

March 29, 2022

Submitted online via the Environmental Registry of Ontario

**ERO-019-5054- Proposal to Enable a New Voluntary Enhanced Time-of-Use Rate
Including Consideration of a New Ultra-Low Overnight Price**

The Ontario Society of Professional Engineers (OSPE) is the advocacy body and voice of the engineering profession. Ontario currently has more than 85,000 professional engineers, 250,000 engineering graduates, 6,600 engineering post-graduate students and 37,000 engineering undergraduate students.

We have attached Appendix A which offers detailed comments on the Energy Ministry's proposal and also answers the Ministry's questions contained in the proposal.

OSPE strongly supports your policy proposal. The very low overnight price for electricity is **essential** to ensure the electric power system is able to accommodate the growing number of electric vehicles people are purchasing and that the government wants to further incentivize. The power system has significant idle generating capacity overnight but not during the daytime peak periods. The province and its residents will benefit significantly from making surplus electricity available to Ontario residents at a discounted retail price rather than the current practice of exporting the surplus at very low wholesale prices or curtailing (wasting) those amounts that cannot be exported.

Appendix A

Proposal to Enable a New Voluntary Enhanced Time-of-Use Rate Including Consideration of a New Ultra-Low Overnight Price

Comments on the Ministry of Energy's Policy Proposal

Before commenting on the Ministry's policy initiative, OSPE would like to summarize the situation with respect to the amounts of emission-free surplus electricity in Ontario. Table 1 below summarizes those quantities.

Table 1
Amounts of Surplus, Emission-Free, Electricity in Ontario

Year	Curtailed Surplus Amounts TWh	Number of Homes Equivalent for Curtailed Surplus	Total Surplus Amounts TWh	Number of Homes Equivalent for Total Surplus
2014	3.6	380,000	10.0	1,040,000
2015	4.8	500,000	13.3	1,390,000
2016	7.6	840,000	15.9	1,770,000
2017	10.2	1,130,000	23.9	2,520,000
2018	5.8	644,000	13.5	1,500,000
2019	6.5	720,000	17.3	1,920,000
2020	7.0	780,000	19.6	2,180,000

Note: (1) Total surplus amounts include both curtailed and exported amounts.
 (2) Quantities are estimated by OSPE based on IESO, OPG and OEB data.
 (3) Number of homes is estimated based on a typical home's consumption of 800 kWh/mon in 2014/2015 and 750 kWh/mon from 2016 to 2020.

In addition to emission-free surplus electricity in Ontario, there are also much greater amounts of moderately emitting, natural gas-fired electricity in Ontario. Table 2 below summarizes those quantities.

From a policy perspective the amounts of moderately emitting natural gas-fired electricity in Ontario is very important. Electric vehicles (EVs) are much more efficient than internal combustion engine (ICE) vehicles. Consequently, electric vehicles can achieve emission reductions on a per kilometer driven basis compared to ICE vehicles even if the electricity is supplied by natural gas-fired generating stations.

Consequently, government policy should take advantage of that surplus moderately emitting natural gas-fired electricity to charge EV's. This action will save residents money and reduce emissions in the province. The province will also be able to successfully deploy additional EVs without being concerned about the lack of generation infrastructure which is a longer-term problem. In the longer term, to meet the provincial and national net-zero goals by 2050 the province will require the natural gas-fired plant emissions to be sequestered or offset, or alternately, the plants will eventually have to be replaced by emission-free generation

technologies. Ontario Power Generation (OPG) is currently in the process of demonstrating the commercial viability of flexible small modular reactors (SMRs). SMRs are an emission-free technology that could eventually replace the natural gas-fired plants in the 2030 to 2050 period.

