

Global Adjustment In Ontario

Introduction

This is an update to a previously published article *Global Adjustment in Ontario*, which was first published in November 2012. We have updated the information to reflect the most recent forecasts and actual costs for Global Adjustment in Ontario. As well, a new section has been added to aid large consumers in their decision whether or not to be billed as a Class A Consumer, and separately, whether or not to operate as a Class A Consumer.

In addition, as of May 1, 2014, the Ontario Government lowered the threshold for qualifying customers from 5MW to 3MW if their load facilities are identified to be within one of several industry classifications. It is a program the Government has labeled under their Industrial Conservation Initiative (ICI). The calculations to determine your contribution to GA remain the same, however, these new prospective consumers are not Class A consumers by default, but instead must opt-in to the program. This requires customers to work with their local LDCs and the IESO to determine if they qualify for the program.

Overview

Global Adjustment has become a significant charge for Ontario electricity consumers, and what was once a small credit in 2005 has ballooned to the point where it now exceeds the cost of energy itself. Recent regulation changes now allow larger consumers to choose how the Global Adjustment is charged, giving them an option to be billed based on their consumption during the top five peak demand hours in the province. This presents a tremendous opportunity for many companies to save hundreds of thousands of dollars by implementing strategies to ensure they reduce or offset their load during these peak hours.

The potential for savings is significant: every 1 MW that a large consumer is able to either curtail load or displace it through approved on-site generation during the top five peak hours in 2013 (calendar year), will result in annual savings of nearly \$300K in 2014. This is forecast to increase to over \$400K annually by 2016.

What is Global Adjustment?

The Global Adjustment (GA) is a line item charge on your monthly electricity bill and is used to cover the difference between the market price and rates paid to regulated and contracted generators, and to pay for conservation and demand management programs. The GA was designed to assist the government in eliminating coal-based generation and greening the power system through conservation, demand response and cleaner generation sources.

When GA was first introduced in 2005, it included the existing Power Mitigation Rebate which was paid by Ontario Power Generation back into the electricity market, and resulted in a net credit to consumers. However, this credit disappeared the following year and the GA became a minor charge. In 2009, the GA charge increased significantly as several new natural gas plants came online. In addition, with the introduction of the Green Energy Act, Feed-In Tariffs (FIT) and Micro-FIT programs in 2009, the GA continued to grow unabated to the point where it now replaces the net energy settlement charge as the single largest line item on the monthly bill. During those same years, the Ontario Spot Market price for electricity dropped significantly, primarily due to the lower cost of Natural Gas which tends to set the hourly market price. However, the GA forecast is expected to increase further over the next several years as those companies with contracts to upgrade or build new generation will finish their construction and begin to produce new energy at their contracted rates.

