ENERGY STORAGE CANADA

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Re: Rate Design for Electricity Commercial and Industrial Customers
Board File No. EB-2015-0043

Please find attached, comments submitted by Energy Storage Canada on EB-2015-0043

CONTEXT

On February 21st, 2019, the Ontario Energy Board (OEB) released a Staff Report to the Board: Rate Design for Commercial and Industrial (C&I) customers to support an evolving electricity sector. The report provides OEB Staff's recommendations for a new rate design for electricity C&I customers. The OEB is seeking feedback from interested stakeholders on the proposed rate design.

Energy Storage Canada (ESC) is the national industry association representing the energy storage industry across Canada. It is a non-profit, membership-based organization whose mission is to advance the energy storage industry through collaboration, education, policy advocacy and research. The goal of the association is to build a sustainable market for energy storage in Canada and to ensure that the full benefits of storage can be realized to the advantage of ratepayers and our electricity systems.

ESC represents more than 60 organizations involved in all aspects of energy storage, including technology developers, project developers, research groups, energy consultants and power generators, researchers and non-governmental organizations.

Summary of Feedback to OEB

In the cover letter for the consultation, the OEB outlined the following objectives for the new commercial and industrial rate design.

1. Facilitate customer adoption of technology to manage energy use and costs, including the installation of distributed energy resources
2. Increase efficiency of the system by encouraging cost effective investment in distributed energy resources
3. Maintain fairness in the recovery of costs of maintaining a reliable and flexible distribution system and ensure that customers who install distributed energy resources do not shift costs to other customers
4. Facilitate investments to modernize the grid in a paced and prioritized manner that will support customer choice and efficiency

As this submission will demonstrate, the proposed rate design summarized in the Staff report does not meet these objectives. The rapid adoption of emerging and innovative Distributed Energy Resources (DERs) are changing the way customers consume electricity. The changes to customer consumption patterns and their growing ability to respond to price signals requires a broad re-think on how Ontario's power system is planned, financed, operated and maintained. The re-thinking must include consideration for the following broad components of Ontario's electricity regulatory framework:

- Cost allocation: which customers pay for what investments;
- Rate design: how are customers charged for system costs;
- Utility remuneration: how network owners receive revenue and returns for efficient operation and investment in their networks; and

- Compensation for DER benefits: how DERs should be measured and compensated for services they provide to network operators.

Due to growing economic and technological pressures for change to the electricity system, action must be taken promptly. The OEB has launched two additional consultations (i.e., Utility Remunereration (EB-2018-0287) and Responding to Distributed Energy Resources (DERS) (EB-2018-288)) that are strongly intertwined with C&I rate design. These should be addressed together through a comprehensive approach. To achieve the OEB objectives in an optimal fashion, the OEB and stakeholders must assess the impact of changes to one component on the other components. Efficient modernization and effective integration of DERs requires a transparent regulatory framework of all components to distributors and customers. Cost allocation signals cost responsibility among customers, rate design sets prices for electricity services, and utility remuneration determines the amount received for distributors' investments.

ESC's analysis of the proposed rate design concludes that further analysis and consultation on C&I rate design is required. ESC recommends that the Board take the following actions:

- Instruct Staff to include C&I rate design in the newly launched consultations (specifically, EB-2018-0287 and EB-2018-0288);
- Staff to establish a comprehensive engagement plan that includes technical conference, analysis to support conclusions and multiple stages for stakeholder feedback;
- Set timelines for consultations to ensure a timely conclusion and adoption of new C&I rate design in conjunction with other regulatory framework or policy changes (e.g., Industrial Rate Review); and
- Ensure that cost causality principles and coincidental peak charges are including as part of any new rate design.

