ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

February 25, 2022

Nancy Marconi
Registrar
Ontario Energy Board

Submitted via the Ontario Energy Portal:

File Number: EB-2022-0074
Design of an Optimal Enhanced TOU Rate

Dear Ms. Marconi:

The Ontario Society of Professional Engineers (OSPE) has reviewed the OEB February 17, 2022 proposed Alternative Time-Of-Use Price Design. OSPE is very supportive of the OEB's proposal.

We have attached Appendix A which offers detailed comments on OEB's price design proposal and also answers OEB's questions. This letter is further to our submission to the OEB dated on February 9, 2022 prior to the OEB stakeholder meeting.

Thank you for the opportunity to provide feedback on the Design of an Optimal Enhanced TOU Rate. OSPE would be pleased to elaborate on any points in our submission to the OEB. If you have any additional questions, please contact Stuart Atkinson, OSPE Public Affairs Manager, at satkinson@ospe.on.ca.

Sincerely,

Mark Frayne, P.Eng.
Chair and President
Ontario Society of Professional Engineers

Sandro Perruzza
Chief Executive Officer
Ontario Society of Professional Engineers

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Appendix A

OSPE's Input to OEB's Feb 17, 2022 Alternative Time-Of-Use Price Design

Comments on the OEB's Price Design

1. OSPE agrees with the OEB's proposal to use an 11 pm to 7 am Low Overnight TOU period. This aligns well with the overall power system low load period.

2. OSPE agrees with the OEB's proposal to apply the low overnight rate to every day all year. This is consistent with the overall power system daily low load periods.

3. OSPE agrees with the OEB's proposal to eliminate seasonal periods. This will simply consumers programming of timers and controllers to one initial setup and will avoid having to reprogram those devices every 6 months.

4. OSPE agrees with the OEB's proposal to define the new Higher On-Peak period as 4 pm to 9 pm every working weekday all year. This aligns well with the power system's high load period.

5. OSPE agrees with the OEB's proposal to use a baseline historical load profile prior to the consumer subscribing to the new overnight rate plan for the purpose of cost under-recovery. This will ensure subscribers to the new plan are not penalized either for achieving load shifts which are economically beneficial for all consumers and new electrical loads which displace fossil fuels which are environmentally beneficial for the province.

6. OSPE agrees with the OEB's proposal to design the low overnight rate to be 1/10th the highest on-peak rate. This will provide sufficient incentive for consumers to subscribe to the low overnight plan and help reduce power system fixed costs and reduce emissions.

7. OSPE agrees with the OEB proposal that consumers who subscribe to the Low Overnight Price Plan should not transfer their system costs to other consumers. OSPE suggests that the fair amount of the reduced electricity rates is the "avoided costs of the overall power system". How those avoid costs are shared between the consumers who subscribe to the new low overnight rate plans and other consumers is an important policy decision. If the savings are too low for subscribers of the new low overnight rate plans, consumers are unlikely to subscribe and purchase the equipment necessary to make use of the new price plan. In the early years of the new price plans OSPE suggests the OEB bias the shared savings in favour of subscribers of the new price plans because they must invest in new equipment to take advantage of the new price plans. The payback period should not be excessive.

8. OSPE would like the OEB to reconsider how the under-recovered system costs are allocated to subscribers of the new price plans. The OEB's proposal to assign all those under-recovered costs to the rate in the Higher On-Peak period will create a disincentive to subscribe to the plans. There are two main reasons.

a. The Higher On Peak period only applies to 4 hours a day for only 251 days a year for a total of 1004 hours per year. Consequently, the Higher On-Peak period will have to rise noticeably to recover the costs in those relatively few hours each year. The larger Higher On-Peak rates will create a stronger disincentive to subscribe to the new price plans.

b. The second reason is that the fixed 10:1 ratio between the Higher On-Peak rate and the Low Overnight rate will cause the Low Overnight rate to rise as the Higher On-Peak rate is adjusted higher. The higher Low Overnight rate creates a disincentive to subscribe because the rate may not be sufficiently below the cost of fossil fuels in incentivize consumers to purchase the equipment needed to displace those fossil fuels with electricity overnight.

OSPE recommends the OEB consider alternatives to using only a larger Higher On-Peak rate to recapture all the under-recovered costs. OSPE suggests the OEB consider one of two alternative options:

- OSPE prefers the under-recovered costs for the Low Overnight price plan subscribers to the consumer's monthly fixed charge similar to the presently approved OEB fixed monthly charge for distribution fixed costs. This method is preferred because it does not affect the volumetric rates for electric energy (kWh) consumption of any of the price periods. It also allows the Low Overnight rate to be as low as possible using the 10:1 ratio rule mentioned above. This will further incentivize use of the Low Overnight price plan for fossil fuel displacement.

- A second option is to apply the under-recovered costs as the same kWh surcharge to all the rate periods except the Low Overnight rate period. Because this approach would apply to all 365 days a year and 16 hours each day, or 5,840 hours a year, the amount of that kWh surcharge will be modest if applied equally to all those hours and will not create a disincentive to subscribe to the new price plans.