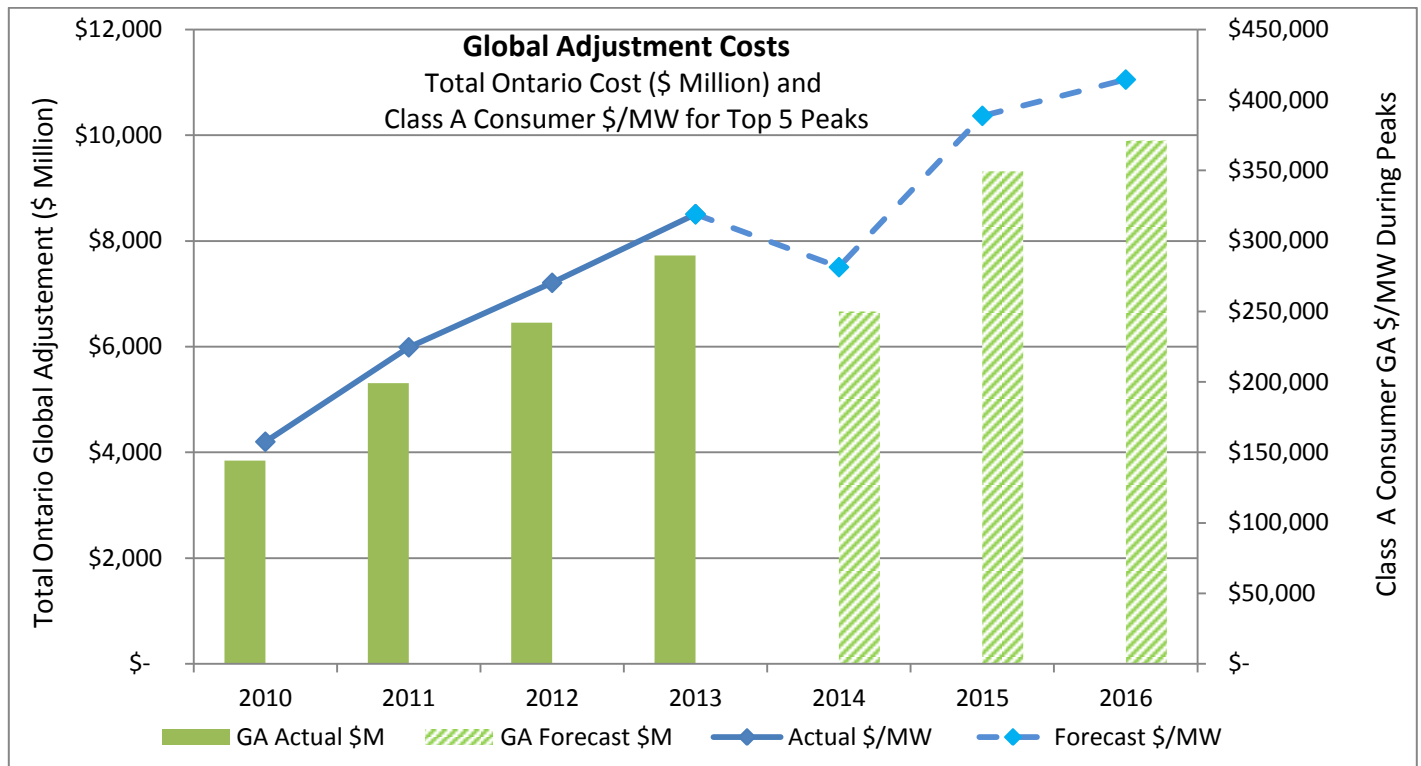


Figure 1. Historical and Forecast Global Adjustment

Changes to How Global Adjustment is Charged

Prior to January 2011, all major Ontario consumers paid Global Adjustment on a volumetric basis, with the monthly cost spread equally across the total energy consumed by the loads in the province. However, with the passing of Ontario Regulation 398/10 amending Regulation 429/04, two separate classes of consumers were created: Class A consumers are defined as having a monthly average peak over 5,000kW, while all others are considered to be Class B.

As of May 1, 2014, Ontario Regulation 126/14 also amends Regulation 429/04 to include qualifying industrial customers with a maximum hourly demand for electricity between 3 and 5 megawatts to be able to opt into this program. The decision to opt in to the program must be made prior to the Adjustment Period (billing period), and once they opt in they will qualify to be billed as a Class A consumer for all future Adjustment Periods until they explicitly opt out. This new regulation also limits participation to certain industries, described later.

Class A consumers pay for their GA portion based on their consumption relative to the total Ontario load during the top five hours (from different days) of any given 12-month base period. Hence, the program is referred to as the "5 Coincident Peak" or 5CP program. Little has changed for Class B consumers, whose GA amounts continue to be charged based on their total energy consumption within each month, except that they must also make up any difference in savings realized by the Class A group. In both cases GA continues to be a separate charge item on the bill, identified as the "Global Adjustment Charge".