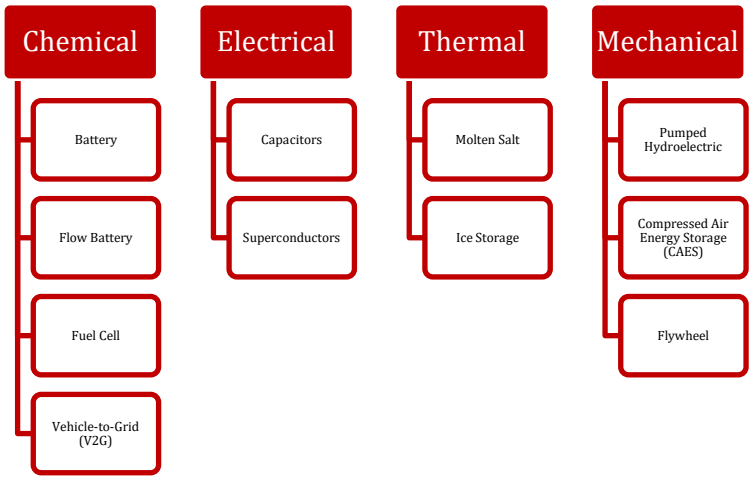
Overview of Energy Storage Technology

Energy storage technologies have potential to greatly enhance the efficiency, cost-effectiveness, and reliability of the Ontario electricity grid. Increasing the use of energy storage technologies has the possibility to transform how electricity is generated, transported and consumed. There are many benefits that energy storage can offer to Ontario's distribution systems:

- Energy storage can reduce costs for customers by increasing the utilization of existing assets allowing for deferment of future investment needs. Distribution asset owners can use energy storage to adapt their networks to meet a customer needs and manage outages, both planned and unplanned.
- As a fast and flexible resource, energy storage can provide essential reliability services and support the integration of variable renewable generation among other challenges facing the Ontario electricity grid
- Energy storage offers customers control in meeting their electricity service needs including power quality, ability to respond to prices signals and security of electricity supply.

Energy storage is a broad term that captures a wide array of technologies that can offer electricity services. The parameters and attributes of different energy storage technologies means there is an

incredible potential for optionality in meeting future electricity system requirement (see figure below for a classification of energy storage technologies)



At the customer-level, energy storage can offer behind-the-meter load displacement services to assist consumers in managing their distinct energy needs. Energy storage can also directly connect to distribution systems and offer network operators (i.e., Local Distribution Companies (LDCs)) reliability and network efficiency services.

ESC commentary on Proposed C&I Rate Design by Objectives

ESC has reviewed the Staff report and assessed whether the proposed rate design achieves the four objectives set out by the OEB. This ESC submission on the proposed rate design does not prejudice against past ESC input in this consultation. In particular, ESC firmly believes that the requirement for a wholesale market structure for energy storage is required that does not disadvantage storage against other market services like exports. As a resource that consumes as well as produces energy, rate design is an important component of fair and equal treatment in wholesale market structures. Commentary on each objective is provided below including conclusions from ESC's research and analysis.

Objective #1: Facilitate customer adoption of technology to manage energy use and costs, including the installation of distributed energy resources

A core principle in facilitating customer adoption of technology to manage energy use and costs is cost causality. Cost causality principle means that rates charged to customers reflect to some degree the costs actually caused by the customer who must pay for them. In other words, if a customer action results in continued or new costs for distributor, then that customer should pay for those costs. Alternatively, if a customer action results in deferment or reduction in costs, that customer should benefit from lower costs. Establishing a transparent and logical rate design linked to system costs facilitates customer adoption of technology to manage energy use in response to those costs.
A vast majority of distribution system costs are caused by investments to resolve capacity constraints due to coincident peak loading. For example, investments to install new transformer capacity is derived

from forecasts of coincidental peak demand on those assets. Further, given that Ontario's distribution infrastructure is aging and must be replaced, coincidental peak usage is a direct indication to whether the existing capacity should be expanded, maintained or shrunk (i.e., should the asset replacement be at a higher or lower capacity).