Table 2
Amounts of Surplus, Moderately Emitting, Natural Gas-Fired, Electricity in Ontario

Year	Curtailed Surplus Amount TWh	Number of Homes Equivalent for Curtailed Surplus	Total Surplus Amount TWh	Number of Homes Equivalent for Total Surplus
2014	48.7	5,100,000	60.7	6,300,000
2015	50.4	5,300,000	65.9	6,900,000
2016	54.5	6,100,000	68.8	7,600,000
2017	61.1	6,800,000	74.0	8,200,000
2018	59.9	6,700,000	71.4	7,900,000
2019	61.5	6,800,000	74.3	8,300,000
2020	61.5	6,800,000	74.8	8,300,000

- Note:** (1) Total surplus amounts include both curtailed and exported amounts.
 (2) Quantities are estimated by OSPE based on IESO, OPG and OEB data.
 (3) Number of homes is estimated based on a typical home's consumption of 800 kWh/mon in 2014/2015 and 750 kWh/mon from 2016 to 2020.

The power system does not have the same amount of idle capacity every hour. The idle capacity varies by season and by hour of the day. Idle capacity is lowest during on-peak demand periods in the summer and winter. During those same on-peak days the demand drops in the evening due to lower industrial, commercial and residential demands. The minimum available idle capacity at night in the summer or winter can reach 7,000 MW during the overnight period. Larger amounts of idle capacity are available in the spring and fall.

For reliable EV charging, we need to use the minimum idle capacity available in the overnight period during the year. Therefore, if the minimum idle generating capacity each evening, including natural gas-fired plants, is 7,000 MW, then at least 42 GWh of energy will be available to charge EVs every evening all year.

According to Natural Resources Canada, the typical Ontario passenger vehicle travels about 16,000 km each year or on average a bit more than 40 km each day. EV's consume about 0.2 to 0.3 kWh for each 1 km of travel depending on weather and road conditions. Using the 0.3 kWh/km gives an energy consumption of 13 kWh each day per vehicle. That is the energy that must be charged every day on average per EV vehicle. Vehicles with larger batteries could be charged on weekends only when there is a lot more surplus energy. However, we will ignore that additional charging capability for the purposes of estimating the number of cars that can be charged.

42 GWh of energy is enough surplus electricity to charge 3,200,000 million vehicles every night before any additional generating capacity needs to be built.

Consequently, if Ontario has a very low overnight electricity rate, consumers will be strongly incentivized to charge their EVs at night rather than during the day when electrical capacity is very limited especially on hot summer days or cold winter days.

Ontario can therefore put in place policies that accelerate EV purchases up to at least 3,200,000 EVs before any additional generating capacity is needed.

The very low overnight rate is an essential component of a successful EV deployment strategy. Without a very low overnight rate the potential for overloading the electrical grid during daytime hours is a very real concern in the short term. The present electrical system dependable installed generating capacity cannot accommodate very many EVs charging during peak hours on hot summer days or cold winter days.

Accelerating EV Sales

To ensure Ontario accelerates the uptake of EV sales, the province should:

1. Impose manufacturer mandates that set the minimum percentage of EVs sold each year. Mandates force manufacturers to raise the price of fossil fuel vehicles and use those revenues to lower the price of their EVs.
2. Develop and implement an incentive program for electric vehicles, through a direct subsidy, until mass adoption “tipping point” is achieved.
3. Implement special low interest loans to purchase EVs. The loans would be guaranteed by the government to minimize the financing costs. Many consumers today finance their vehicles. A combination of EV subsidies and special low financing rates can be designed to eliminate the monthly payment differential of an EV compared to a fossil fuelled vehicle.
4. Incentivize battery pack leasing/rental options. As the battery pack is currently the most expensive component of electric vehicles, consumers that need larger battery capacity (and thus can provide the most emission reduction benefit) have higher purchase costs for EVs. If such incentives caused EVs to be designed with easy end-of-lease battery replacements, not only would it reduce the EV purchase cost but it would provide significant opportunities for battery repurposing for stationary storage, “upgrading vehicles with better batteries” and create a source of supply for battery refurbishment and recycling.
5. Continue establishing a robust network of electric vehicle charging stations across Ontario.
6. Amend the Building Code to ensure that there is a minimum percentage of electric vehicle supply equipment (EVSE) in residential and non-residential buildings, including condo and apartment buildings.

Thank you for the opportunity to provide feedback on your policy proposal. OSPE would be pleased to elaborate on any points in our submission. If you have any additional questions, please contact Stuart Atkinson, OSPE Public Affairs Manager, at satkinson@ospe.on.ca.

Sincerely,



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