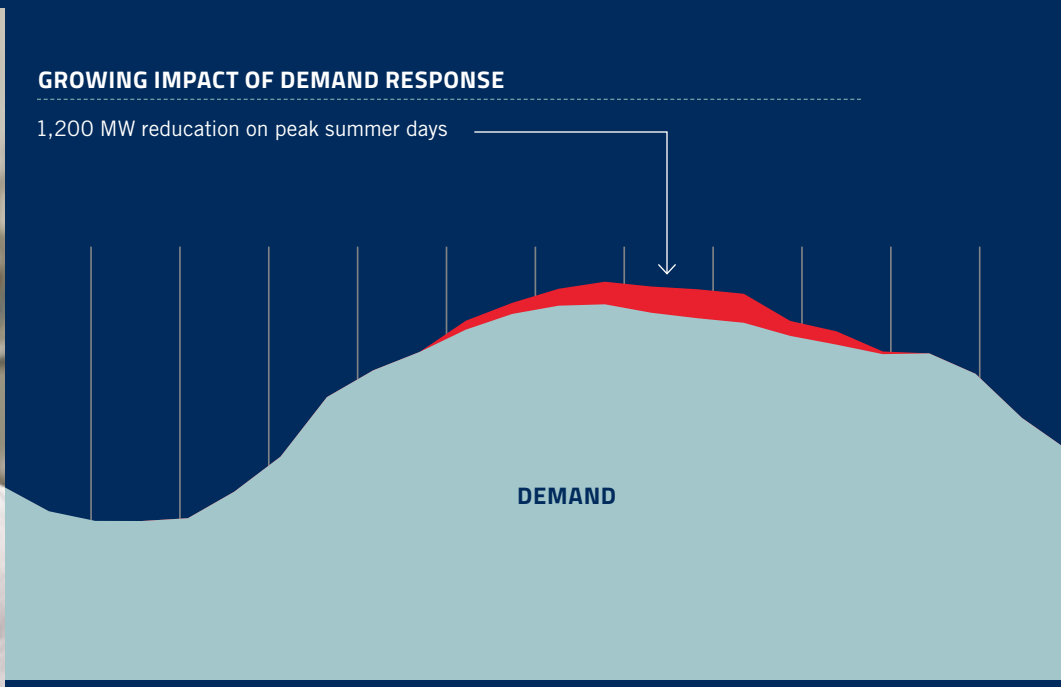
FAR RIGHT Energy manager Behdad Bahrami says that demand response is one of the ways in which his company, Vision Extrusions, is maintaining its competitive edge.

Businesses that invest in energy-efficient technology are not only positioning themselves to save on their electricity costs, they are also paving the way for a new revenue stream when they leverage that technology to participate in demand response programs.

"Demand response is really about the power of critical mass," said the IESO's Manager, Market Development, Tom Chapman. "When one customer changes their energy use in response to price signals or conditions on the power system, that's good. But when lots of customers do it, their collective actions can produce a sizeable decrease in the amount of power required to meet demand. This is the new thinking behind demand management, and the IESO wants more businesses to know about it. Improved capacity, overall reliability and flexibility of the electricity grid, and potentially lower power system costs, these are all great reasons to use demand response to manage costs."

Ahmed Azhari is Energy Project Management Coordinator at the City of Burlington, where he manages a portfolio of approximately 55 city-owned facilities. As far as he's concerned, demand response is not only good for the electricity grid, it's good for the City and it's good for taxpayers. "In 2014, we reduced the City's overall energy cost by 12 per cent. We have well-established protocols for demand response. These energy initiatives help to keep people's tax bills from increasing," said Azhari.





Demand response can significantly reduce peak demand, particularly on hot summer days. This graph shows what happened several years ago, when peak demand decreased by 1,200 MW on one specific summer day – more than enough to power the cities of Hamilton and St. Catharines.

In addition to the advantages for businesses, demand response also represents a clean and cost-effective resource that reduces or defers the need to build new power plants and increases participation in the wholesale electricity market.