When the new GA regulation was introduced in 2011, the Class A consumer was paying about \$200,000 for GA per average MW consumed during the 5CP periods. For 2013 the GA amounted to \$318,000/MW annually and is expected to rise to almost \$400,000/MW by 2016. That is an average increase of about 27% per year since 2011. The Independent Electricity System Operator (IESO) and Ontario Power Authority (OPA) determines the GA recovery charges required monthly and provides these numbers to the LDC, who in turn charges and collects from their customers accordingly. The LDCs remit the collected GA dollars for the IESO for settlement and disbursement.

In 2012, the regulation was further amended to allow Class A consumers to choose how they were billed for GA. They now have the choice of being billed on a \$/MWh (Class B) or based on the \$/MW (Class A) basis. Many consumers continue to select Class A, as they are able to save simply based on their inherent load profile, and are billed based on the peak MW method. This also allows them to have further control over the GA charges they may incur in the future. This could present significant opportunities for savings. By anticipating when the grid peaks are going to occur, the Class A consumer could cut their loads during the 5CP days to reduce their GA contributions considerably.

Your Global Adjustment Costs

Customers need to consider that the determination of the peak hours is based on the Actual Quantity of Energy Withdrawn (AQEW), which is published 20 business days after the trade date by the IESO. The Ontario demand number is published almost instantly from the IESO and is used as a guide to determine the top peaks. In both 2012 and 2013, the peaks were so close that once the AQEW numbers were published, it changed the order and days of the top five peaks.

The new regulation defines two periods: the Base Period in which the top five provincial peaks are established, and its associated Adjustment Period, where the consumers are billed for GA. There is a two-month lag between the end of a Base Period and the start of an Adjustment Period, so any year's Base Period will overlap with one or two previous Adjustment Periods.

Base Period (peak-setting measurements)	Adjustment Period (billing period)
May 1, 2012 to April 30, 2013	July 1, 2013 to June 30, 2014
May 1, 2013 to April 30, 2014	July 1, 2014 to June 30, 2015
May 1, Year X to April 30, Year X+1	July 1, Year X+1 to June 30, Year X+2

Below is a chart showing the top five peaks for the 2013 Base Period.

DATE	HOUR (EST)	Ontario Demand (MW)	Ontario AQEW (MW)	*Estimate Embedded Generation (MW)	Total MW
July 17, 2013	17	24,927	24,141	760	24,901
July 16, 2013	17	24,224	23,551	760	24,311
June 18, 2013	17	24,139	23,504	760	24,264
July 19, 2013	14	23,875	23,234	760	23,994
July 15, 2013	17	23,558	23,107	760	23,867
Average Total Ontario MW for determining Peak Demand Factor					24,267

*Estimated amount used for embedded generation

We anticipate that the above hours will remain as the top hours for the current Base Period, and have provided a further estimate of embedded generation to arrive at a final total average MW. The official values will be published by the IESO by June 2014.

The consumer's coincident demand during the top five peaks in any Base Period becomes the customer's Peak Demand Factor (PDF) and will be used for the subsequent billing year. The PDF will be multiplied by the total GA amount published by the IESO for that month. By reducing your coincident peak, you will reduce your

PDF and thus reduce the amount of future GA costs on your energy bills.

For example, consider a Class A load that was consuming an average of 6.5MW during each of the five peak hours from May 1, 2013 to April 30, 2014. The PDF is determined first, then used in the Adjustment Period to determine their proportion of the monthly GA costs. The total province-wide GA cost for the Adjustment Period starting July 1, 2014, is forecast to be approximately \$8.4B so the consumer's costs are calculated as such;

$$\begin{aligned} \text{PDF} &= 6.5 / 24267 \\ &= 0.00026785 \\ \\ \text{12-Month GA Cost} &= \$8.4\text{B} * 0.00026785 \\ &= \$2.25\text{M} \quad (\text{about } \$187,500 / \text{month}) \end{aligned}$$

Any load curtailment or displacing it with generation during the 5 peak hours would have lowered the consumer's PDF. If this same consumer was able to reduce his net load by an average of 1 MW, his new PDF and GA costs would be as such:

$$\begin{aligned} \text{PDF}^1 &= 5.5 / 24267 \\ &= 0.00022665 \\ \\ \text{12-Month GA Cost}^1 &= \$8.4\text{B} * 0.00022665 \\ &= \$1.90\text{M} \quad (\text{about } \$158,700 / \text{month}) \end{aligned}$$

In this example, a reduction of net load by 1 MW for the peak hours resulted in a 12-month savings of \$350,000 (\$29,000/month). By 2016, the savings in GA hours in this example would increase to \$425,000 per MW.