9. In the early years (until 2026) it is unlikely that there will be enough subscribers to the new Low Overnight price plans for the OEB to be concerned about how surplus energy is used and if there is enough surplus electricity for every subscriber. However, eventually the amounts of surplus electricity may have to be rationed if the number of subscribers becomes large. This may occur in the future likely beyond about 10 years from first implementation of the new Low Overnight price plans.

   There are two types of surplus electricity – clean electricity and moderately emitting electricity. Clean electricity comes from zero-emission sources like hydroelectric, nuclear, wind and solar generation. Moderately emitting electricity comes from natural gas-fired generation.

   After the Pickering reactors retire at the end of 2025 and until the refurbished reactors return to service, the amounts of clean surplus electricity will be limited. However, there will be abundant amounts of moderately emitting surplus electricity during that period.

Eventually after the refurbished reactors return to service and even more so when the new small modular reactors are deployed in the post 2030 period there will again be significant amounts of clean surplus electricity. The amounts of moderately emitting surplus electricity will depend on government decisions related to the role of natural gas-fired plants in the future.

It would be prudent for the OEB to fund a research, development and commercialization project to develop a load management product that would allow the IESO or the LDCs to allocate surplus electricity quantities fairly and to prioritize load types that can best utilize that energy to meet provincial emission reduction goals. The project should be a collaboration among the OEB, one or more local distribution companies (LDCs), the IESO and private energy management technology developers. This type of load management is not likely to be needed until after 2030 so there is ample time to develop a suitable and inexpensive product and associated LDC load control and billing software for use with even more innovative future OEB rate plans designed to use surplus electricity whenever it is available, 24 hours a day.

10. OSPE recommends the OEB allow Alectra Utilities Inc. to deploy the OEB's Low Overnight price plan design as soon as possible. The real deployment experience will help the OEB iron out any wrinkles in the rate design and help to finalize all the required rates and regulations required for province wide deployment. Alectra Utilities Inc. had significant experience with the original Low Overnight TOU pilot and has the billing software to implement the plan. Some minor software changes to deploy the OEB's Low Overnight price plan design should not impose major challenges for an early deployment if Alectra Utilities Inc. is involved.

11. OSPE suggests the OEB either produce or arrange for others to produce consumer friendly information needed by consumers to decide if the new Low Overnight price plan would be advantageous to them. This information could include typical applications, equipment needed and typical costs for that equipment. Additional details can be found in OSPE's letter to the OEB's Acting Registrar dated February 9, 2022 which was submitted in preparation for the stakeholder meeting on February 17, 2022.

OSPE's Replies to the OEB's Questions

Q1 – Effectiveness of the Price Design

OSPE believes that the new price plan will be a strong incentive for electric vehicle owners to subscribe to the Low Overnight price plan. EV owners benefit from both clean and moderately emitting surplus electricity. Both types of surpluses result in lower energy costs and lower emissions for EV owners.

However, load shifting of other electrical loads for cooling and heating and fossil fuel displacement by electricity will depend on the low overnight rate relative to the cost of the equipment needed to implement the load shift or fuel displacement and the volumetric cost of the fossil fuel being displaced. By careful selection of the various TOU period rates the OEB can maximize the incentive to subscribe to the low overnight rate plan. It should be easier to make a compelling case for consumers who use propane and heating oil for their heating needs because these fossil fuels are more expensive than natural gas.

By the careful selection of the various TOU period rates, and power system avoided cost sharing, the OEB can provide value for both the consumers who subscribe to the Low Overnight price plan and those who do not.

Q2 – Suggestions for Improvements to the Price Design

OSPE has submitted some suggestions for the price design in items 7, 8 and 9 above.

Q3 – Potential Risks Not Already Identified by the OEB

OSPE sees two potential risks:

- If the new price plans prove more popular than expected it may be necessary to ration surplus electricity earlier than anticipated. The OEB has options to deal with this fortunate outcome. The rates in the low overnight period can be raised to reduce the incentive for additional consumers to subscribe to the new price plans or automatic load management solutions could be deployed sooner than expected by the LDCs in order to ration the surplus electricity fairly.

- Consumers who are unable to take advantage of the new price plans either through a technical limitation (no working smart meter) or a lack of funds to purchase the required equipment may complain to their elected representatives that they are being unfairly treated. This will require some effort on the part of the OEB, LDCs and government to educate the public on the value to all electricity consumers of:

    - achieving lower overall power system cost if the surplus electricity is used domestically instead of exported or curtailed so that the benefits can be shared among all domestic consumers, and
    - achieving lower environmental emissions, or
    - by providing alternate communication capability for those non-functional smart meters such as internet, cellular or dialup communication capability.