To encourage more businesses to not only invest in energy-efficient technologies but also to benefit financially from their investment, the IESO has developed a demand response auction. The auction provides a transparent and cost-effective way to select the most competitive providers of demand response. It takes offers from large companies and aggregators (representing a group of commercial energy consumers) that commit to reducing their energy use in response to an instruction from the province's grid control centre. The auction is repeated each year, creating a sustainable market for demand response service providers, while ensuring that electricity is secured at the best available price.

"We're big fans of demand response because it's manageable and it's flexible. In our Appleby Arena, we can move ice rentals between four rinks and shift electrical load between two refrigeration plants during peak demand," said Azhari.

"In the Community Centre, I can increase the temperature by one degree and reduce the lighting by 50 per cent. In either case, it's not making much of a difference for the user experience, but it's making a huge difference for the City in terms of cost savings."

Vision Extrusions Ltd. is a manufacturing leader in the building products sector. Operating from a one-million-square-foot campus in Woodbridge, the company has participated in the demand response program through an aggregator for three years. Between 2011 and 2014, it reduced its peak demand by ten per cent when requested, and in exchange, received availability (or capacity) payments from the IESO.

"The availability payments are certainly a welcome source of new revenue, but for Vision Extrusions, it's really about managing our electricity costs and staying ahead of the curve," said Behdad Bahrami, Vision Extrusions' Energy Manager. "We do this because it is helping Ontario. The less energy we use, the more efficient we are, and the more efficient we are, the more that helps Ontario and Vision to stay competitive on a global scale."