The proposed rate design by Staff is not aligned with cost causality principles of objective #1 for the following reasons. First, a majority of distribution system investments are derived from coincidental peak needs. As noted in the Staff Discussion Paper, distribution systems are rarely influenced by energy flows and instead driven by peak demand requirements (i.e., how big the pipe needs to be to supply maximum flow). The Staff Discussion Paper stated "Actions that customers take to reduce their bills will lower long term investments by distributors and help contain future distribution system costs"[1]. **Coincidental peak charges result in efficient use of the electricity system and reduce costs for all consumers, as reductions in peak demand defers unnecessary capital investment.** Second, the proposed rate design continues to use customer peak (i.e., non-coincident peak (NCP) demand charges (i.e., $/kW). NCP demand charges do not provide a direct cost causal price signal for distribution system costs to customers. In the 2016 discussion paper, the OEB Staff's own analysis showed how NCP charges are not an appropriate signal for coincidental peak (CP) reaction from customers. Figure 1 below from the Staff 2016 discussion paper demonstrates when customers are charged on-peak rates for off-peak use. In the Staff's words, "*when the blue line is below the red line, the customer is charged peak rates for off-peak use*"[2]. The continued use of NCP demand charges does not facility customer adoption of technology to manage energy use in response to potential future system costs.

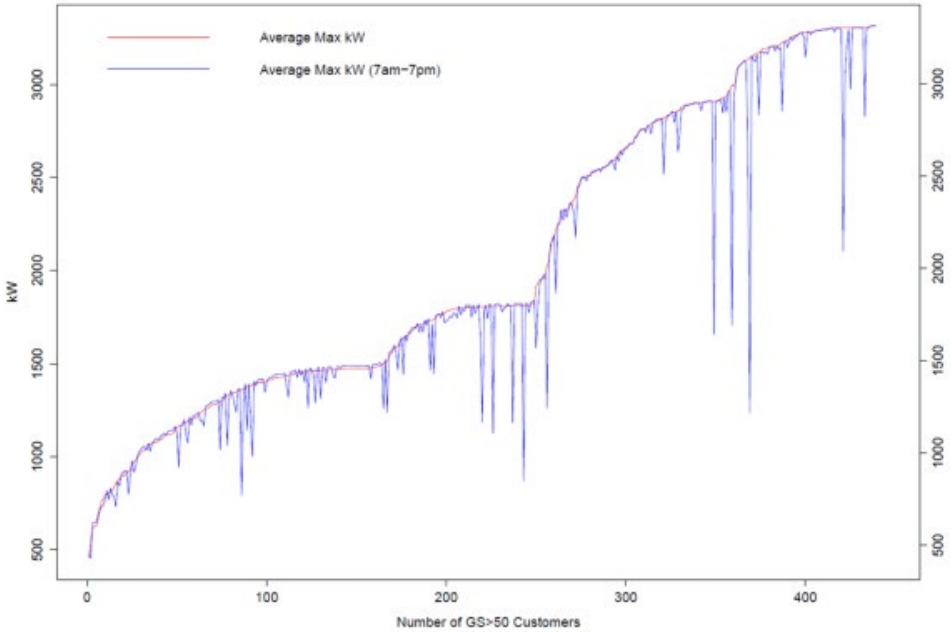


Figure 1: GS>50 customers billed demand compared to peak demand (7am to 7pm)[3]

[1] EB-2015-0043, Staff Discussion Paper, March 31, 2016, p. 2.
[2] EB-2015-0043, Staff Discussion Paper, March 31, 2016, p. 6.
[3] EB-2015-0043, Staff Discussion Paper, March 31, 2016, p. 7.

Third, for the proposed newly created <10 kW customer class, the adoption of fixed monthly service charges provides no price signal for customers on the causes for distribution system investments. The Staff report argues that fixed charges aligns distributor and customer interests, but instead the adoption of fixed charges hides the cost drivers of the distribution system from those customers.
Finally, the proposed provincial standby charge, the Capacity Reserve Charge (CRC), restricts the ability for customers to manage energy use and costs. Specifically, the CRC combined with the NCP demand charges has the possibility of increasing costs for customer's that choose to adopt DERs.