Qualifying To Become a Class A Consumer

Consumers with over 5 MW demand are considered to be a Class A consumer by default. However, they have an option to be billed as Class B if they wish. The decision to opt out must be made in writing to the IESO each year no later than June 15. They have the choice to be billed as Class B consumer if they wish.

Consumers with a maximum hourly demand between 3 MW and 5 MW are currently being billed as a Class B consumer by default. However now qualifying industrial consumers, under the new Industrial Conservation Initiative (ICI) program, may choose to be billed as a Class A consumer if they opt into the program. It is not by default for this group of consumers and they will need to provide written notice to their Local Distribution Company (LDC) or the IESO (if they are already a market participant) to Opt-In and work with the IESO and their LDC to determine if they qualify.

For this new group of consumers, the government has used the North American Industry Classification System (NAICS) maintained for Canada by Statistics Canada to determine which load facilities qualify for this program. The table below lists the NAICS codes of 3-5 MW load facilities that qualify.

NAICS Code	Description
493120	Refrigerated warehousing and storage
Starting with 21	Mining
Starting with 31-33	Manufacturing
Starting with 518	Data Processing, hosting and related services
Starting with 1114	Greenhouse, nursery and floriculture production

The starting cycle for the newly qualifying consumers will have their base periods starting May 1, 2014 through April 30, 2015. The coincident peaks determined during this base period will be used during their adjustment period

commencing on July 1 2015. To maximize on their reduction in GA these consumers will need to reduce their coincident peaks during the base period of May 1, 2014 through April 30, 2015.

Opportunities for Significant Savings

For most businesses, electricity costs represent a relatively small portion of their overall operating budget. It is often a challenge to balance the financial benefits of curtailing load during peak hours and the disruption that this could cause on productivity. However, the opportunity for saving on GA costs is so significant that it has become an increased priority for consumers that qualify as Class A. Many are now looking at demand response strategies with new interest and are considering the three main opportunities below:

Direct production curtailment.

Non-production base-load conservation and demand management.

Load-displacing through on-site generation.

Curtail Production

Given the small number of hours that the 5CP program is based on, directly scaling back production operations to reduce demand during peak hours is often the most effective strategy. This is particularly key for consumers that have a small number of large loads and may have slack in their production cycle, or alternatively, have the capacity to build up storage inventory of one component and can shut down part of the plant for a number of hours without impacting the main production lines. This strategy involves careful analysis of the energy needs throughout all stages of the production cycle to identify opportunities for load curtailments, then setting limits on when and how long each stage can be shut down without having a significant impact on the business.

Manage Demand

Many consumers have production constraints that prevent even short interruptions to their operations. They must consider alternate solutions that focus on curtailing their non-production base-load; such as lighting, HVAC, and compressed air. The key is to develop a strategy and select technologies that include a Demand Response (DR) component. It is not simply about conservation or saving a few kilowatt-hours across the board anymore; it is about being able to curtail loads by having the proper controls in place that will allow for that flexibility when you need it most. The good news for consumers is that there are an increasing number of new technologies available on the market designed to control base loads. Businesses are starting to assess new Conservation and Demand Management (CDM) technologies for the purpose of DR to reduce non-production base-loads within their facilities, seeking to reduce demand while not impacting production time. By focusing more on the benefits of DR, rather than efficiency and conservation alone, businesses can more easily justify investments in these new technologies.