For more information about demand response, visit **ieso.ca/demand.response**

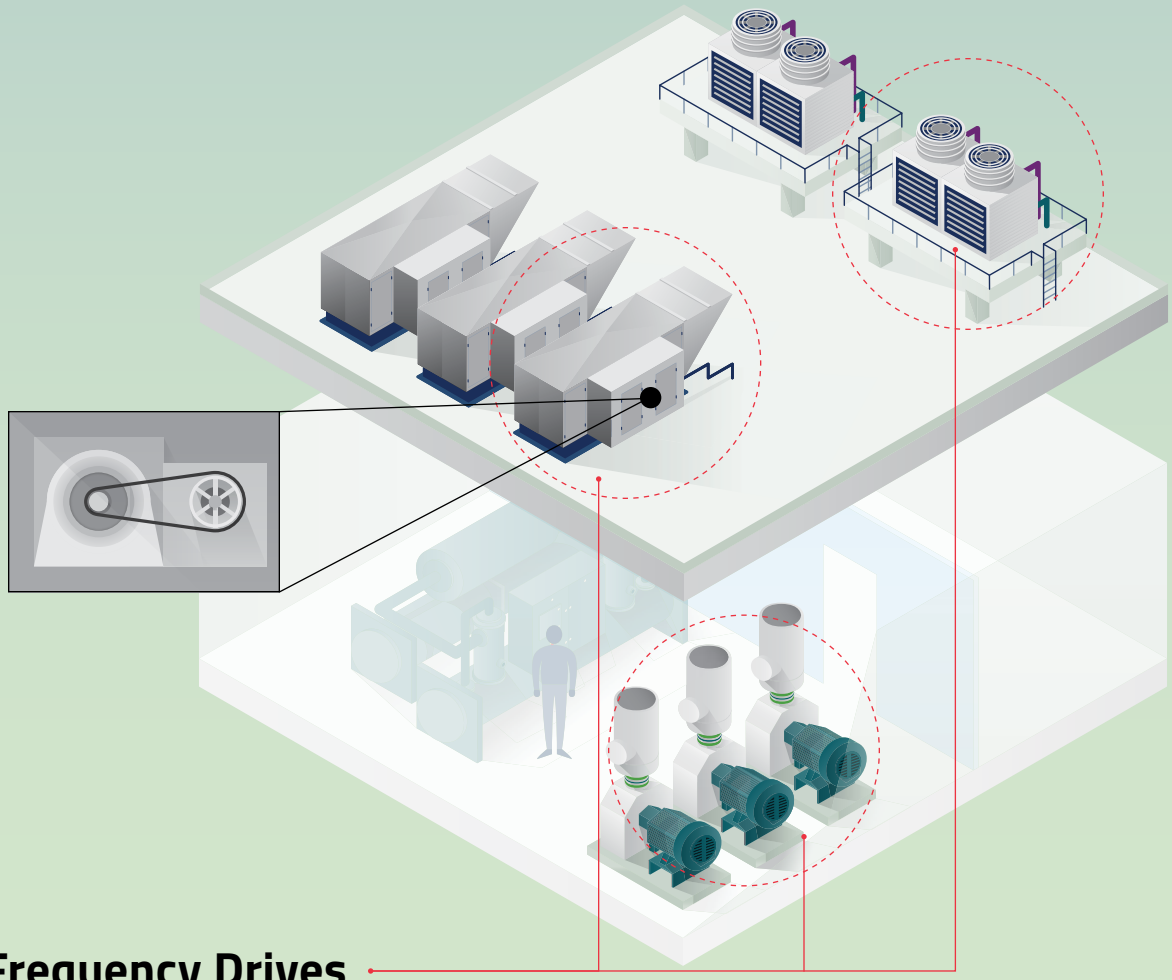
ENERGY MANAGEMENT FROM THE INSIDE OUT

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



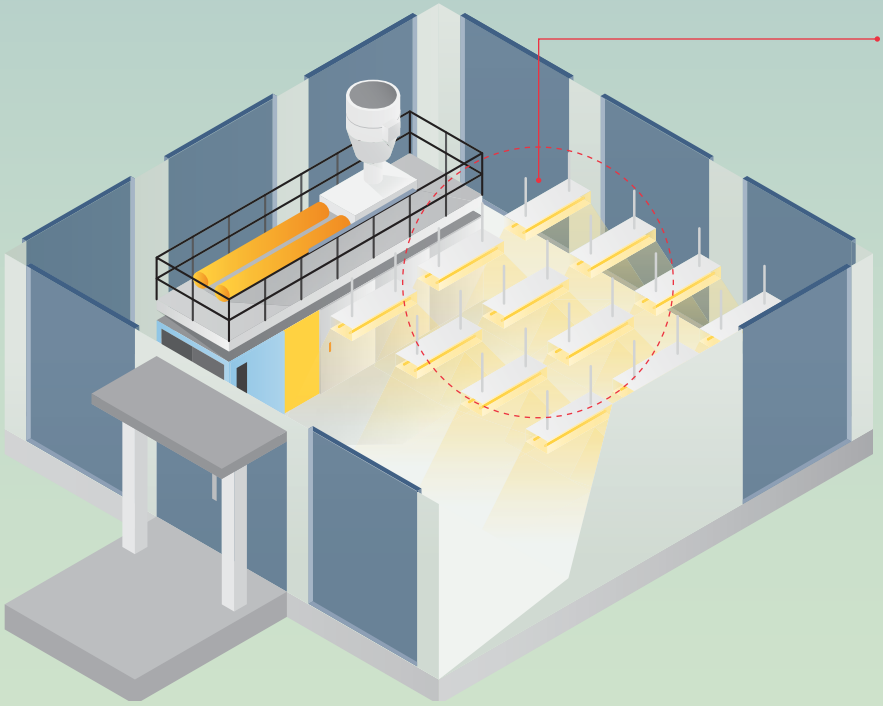
1

Variable Frequency Drives

Electric motors on pumps, blowers, compressors and conveyers 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 facility equipment with motors to help reduce energy costs, control start-ups and shutdowns, and adjust operating speeds.

"We've installed over ten VFDs on cooling tower pumps, swimming pool pumps, and heating and cooling pumps in our facilities across the city and continuously consider VFD retrofits within all our capital renewal projects," said Ahmed Azhari, Energy Project Management Coordinator, City of Burlington. "We do this because VFDs help to reduce pumping power and extend the life of the motors. They also help us to achieve our energy savings targets and manage our peak demand. We have plans to retrofit pool filtration pumps with VFDs in three swimming pool facilities next year."