Objective #2: Increase efficiency of the system by encouraging cost effective investment in distributed energy resources

Increasing the efficiency of the distribution system while maintaining the same standard of power quality is a benefit for all customers. Higher efficiency maximizes the value of existing distribution assets and reduces losses in the distribution system. In other words, increasing efficiency requires higher utilization of the existing power system.

Energy storage systems are an essential component of increased distribution system utilization. Energy storage systems can charge during periods of low utilization (e.g., overnight) and discharge during constrained system conditions (i.e., during system peaks). To encourage cost effective investments in energy storage that can increase the utilization of the distribution system, an appropriate rate design is needed. The rate design must inform an energy storage system when are the optimal times to charge and when discharge is preferred. Looking at it another way, an appropriate rate design would include a higher cost to charge when capacity is constrained, therefore discourage charging of energy storage system during distribution system constrained capacity periods.

Discharging during system peak can reduce grid demand and lead to deferred distribution infrastructure for the benefit of all customers. Further, lower consumption during peak demand hours can reduce system losses. Unfortunately, the proposed rate design continues to rely on NCP demand charges that provide no appropriate price signal for energy storage. In fact, NCP demand charges directly harm energy storage systems that must pay maximum distribution costs even though their actions are likely reducing system costs. For example, consider a behind-the-meter energy storage system installed by a load customer with a flat load profile (i.e., consistent for all hours of the day). The existing NCP demand charge would increase the distribution charges paid by the load customer even if the energy storage system is charged overnight and discharged during the daily distribution system peak. This is perverse outcome and illogical conclusion since the cycling of the energy storage in this manner would decrease the efficiency of the distribution system.

During the March 7, 2019, stakeholder session on the proposed rate design, it was stated that the responses to the Board's 2016 discussion paper did not support coincident peak charges. However, reviewing the stakeholder comments submitted, it is clear that a majority of stakeholders supported coincident peak charges in one form or another. Most importantly, coincident peak charges had strong support from customer groups. So strong that many were supportive even though they understood that some customers could have a negative impact to their bills. In the stakeholder's feedback, the benefits of coincidental peak charges outweighed the potential costs. Most of the feedback received

demonstrates that stakeholders believe the inclusion of coincidental peak charges is the most cost-effective option and increases the efficiency of the system. The table below provides a summary of some of the stakeholder feedback supporting coincidental peak charges

Organization	Quote	Comment
Association of Major Power Consumers in Ontario (AMPCO)	"agrees in principle with current OEB thinking that providing incentives to customers to reduce peak capacity optimizes use of the current system and optimizes investment needs for long term cost containment." and "In AMPCO's view, this rate design option (i.e., three part demand rate) best responds to cost causality and the uniqueness of customers and how and when they use energy and the distribution system, while still sending the right price signals to appropriately incent customers to use the grid more efficiently and shift demand to off-peak periods. Some AMPCO members (Intermediate/Large Use customers) use more energy during the peak and others use more energy off-peak and their contribution to the peak varies. Some customers use energy at a steady rate, for example, 24/7 and 365 days a year. This rate design recognizes the differences between customers and in AMPCO's view is fairer and leads to better economic outcomes for customers. Board Staff indicates that this option is expected to be fairer and provide more revenue stability than peak and off-peak alone. AMPCO submits this option is the most cost-effective. This Option also provides more accurate price signals in that it reflects connection demand and capacity demand, two of the main distribution system cost drivers and it differentiates between the two. Active customers are rewarded for reducing peak capacity."[4]	The feedback from AMPCO focuses on cost causality principles and fairness in cost allocation based on consumption that results in system costs. In other words, AMPCO represents the largest consumers in the province and was strongly in support of coincidental peak demand charges
Association of Power Producers of Ontario (APPrO)	"APPrO agreed that distributor and generation owner objectives can be aligned by recognizing in rate design that a considerable portion of distribution investment is driven by customer and distribution peak loads"[5]	APPrO rejected fixed charges and was strongly supportive of the narrow coincident peak charge
Building Owners and Managers	"BOMA supports either 5b (three-part demand with narrow peak) or 6b (two-part demand without off-peak charge) in but neither should use demand charges in off (system)	BOMA generally supported on-peak distribution rates for GS>50

[4] AMPCO Comments, May 27, 2016, pg. 4.
[5] APPrO Comments, May 27, 2016, p. 5.