Q4 – Which Consumers Will Be Interested

OSPE believes there will be three primary groups of consumers who will be strongly incentivized to subscribe to the new price plan as it has been proposed by the OEB. Two other groups will be less incentivized initially but may find value later when the economics is more compelling. The five groups are:

i. Battery EV owners (including plug-in hybrid EV owners). Their cost of charging their vehicles will be dramatically lowered in accordance with the ratio of the new Low Overnight rate plus volumetric (kWh) delivery charges compared to the standard Off Peak TOU rate plus volumetric (kWh) delivery charges. EV owners will also achieve a significant reduction in emissions.

ii. Propane and heating oil consumers. The volumetric rate for these fossil fuels is relatively high especially with rising federal carbon taxes and the subscribers will experience a significant reduction in fossil fuel bills in exchange for a modest increase in

their electricity bills. The saving will be significant and will easily pay for the required fuel switching equipment with a reasonable payback period. Subscribers will also contribute to a significant reduction in emissions if they use clean surplus electricity rather than moderately emitting surplus electricity.

iii. Consumers who are considering installing an air sourced heat pump with fossil fuel backup heating may be incentivized to subscribe to the new price plan. These consumers will see a noticeable reduction in total energy cost because the heat pump can be programmed to operate at much lower electricity cost overnight and lower electricity cost than fossil fuels during the day during mild temperature periods.

iv. Natural gas consumers have a lower incentive to subscribe but will eventual become interested when carbon taxes rise high enough to provide a reasonable payback period for the required fuel switching equipment.

v. Electrical load shifting of heavy on-peak electrical loads like air conditioning will likely need to wait for much cheaper electrical battery storage technologies to economically justify the equipment needed to use surplus electricity.

Q5 – Who Should Pay for Under-recovery Due to Consumption Shifts

Subscribers to the low overnight price plan should enjoy a reasonable share of the avoided overall power system costs for shifting their electric loads from on-peak to overnight. They should not be penalized for improving the performance of the power system.

Also, their use of additional electricity that is surplus and would otherwise be exported at low prices or curtailed at zero revenue should ideally be charged the same price that energy is currently being exported at (i.e.: the wholesale market price) or curtailed (i.e.: no revenue). OSPE would not define these cost savings to subscribers as under-recovery. However, some sharing of those economic benefits with other consumers who are not subscribers of the new price plan may be appropriate.

Q6 – Impact of OEB Price-setting Methodology on Future Overnight Rate

OSPE believes that the OEB should analyze the energy use overnight in three categories:

1. Historical overnight consumption for dependable electricity prior to the change to the Low Overnight price plan. This consumption level can be considered a base level that is subject to under-recovery to treat subscribers to the new plan the same as standard TOU plan subscribers.

2. Historical electrical load On-Peak shifted to Low Overnight periods. The cost savings should be compared to the avoided cost for the overall power system and any excess cost reduction by Low Overnight price plan subscribers could be subject to recovery.

3. Additional new electrical load used to displace fossil fuels and charge EVs with surplus electricity that is currently exported at low prices or curtailed at zero revenue. The cost savings should be compared to the present revenue that energy receives when it is exported (i.e.: the wholesale market price) or curtailed (i.e.: no revenue). If the

consumer pays less than that revenue then that windfall benefit could be subject to recovery.

It is incorrect to assume all electricity consumed overnight at the new Low Overnight rate is subject to cost under-recovery relative to the standard Off-Peak TOU rate. Currently about 60% of surplus electricity is exported at very low wholesale market rates (with no global adjustment surcharge) and about 40% is curtailed or wasted with no revenue. Under-recovery should be measured against that present revenue not the standard Off-Peak TOU rate.

If under-recovery is defined and calculated correctly, the low overnight rate will track market conditions in the wholesale market. The low overnight rate will vary with the relative amounts of clean surplus electricity and moderately emitting electricity that is available.

The OEB could provide longer lasting financial incentives to keep the low overnight rate artificially lower but that implies a cost shift to other consumers who are not subscribers of the Low Overnight rate.

Q7 – Use of Historical Baseline Load Profile

OSPE supports the use of a historical baseline to determine under-recovery because it better reflects the actual dependable electricity that consumers were using before they added flexible or interruptible loads to the power system during the overnight period.

Dependable electricity has higher value because it is capacity backed and not interruptible. Interruptible electricity is much less valuable because it is not capacity backed and can be interrupted during periods when capacity is insufficient to meet total demand.

In an ideal situation the OEB/LDCs would differentiate between dependable and interruptible load demand and price the energy accordingly like the wholesale market currently does. However, that would require a more complicated load management strategy and dispatch control system similar to what is used in the wholesale market. For small consumers that would be prohibitively expensive.

The use of a low overnight TOU price period is a simplified but inexact proxy for differentiating between dependable demand (on-peak high-priced period) and flexible or interruptible demand (low overnight price period). Using a historical baseline load profile allows the OEB to estimate the electricity quantities that should be subject to standard TOU rates and determine the under-recovery for that baseline quantity during the low overnight period.

OSPE believes the OEB low overnight price plan and rate design proposal will meet the Minister's goals to:

- provide consumers more choice,
- lower consumer's energy bills,
- stimulate economic activity by encouraging purchase of EVs, load shifting and fuel switching technologies, and
- lower environmental emissions.

The risks that OSPE sees are described in the answer to Q3 above.

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Q8 – Alternative Price Setting Methodologies

OSPE has proposed some alternative methods to set prices for the different rate periods in OSPE's comments on the OEB's price design in items 7 and 8 above and our answers to Q5, Q6 and Q7 above.