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May 11, 2020

VIA RESS

Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4
Attention: Registrar

Dear Ms. Long:

**Re: Hydro Ottawa Limited Custom Incentive Rate-Setting Application for 2021-2025
Electricity Distribution Rates and Chages
Board File No.: EB-2019-0261**

We are counsel to the Distributed Resource Coalition (**DRC**). Please find enclosed DRC's interrogatories to Hydro Ottawa in the above-mentioned proceeding, filed further to Procedural Order No. 1.

Sincerely,

A handwritten signature in black ink, consisting of a large, stylized 'L' followed by a horizontal stroke that curves upwards and to the right.

Lisa (Elisabeth) DeMarco

- c. Gregory Van Dusen, Hydro Ottawa Limited
Fred Cass, Aird & Berlis LLP
Cara Clairman, Plug'n Drive
Wilf Steimle, Electric Vehicle Society

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998*,
S.O. 1998, c. 15, Sched. B, as amended (the **Act**);

AND IN THE MATTER OF an application by Hydro Ottawa
Limited (**HOL**) to the Ontario Energy Board for an Order or
Orders approving or fixing just and reasonable rates and
other charges for the distribution of electricity as of January
1, 2021.

EB-2019-0261

INTERROGATORIES

OF

DISTRIBUTED RESOURCE COALITION (DRC)

May 11, 2020

Question: **1-DRC-1**

Reference: • Exhibit 1, Tab 1, Schedule 10, Attachment B
 • Exhibit 1, Tab 1, Schedule 13

Preamble: In its 2017 Annual Summary: *Achieving Ontario Energy Board Renewed Regulatory Framework Performance Outcomes* dated December 2019 (Exhibit 1, Tab 1, Schedule 10, Attachment B), HOL describes its collaboration with Natural Resources Canada on an electric vehicles (**EVs**) study. HOL states:

“In 2016, Hydro Ottawa became a partner in a research project initiated by Natural Resources Canada (“NRCan”) and funded through the department’s Energy Innovation Program. The project was launched to increase learning around the impact of direct current fast charging (“DCFC”) EV chargers on local distribution networks. More specifically, Hydro Ottawa and NRCan investigated the need for DCFCs in Ottawa, the locations at which they will likely be installed, and their impact on the distribution grid for different scenarios of EV penetration for the period 2017-2037.

Hydro Ottawa committed in-kind support to the project. The study – entitled “Impact of Clusters of DC Fast Charging Stations on the Electricity Distribution Grid in Ottawa, Canada” – was published in October 2017, in conjunction with the international EVS30 Symposium held in Germany.”

HOL also provided a summary of the key findings in the study and stated that it is “confident that the results of this study will play a value-added role in helping the company plan and prepare for increased penetration of EVs across its service territory.”

In addition to home charging, public charging infrastructure will also impact this future electrical demand.

Similarly, HOL also collaborated with Natural Resources Canada on multiple studies over the duration of the Custom IR rate term. These studies examined the impact of direct current fast charging EV chargers on the local distribution network in Ottawa, with effects analyzed all the way down to individual transformers. Although the findings are specific to the unique circumstances of Ottawa, the studies will yield important learnings that can be applied across Ontario and Canada.

- a) Please place a copy of the study “Impact of Clusters of DC Fast Charging Stations on the Electricity Distribution Grid in Ottawa, Canada” on the record in this proceeding.
- b) Please provide copies of any other EV-related studies/work that HOL has conducted with NRCan or otherwise contributed to.
- c) Please provide a brief summary of the important learnings from the NRCan studies that are relevant to HOL’s:
 - (i) proposed rates;
 - (ii) proposed capital plan;
 - (iii) customer needs and preferences;
 - (iv) reliability;
 - (v) vehicle fleet; and
 - (vi) productivity.