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.

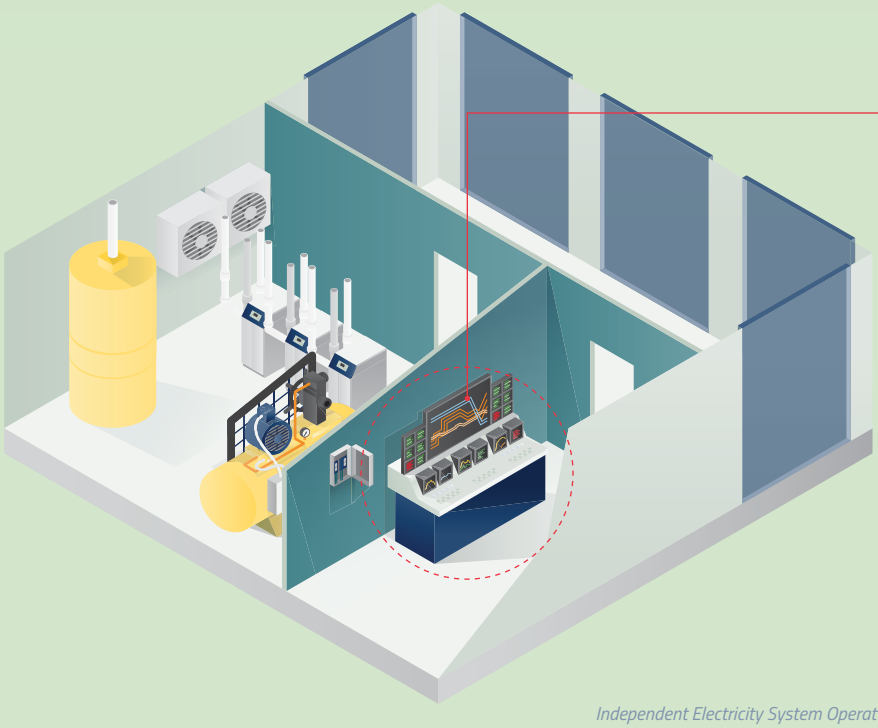
During the past two years, Vision Extrusion has made significant investments in energy-efficient technology, according to Energy Manager Behdad Bahrami. Projects include a facility-wide upgrade to LED lights, as well as pumps retrofitted with more efficient models and variable frequency drives. "These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

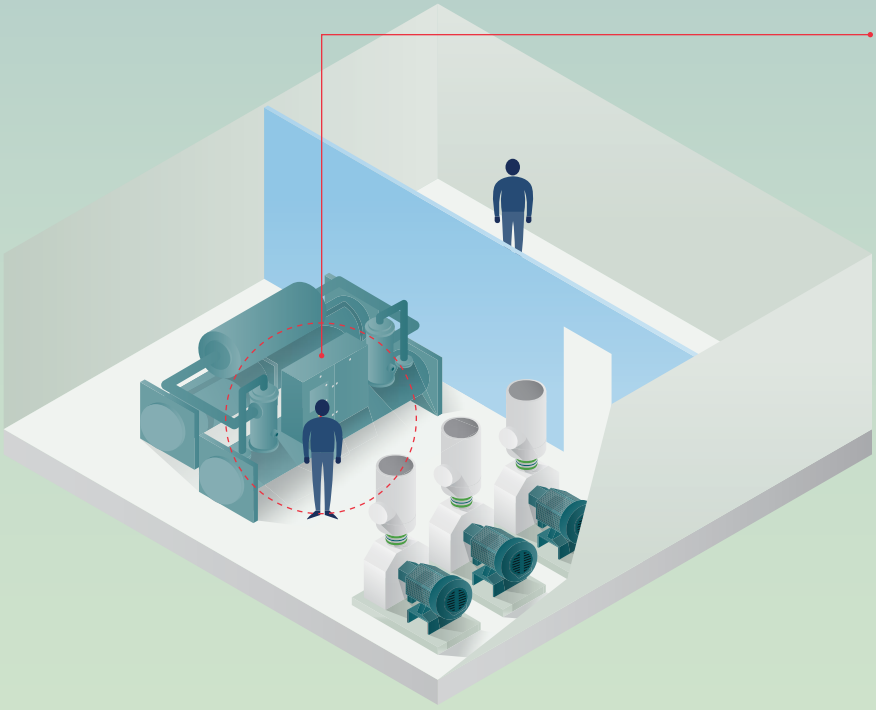
DID YOU KNOW?