Association (BOMA)	peak periods"[6]	
Canadian Federation of Independent Business (CFIB)	Supports "which gives users who peak in peak hours a very strong incentive to shave their peak, but also gives an incentive to users who peak outside peak hours to manage their peak."[7]	Clearly coincident peak is the preferred option for CFIB
Canadian Solar Industries Association (CanSIA)	"rate design options to help ensure that customers contributions to peak demand are charged appropriately"[8]	While CanSIA overall supported consumption-based rate design, they were also supportive of peak demand charges
School Energy Coalition (SEC)	"Any change to C/I rates will produce winners and losers. Schools are not necessarily fixated on being in the winners' group in that process. Winners and losers should be based on sound ratemaking principles, including in particular cost causality. In the long run, that is better for all customers."[9]	The SEC support for any rate design changes was firmly based on cost causality principles

Table 1: Summary of stakeholder feedback to Staff 2016 discussion paper

Energy Storage Ontario (ESO), the predecessor organization to Energy Storage Canada (2016) offered feedback to the 2016 Staff discussion paper and generally supported rate design that encouraged different operation during off-peak periods. In particular, ESO believed that a lower off-peak rate compared to a peak rate would benefit customers and the system as a whole through deferment of transmission and distribution infrastructure investments.

Objective #3: Maintain fairness in the recovery of costs of maintaining a reliable and flexible distribution system and ensure that customers who install distributed energy resources do not shift costs to other customers

ESC recognizes the potential concern that adopting only CP charges could lead to energy storage resources not paying anything for use of the distribution network (i.e., by injecting during peak hours). ESC believes there is a value of grid connection since the distribution network offers DERs the ability to buy and sell services with a broader pool (i.e., other customers, grid operators (i.e., LDCs) and wholesale markets). In addition to the value of grid connection, there is an added cost to use the grid when capacity is constrained. From an economic principles point of view, when there is limited capacity (i.e., supply) to meet customer demand (i.e., during the coincidental peak periods), grid capacity should have a higher value. To maintain fairness in the recovery of costs, rate design should

[6] BOMA Comments, May 27, 2016, p. 7.
[7] CFIB Comments, May 27, 2016, p. 8.
[8] CanSIA Comments, May 27, 2016, p. 4.
[9] SEC Comments, May 27, 2016, p. 9.

have two components: i) cost to use the distribution network when it is unconstrained, and ii) cost to use distribution network when it is constrained. ESC recommends that the unconstrained cost be derived from the minimum system cost of the distribution network. That is, the theoretical model of the network that connects all customers without carrying any current[10]. The rate design for this unconstrained cost should be based on customer peak demand (i.e., NCP demand) to ensure a pro-rata fair share is allocated to each customer (e.g., a customer with a 10 MW peak demand pays 10x the cost of a customer with a 1MW peak demand.) All additional costs beyond the minimum system cost of the distribution network would be allocated to constrained costs. ESC recommends that a CP rate design be used to charge customers the constrained cost. This approach also recommends that no monthly service charge be applied to customer classes >10 kW, since monthly service charges would be collected on a pro-rata share basis through the NCP demand charge. **ESC firmly believes an appropriate balance between NCP and CP demand charges is the best way to maintain fairness in the recovery of costs to maintain a reliable and flexible distribution system**.