Question: 1-DRC-2

- Reference:
- Exhibit 1, Tab 1, Schedule 10, Attachment C
 - Exhibit 1, Tab 1, Schedule 13
 - Exhibit 2, Tab 4, Schedule 3

Preamble: HOL launched a pilot program in April 2018 in partnership with FLO aimed at helping to increase understanding of the impacts of EVs on the grid, while responding to customer preferences for EV transportation options. As part of the pilot, Hydro Ottawa assumed responsibility for pilot participant recruitment, marketing the project, and managing the installation of charging stations for eligible participants. As of the end of 2018, Hydro Ottawa had successfully recruited approximately 50 participants. Of these, approximately 20 had charging stations installed and operating by year's end, while the remainder were at an earlier stage in the pre-installation process.

The data collected from each active installation as part of the pilot includes the following: total kWh consumption, date of use, time of use (broken down into off-peak, mid-peak, and on-peak), consumption per charge session, and km driven per week. HOL states that the most valuable of these data points is the time of use (specifically, the on-peak periods), which allows it to analyze and understand the behavioural trends of consumers as it relates to charging for each month and season.

- a) Please explain what steps are required and what costs are incurred for a single residential unit to install and connect an EV charger through the typical layout process.
- b) Please explain what steps are required and what costs are incurred for commercial facilities or multi-unit residential buildings to carry out the necessary "upgrades" to connect EV chargers.
- c) Please indicate how many of each of the following types of customer connections HOL facilitated in its service territory in 2019:
 - (i) single residential unit EV charger connections;
 - (ii) commercial facility EV charger connections; and

(iii) multi-unit residential EV charger connections.

- d) Please indicate how many of each of the following types of customer connections HOL anticipates in its service territory over the 2021 to 2025 rate period:
- (i) single residential unit EV charger connections;
 - (ii) commercial facility EV charger connections; and
 - (iii) multi-unit residential EV charger connections.
- e) Has HOL considered the distribution system planning, grid, emissions, and/or rate impacts of offering extremely low-cost electricity distribution charges during the lowest-peak period (i.e., overnight) for EV charging? If so, please provide any and all working papers. If not, please explain why not.
- f) Please provide any and all working papers, reports, and analysis conducted to support its demand forecasts of expected EV penetration on its service territory.
- g) Please provide any and all details and analysis of HOL's forecast of future participants in the HOL/FLO pilot project?
- h) Please provide a brief summary of HOL's learnings and all reports from the HOL/FLO pilot project, based on the data collected, including time of use during on-peak periods.
- i) Please indicate whether or not HOL has considered or will consider bidirectional, "vehicle to grid" (V2G) flow, and if so, please provide any and all assumptions and data.

Question: 1-DRC-3

Reference: • Exhibit 1, Tab 1, Schedule 10

Preamble: HOL is proposing that OM&A costs in years two through five of its rate term be adjusted by a Custom Price Escalation Factor ("CPEF"), on an annual basis, as follows:

$$\text{CPEF} = I - X + G$$

where,

- "I" is the inflation factor;
- "X" is the two-component productivity factor;
- "G" is the growth factor

HOL has determined that the CPEF will be 2.51%.

- a) Please outline HOL's assumptions in the two-component "X" productivity factor in the above CPEF equation regarding capacity, load changes, and leveraging due to EVs and other DERs in each of years two through five.
- b) Please outline HOL's assumptions in the "G" term in the above CPEF equation regarding capacity, load changes, and leveraging of EVs and other DERs in each of years two through five.
- c) How were each of DERs, EVs, and EV charging infrastructure treated for the purpose of setting the "I" factor at which HOL arrived? Please provide all related working papers.

Question: 1-DRC-4

- Reference:
- Exhibit 1, Tab 1, Schedule 13, Section 3.2.4
 - Exhibit 2, Tab 4, Schedule 3, Attachment E, Section 3.6.2

Preamble: HOL has proposed several planned productivity initiatives for the 2021 through 2025 period, including Advanced Metering Infrastructure (“AMI”) analytics and integration management as a means of driving operational efficiencies and improving the accuracy of customer bills. HOL states that the initiative will help position HOL “to better prepare for and accommodate the introduction of greater complexities into the AMI and metering domains, as [DERs] and EVs continue to proliferate” (pp. 54-55).