On-Site Generation

Using back-up generators to curtail demand is not a new concept. Customers who have environmentally approved generation capacity have been shaving their peaks by generating their own power during those periods for several years. The difference now is that the use of generators is becoming more prominent as the 5CP and other DR programs provide an accelerated payback of the initial capital costs. Every kW of generation output during a peak hour has the same net benefit in reducing your GA costs than if it resulted from a reduction in the consumer's load itself. Consumers wishing to utilize existing generators, or considering the purchase of new generators, must consider the additional costs of running the equipment during peak hours and ensure they have the appropriate environmental certification that allows them to use it for this purpose. In some cases, customers with existing backup generators may simply upgrade their equipment to meet the environmental certification requirements.

Greening Your Corporate Image

While we are seeing more customers become creative in the way they curtail load, many are also benefitting from the opportunity to publicly demonstrate their commitment to responsible energy use. When a demand response strategy is activated, it is nearly always visible to employees and in several cases may actually be viewed by their customers. In recent years, such actions have not only become acceptable but have been received very favourably positioning the company as being proactive in helping address the energy shortage and reducing pollution during peak demand days. This can have a positive side-effect of enhancing the organization's corporate image.

In our years of working with DR programs, one retail client stands out as a great example. We installed a light dimming technology on the high-intensity lighting in a large grocery store. The owner was quite concerned about loss in revenue due to reduced lighting during busy times, which also happened to coincide with peak times. Appropriate lighting is considered sacred in retail space, as it impacts customer purchase decisions. We announced the dimming strategy over the intercom in the store every time we activated the technology. The results were unnoticeable as the lighting was only reduced by 40% and the dimming was gradual to allow for eyes to adjust. To their surprise, the owner started receiving letters of support from their customers, stating how proud they were to be shopping at the store and how they would continue shopping there because of the store's commitment to conservation. This initial success led the company to deploy the technology in their other locations throughout the province, with the added benefit of significant cost savings.

Challenges Facing Consumers

The challenge for most Class A consumers is knowing when to cut load so it will have the greatest impact on their GA costs. The balance is always between cutting too many times, which impacts production, versus not cutting enough and missing the peaks. We are approaching the fourth year of the 5CP program and already we have noticed a significant impact on the grid. There are only five peaks during the base period that matter most when determining the peak demand factor. However, the peaks this past summer were wider and longer than ever before, making it much more difficult to predict the peaks when compared to previous years.

The following is a guide to help customers to reduce usage during the peak periods. All these factors can alter when the peaks occur for the day.

Assess the impact of GA on your overall bills. Analyze the sources of load within your company and what their contribution is during peak days. Assess your ability to reduce these loads during peak days. Identify opportunities for stock-piling with batch processes within some areas to make it easier to ride through a curtailment.

Develop an energy management strategy that includes demand response. Evaluate using existing or new low-cost or no-cost methods for opportunities in curtailing loads.

Engage the right departments. The strategy should involve the whole organization in order to execute your plan.

Understand how electricity demand is reported in Ontario, and establish your demand threshold (MW). The demand threshold will be your initial point in the Ontario demand where you will want to activate your curtailment actions. After the five peaks have been established that exceed the initial threshold, the new threshold becomes the lowest of the five peaks. Setting the initial threshold is critical. If the threshold is too low, production will be unnecessarily disrupted; if it is too high, then peaks will be missed.

Monitor the Ontario electricity market in real-time. Understanding the market dynamics and what is happening during peak days is crucial in knowing if and when to cut for any day. Some key elements to look for are:

Monitor the IESO hourly demand forecast very carefully. The forecast itself rarely equates to the final actual demand, so it is important to factor in confidence bands so you will not miss a peak if the final demand comes in higher than the forecast, or if the peak shifts to another hour.

Track the actual demand very carefully during peak days. You are now competing with over 1000 MW of other Class A consumers that are all trying to avoid the peak, while hoping the rest of the group do not. As a result, peak hours can shift radically through a day. If possible, it is best to monitor demand deviations in real-time so you can quickly detect and respond to such shifts.