The Staff paper raises the concern of potential cost shifting:

> *The current rate design of fixed and volumetric charges does not align well with the changing use, expectations and value to some customers. It can lead to uneconomic decisions by the customer and shifting of costs to more traditional customers who are either unable to,* ***or choose not to****, adopt new technologies.*[11]

While there is a potential for cost shifting due to uneconomic decisions by some customers, the lack of an appropriate price signal for the cost of maintaining and expanding the system ensures that there is cost shifting. Customers who are not informed of the higher cost of consumption during constrained hours will not adjust their consumption patterns or seek out potential net benefit investments. Instead, the distribution system must be expanded that burdens all customers with higher costs. Effectively, coincidental peak charges dissuade inefficient behaviour, in this case leaning on the system or free riding while other customers are not rewarded for economically efficient decisions that are beneficial to them and all customers as a whole (see Figure 2 below for an illustrated example). **In short, rejecting coincidental peak charges will increase system costs for all customers.**

[10] The OEB described the minimum system model that is used for monthly service charges in the Staff Discussion Paper, Mar 2016, pg. 7.
[11] Staff Report, Feb 21, 2019, p. 3.

- Customer A & B have the same customer peak demand.
- Customer A's peak occurs during system demand's off-peak hours, while Customer B's peak occurs during the coincidental system peak.
- Under NCP charges, both customers pay the same amount, even though Customer B's peak will result in higher system costs for all customers (i.e., free-riding)

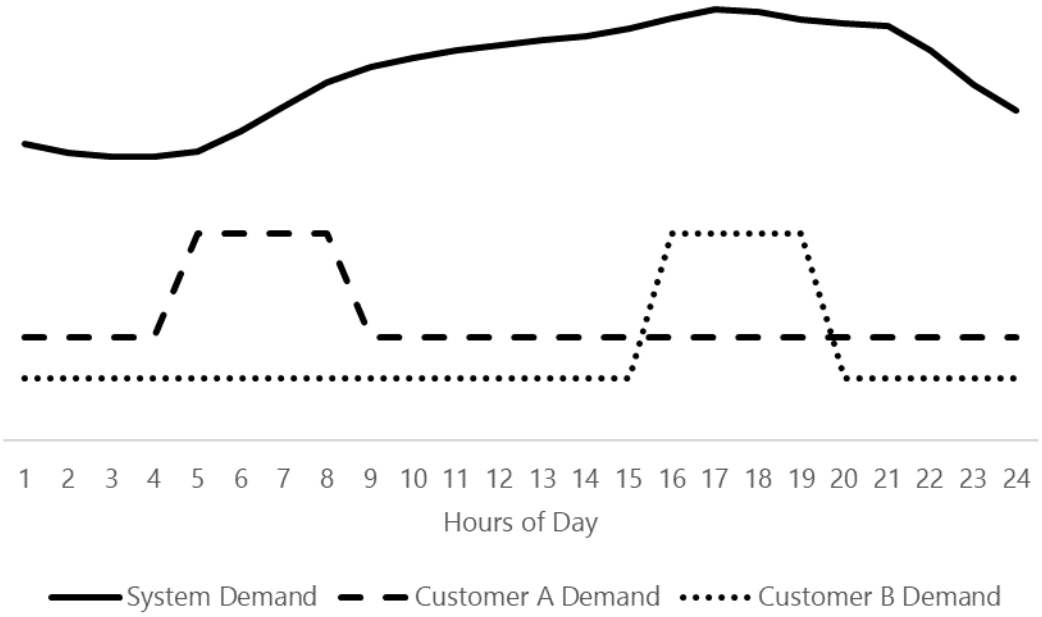


Figure 2: Example of cost shifting under NCP rate design

Looking at the issue another way, DERs (such as energy storage) may result in a gross cost shifting to customers that choose to take no action but there are benefits that the DER offers all customers (e.g., deferred system investments). Therefore, when considering the impact of shifted costs, the assessment must be complete an appropriate net cost-benefit analysis. If DER delays spending for benefit of all customers, there is no cost shifting. ESC notes that energy storage facilities can be connected behind the meter or directly connected to distribution systems. Both configurations must be considered in future rate design.