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

All of these energy management tools are eligible for funding and incentives through Save on Energy. For more information, please visit 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 System/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.

i

DID YOU KNOW?

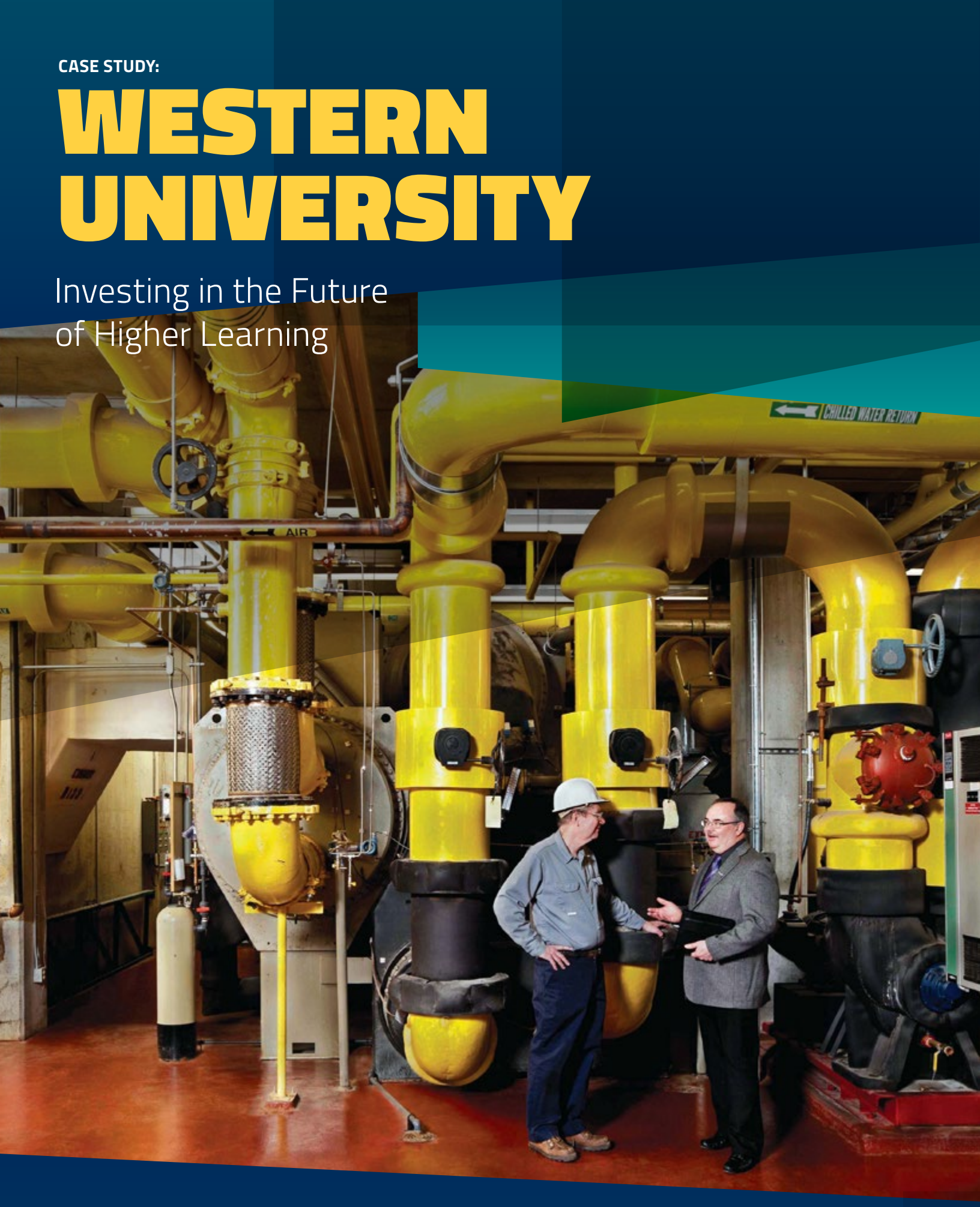
The Industrial Accelerator Program (IAP) is designed to assist eligible transmission-connected companies to fast track capital investment in major energy efficiency projects. The program provides financial incentives to encourage investment in innovative process changes and equipment retrofits. For more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