Monitor other components of the Ontario electricity market that will impact demand. The IESO will warn of changes to the demand forecast in their System Status Reports. Also, large industrial customers may withdraw their market bids to consume energy for upcoming hours, indicating that they may also be curtailing load during those hours.

Assess the impact of other Class A loads actions on the system peak and DR programs on the system peak (i.e. impact of DR3 or Peak Saver Plus). These again will negate peaks or result in them shifting to another hour.

Monitor the status of the “dispatchable” loads that are bid into the market. Often time these loads disappear from the market which means these loads are no longer available to the IESO for dispatching. These Market Participants may reduce their load quantities they are bidding into the market, or remove their bids entirely for upcoming hours in order to avoid the peaks

Best of Both Worlds: Elect Class B option but behave like a Class A

Consumers over 5 MW will be classified as a Class A consumer by default; however they can elect to be billed as a Class B consumer by June 15, prior to the start of the associated Adjustment Period. In addition, customers with an average monthly peak of between 3 and 5 MW that qualify under the new ICI program can choose to be billed as a Class A consumer if they opt into the program by the same deadline. It is not by default for this group of consumers and they will need to apply to their local distribution companies (LDC) or the IESO (if they are a market participant) to determine if they qualify.

Class A consumers generally experience an advantage in lower GA costs, but in some cases remaining on the volumetric approach that Class B consumers pay will be less expensive. The decision to be a Class B should be based on their Peak Demand Factor (PDF) from the past Base Period, along with the energy volume requirements that they foresee going into the next Adjustment Period. Even as a Class B consumer, these companies can still implement an energy management strategy to shave some load during peak hours to lower their PDF for the current Base Period. If their strategy is successful they can switch to a Class A for the next Adjustment Period. If they were unable to shave peak load they can elect to remain as a Class B consumer for that period. This provides a best-of-both-worlds hedging strategy, and allows consumers to test and implement energy strategies within their organizations with little consequences should this strategy fail.

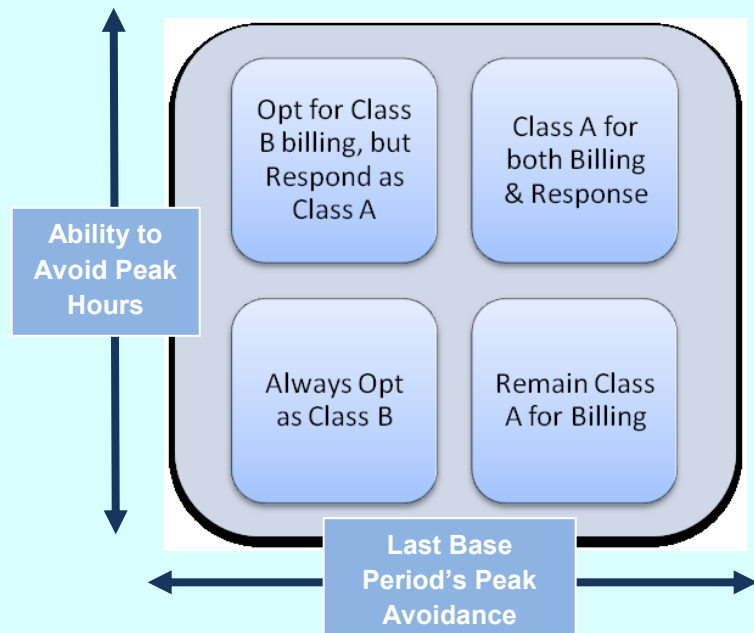
Class A / B Magic Quadrant

While consumers with over 5MW demand are considered to be a Class A consumer by default, they have an option to be billed as Class B if they wish. The decision to opt out must be made in writing to the IESO each year no later than June 15. The choice should be made by determining how much Global Adjustment would be paid in the upcoming Adjustment Period as a Class A consumer (based on their Peak Demand Factor) relative to how much they would expect to pay as a Class B consumer (based on their forecast energy consumption).