Objective #4: Facilitate investments to modernize the grid in a paced and prioritized manner that will support customer choice and efficiency

The proposed rate design does not provide any appropriate consideration for energy storage benefits to either the modernization of the grid or support customer choice & efficiency. In ESC's opinion, the rate design must be assessed under a broad mandate that includes analysis of energy storage benefits, utility remuneration, and cost allocation. To optimally achieve the OEB objectives, the OEB and stakeholders must assess the impact of changes in one area of the regulatory framework to other areas. Determining new rate design in a silo without the other key components is inefficient and lacks transparency. Efficient modernization and effective integration of DERs requires a transparent

regulatory framework of all components to distributors and customers. Cost allocation signals cost responsibility between customers, rate design sets prices for electricity services, and utility renumeration amount received for distributor's investments.

Objective #4 states that modernization must occur in a paced and prioritized manner. The Staff report believes that change cannot be quick for the following reason:

> *We also heard very strongly in consultation that these customers were already dealing with many changes, both in general business conditions and the electricity bill. These customers also pointed out that they had often made previous business decisions for investments and operations based on managing their bill, including to participate in the Industrial Conservation Initiative peak demand reduction program. Changes to the rate design could undermine those decisions.*[12]

The Staff's conclusion to not adopt more appropriate rate design tied to cost causality principles (i.e., coincidental peak demand) in the proposed rate design appears short-sighted. The feedback clearly states that customers are investing to manage energy uses based on the existing rate design. To achieve the key objective of modernizing the grid and increasing efficiency of the system, the new rate design must align customer investment decisions with cost drivers of the system. Further, there is an urgency to making these changes since leaving the rate design in its current form supports inefficient and potentially wrong investment decisions by customers and distributors. While a paced and prioritized manner is beneficial to managing change, delaying appropriate rate design supports the wrong investment drivers for customers. Energy storage systems that can help customers manage their energy use and provide services to grid operators must be supported by suitable rate design to reflects the net benefit the system can offer customers and grid operators. Without a suitable rate design, energy storage investments may be abandoned or improperly designed. In other words, change is of the essence since customers and service providers are acting on the existing rate design which will result in inefficient investment decisions by customers and distributors.

Other jurisdictions are recognizing the need to move forward expediently to address the evolution of the electricity sector. For example, the Alberta Utility Commission (AUC) launched a distribution system inquiry to address similar issues the C&I rate design is attempting to address. Some stakeholders requested that the AUC delay the inquiry because of the many significant changes underway in the Alberta electricity market. The AUC responded correctly to continue the inquiry "***because of the growing economic and technological pressure for change to the distribution system***"[13]**.** Perhaps most importantly, energy storage systems behind-the-meter can offer the capability for customers to actively respond to distribution system price signal (i.e., peak demand charges) without having to change their consumption pattern. The Staff report notes:

> *Most small businesses suggested that they could not shift use because of their business hours. E.g. a retail outlet that is open from 10am to 6pm regardless of electricity prices.*[14]

[12] Staff Report, Feb 21, 2019, p. 36.
[13] AUC Proceeding 24116, Scope and Process for the Distribution System Inquiry, March 29, 2019, pg 3.
[14] Staff report, Feb 21, 2019, p. 16.

However, the Staff does not consider the option that energy storage systems can perform the consumption shifting without impacting the customers' business hours. Energy storage is truly a game changer that the Staff report does not fully consider.

Recommendations to the Board

Analysis completed by ESC concludes that the proposed rate design in the Staff report does not meet the objectives of the OEB. Further, for reasons summarized in this submission, ESC does not support the proposed rate design and strongly recommends that further consultation is required. ESC makes the following recommendations for the Board's consideration:

- Instruct Staff to continue consultation on C&I rate design as part of broader initiative including Utility Remuneration and Responding to DERs.
- Staff should establish an engagement plan that outlines how each component will be assessed and how feedback will be integrated. Potentially activities that could help Staff include a technical conference, multiple stakeholder sessions with Staff, and a schedule for publishing of high-level proposals followed by detailed proposes for comment from stakeholders.
- Proposed rate design should be derived from cost causality principles to meet the objectives of the OEB.
- Due to the rapid change occurring in electricity markets in other jurisdictions, a jurisdictional survey should be completed to assess alternative rate designs includes options for coincidental peak demand, fair and equal standby charges and appropriate cost allocation principles.