Industrial*Accelerator*

CASE STUDY:

WESTERN UNIVERSITY

Investing in the Future of Higher Learning



In his role as Director of Business Operations at one of Ontario's largest universities, Paul Martin describes himself as one part weather forecaster, one part cheerleader and two parts energy management strategist. It's not your typical job description, but then managing the energy used in over 100 buildings on a 500-hectare campus that services the needs of 27,000 full-time students and 4,000 faculty and staff is not your typical day job.

"Western University is like a small city. Some of our buildings date back to the early 1900s and others are just being completed. Our energy needs are complex, but the one thing I've learned in managing that complexity is there's no right way and no wrong way to save money on your electricity bill. It pays to get creative," said Martin.

Martin's approach begins with understanding the university's electricity usage. He monitors the university's building automation system, which tracks electricity usage at each building on campus. And he also tunes into the weather forecast to cross-reference all the data points to predict when the university's facilities will hit their peak. With help from the IESO's website (**ieso.ca/powerdata**), he is able to keep an eye on changes in the hourly pricing of electricity, which is important because he is responsible for deciding when and where to curtail energy consumption.

"You have to measure everything. That's the only way to know if you're achieving your goals," said Martin.

Taking action also means mobilizing the internal energy team, as well as students, faculty and staff to do their part in reducing consumption during peak periods. "Our automated controls are in one central location. They allow us to turn down our chillers and fans anywhere on campus. But that's only one side of the equation. Energy management at Western is a coordinated effort with strong leadership from the top. We have a terrific communications team that puts the word out when it's time to turn off lights, close blinds and reduce air conditioning and fan usage. It's very much a team effort," said Martin.

What are the results from this coordinated and multi-pronged approach to energy management? Fairly significant, considering the university is able to consistently shave about 20 per cent of its demand during summer peaks. What's more, Martin estimates the university spent roughly $1.5 million on energy efficiency upgrades over a two-year period and achieved close to $2 million in energy savings – essentially getting more back from its investment than it originally put in.

"Universities exist in order to help the community," said Martin. "At Western, we bear that responsibility in two ways. One, we share what we know about energy management with other colleges, universities, as well as local businesses. And two, what we save on electricity, we reinvest in the university in order to improve the overall academic experience. In the end, that's really what our energy management efforts are all about."

> "What we save on electricity, we reinvest in the university."

LEFT Director of Business Operations, Paul Martin (right), says the university is able to trim 20 per cent of its demand in summer thanks to a strategic and well-coordinated energy management plan.

TOP RIGHT Students, staff and faculty at Western University all do their part to make energy conservation a part of daily life and rally to the cause when asked.

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

PROVINCE-WIDE CONSERVATION PROGRAMS

saveonenergy.ca

INDUSTRIALACCELERATOR

ieso.ca/iap

DEMAND RESPONSE

ieso.ca/demand.response

FEDERAL GOVERNMENT OFFICE OF ENERGY EFFICIENCY

oee.nrcan.ga.ca

YOUR LOCAL HYDRO COMPANY

ieso.ca/findutility

RETAIL ELECTRICITY CONTRACTS

ieso.ca/retailers

ONTARIO ENERGY BOARD

ontarioenergyboard.ca

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

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Powering Tomorrow.