Qualifying consumers with peak demand between 3MW and 5MW may also decide to be billed as a Class A consumer, but unlike the first group they must explicitly opt-in to the program. It will require they work with their local LDC or IESO to determine if they are eligible.

The Magic Quadrant chart illustrates that there are actually two choices to be made: 1) should you be billed as a Class A or Class B consumer in the upcoming Adjustment Period (July 1 - June 30), 2) how should you behave in the upcoming Base Period (May 1 - April 30). It is generally favourable for a consumer to be billed as Class A. Consumers with a flat demand profile typically save over 30% on their GA costs by being billed as Class A when compared to being billed as Class B. However, if a consumer's normal operations or past behaviour has resulted in a high PDF (its peak load was highly coincident with the Ontario system peaks), then it can be more advantageous to opt out of the Class A and choose the volumetric GA billing method charged to Class B consumers.

As a separate decision, these large consumers should determine how they will behave during the upcoming Base Period. Specifically, they must decide whether or not they will take steps to curtail or displace their load during the peak periods in order to reduce their PDF for the next period. Even if a consumer will be better off financially by opting as a Class B consumer, they can still respond like a Class A consumer by avoiding the peak hours in order to reduce their upcoming PDF so they do not have to opt out for the next Adjustment Period. The cost and effort to do this must be evaluated against the potential savings that will result when being billed as a Class A consumer.



Help to the Rescue

Unless electricity is a major portion of an organization's total costs, it is unlikely that they have the dedicated staff and knowledge to implement a demand response strategy themselves.

Fortunately, there are companies operating in the Ontario electricity market that provide the tools, services and experience that can aid you in developing and implementing a successful strategy. This allows consumers to tap into a vast knowledge of expertise and existing skill sets, as well as powerful market tools, allowing them to execute their strategy more rapidly and more precisely than had they done it by themselves. The costs of most services are minor considering the potential savings offered through the GA 5CP program, and they increase the likelihood that the plans are ready to execute before the critical peak periods occur.

Some of the offerings available to consumers over 5,000 KW include the following services and tools.

Analysis and Planning Consulting Services

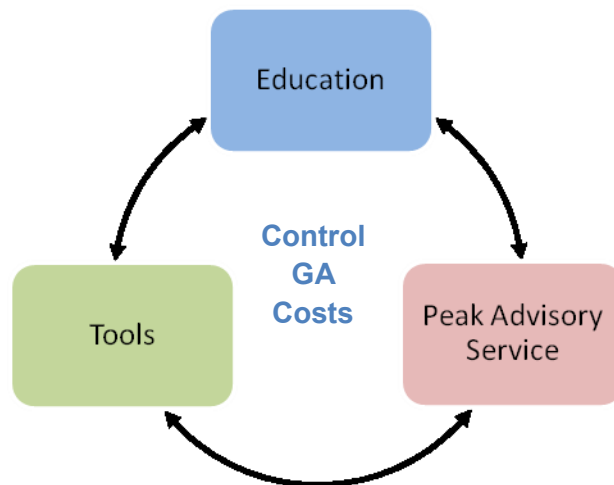
Energy experts are available to assess your energy bills and future energy requirements to determine whether the consumer should elect to be a Class A or Class B consumer for the next Base Period. They can then provide energy audits that will identify areas that would benefit from Conservation and Demand Management, targeting primarily Demand Response opportunities that will result in a lower GA cost.

These services can lead to the implementation of a sophisticated energy management strategy. It may include building automation systems that will help consumers monitor and report on load details, as well as control demand in several areas under computer control.

Peak Avoidance Services

Peak Avoidance services utilize market experts that monitor Ontario demand and provide alerts to consumers that identify hours that are at risk of becoming peaks. These service providers should have an in-depth knowledge of the Ontario electricity market so they can establish initial demand thresholds with confidence using the latest long-term forecast information and tools. The initial threshold is established early in the season as the point where loads will be expected to curtail; with the goal of missing the peak hours while not over-curtailling to the point where the disruptions negatively affect the customer's business. Market monitoring and communications is extremely important to ensure any changes to the demand are identified and discussed well ahead of the likely peak hours.

The service should provide assessments prior to the peak seasons. It should provide you with and understanding of what to expect each month so you are prepared for what is coming. A day-ahead alert would provide some customers the needed time necessary to prepare their operations for the next day's events. During a peak day, you should expect changes in peak times as the dynamics effecting the peaks change throughout the day. Your provider should be monitor changes in the demand, the behaviour of large consumers and activation of other demand response programs through-out the day and alert you to the dynamics throughout the day



Market Monitoring Tools

Advanced market monitoring tools have been available to the Ontario electricity market for generators and large consumers for many years. These tools allow consumers to monitor for changes in Ontario demand, set thresholds and receive alerts, and detect variances in demand forecasts specifically for Class A consumers wishing to avoid peak hours. These systems are browser-based, requiring no additional software installation, and provide more insight into the market – including what other large consumers are doing to avoid the peaks – than would otherwise be possible.

DR3 Aggregation Services

Ontario Power Authority's Demand Response 3 (DR3) program is available through several aggregators and will pay a standby and activation fee for demand response. While both DR3 and GA 5CP programs are based on demand response activations, there are several key differences between these programs:

1. GA 5CP is completely voluntary, while DR3 is contractual.
2. GA 5CP based on the top 5 hours (different days) in the period. DR3 requires a maximum of 100-hour commitments in curtailment.
3. GA 5CP savings through reduction in GA avoidance (over \$300K per MW yearly) are recovered the next year. DR3 contracts pay in the current year and range from \$60-125K per MW plus up to \$200 per MWh during activations. This will vary depending on your DR3 Aggregation services provider.
4. DR3 activations were previously triggered by a combination of forecast market prices and a supply cushion (% of supply in reserve). Beginning with the Summer of 2014, the trigger will be based on the forecast Shadow Prices (locational prices generated by the IESO constrained dispatch system) to allow the IESO to better value the need for demand response activations across zones within Ontario. Still, this method will call upon DR3 during times of energy scarcity and not necessarily peak demand. During peak demand season, generator maintenance and outages have been completed and there is generally enough capacity, so high energy prices and supply cushion may not be an issue. DR3 activations often do not coincide with 5CP activations. In the past years, DR3 activations have occurred only once or twice during the top five peaks.
5. DR3 curtailments are calculated using a baseline load prior to the activation. Voluntary curtailments for 5CP prior to a DR3 trigger can impact this baseline, resulting in a lower deemed curtailment and/or a penalty from the aggregator. Ensure you discuss your options with an aggregator and understand the impact curtailing for GA will have on your DR3 incentives.

An energy management strategy can result in savings through both DR3 and GA 5CP. While the financial certainty of a DR3 contract is a benefit, consumers should take precaution that such contracts do not penalize them from taking actions to avoid the more significant GA costs. Aggregators receive no benefit from the 5CP program, but are compensated through DR3 revenue and may be in a conflict of interest and unwilling to provide candid advice to consumers.

Summary

Any energy consumer with an average monthly peak over 3,000 KW can take advantage of the Global Adjustment 5CP program. Whether the company develops its energy management strategy alone or with the help of a third-party, the financial savings that result from avoiding the top five demand peaks can be extremely lucrative. Curtailing or displacing load for GA demand response can be accomplished in many ways, and can be the most cost effective way of reducing your electrical costs. It is becoming more difficult for companies to ignore the program as other industries and their competitors have already begun to take advantage of the GA, maximizing the opportunity to gain a competitive edge, particularly as GA is forecast to continue rising for the next four years.

Authors

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