HOL proposes to invest in data storage, analytics, and integration solutions.

- a) Please outline and provide examples of the additional complexities that HOL expects will be introduced into the AMI and metering domains as DERs and EVs continue to proliferate.
- b) Please outline how AMI analytics and integration management will assist HOL to manage the additional complexities associated with DERs and EVs. In additional, please explain why the use of AMI data is important in the context of DERs and EVs.
- c) Please provide any and all estimates of short-, medium-, and longer-term customer savings that will result from the AMI.

Question: 1-DRC-5

Reference: • Exhibit 1, Tab 2, Schedule 1, Attachment B

Preamble: HOL's vision is to be a leading partner in a smart energy future. HOL states that "its vision recognizes that the electricity service model is in the midst of significant transformation — taking on a more decentralized, customer-centric, technologically-advanced and environmentally sustainable form — and that the role of electricity utilities will be transformed along with it" (p. 1).

HOL acknowledges that energy requirements are changing and that there is a trend toward the electrification of transportation (p. 3). HOL cites, as initiatives that are factored into its business plan, the City of Ottawa's investment in an electricity-powered Light Rail Transit ("LRT") system, greater consideration of EV charging spots in parking lots, electrification of private and public parking lots in commercial and multi-residential buildings, and growing consumer interest in EVs and the likelihood of exponential EV growth as costs decline (p. 3).

HOL also acknowledges that "electricity consumers are poised to become the most influential actors in a new energy landscape" and a growing number of customers are looking to HOL to enable adoption and use of new technologies (p. 4)

- a) Please comment on the role HOL sees each of DERs, EVs, and EV-related DERs playing as part of the "new energy landscape" and provide any and all related estimates and quantification of impact.
- b) Please discuss the impacts of (1) the electrification of transit (including, e.g., the City of Ottawa's LRT system) and (2) the growing consumer interest in EVs and associated increase in EV penetration in HOL's service territory, on HOL's distribution system planning, load forecast, productivity, and OM&A costs.
- c) Please advise how HOL's data and assumptions regarding EV and EV supply equipment (EVSE) are impacting HOL's own vehicle fleet

Question: **1-DRC-6**

Reference: • Exhibit 1, Tab 2, Schedule 1, Attachment D

Preamble: In its 2018 Electric Utility Large Customer Satisfaction Survey, “energy storage” is defined as “the capture of energy produced at one time for use at a later time” (p. 44). HOL states that the “ability to fill up batteries with power (from off-peak times) for peak-shifting and storing production seems to be gaining the interest of consumers and operators alike” (p. 44).

a) Does HOL consider EVs as part of energy storage as defined above?

Question: 1-DRC-7

Reference: • Exhibit 1, Tab 2, Schedule 2, Attachment A

Preamble: Hydro Ottawa Limited (**HOL**) engaged Innovative Research Group Inc. (**Innovative**) to assist in meeting HOL's customer engagement commitments under the Renewed Regulatory Framework for Electricity Distributors. The work was carried out in two phases. The first phase collected input on customers' needs and preferences for outcomes at the start of HOL's development of its Distribution System Plan (**DSP**) and included follow-up engagement on customers' views on relative priorities, individual projects, and an overall capital rate rider. The second phase presented investment trade-offs to customers and gathered feedback on HOL's draft plan.

a) Please provide a copy of all written instructions provided by HOL to Innovative in relation to Innovative's customer engagement mandate for the DSP and the report provided in Exhibit 1, Tab 2, Schedule 2, Appendix A.

b) The "online workbooks" that Innovative prepared for several customer classes asked questions about consumer choices in integrating DERs and new technologies like EVs, solar power, and battery storage.

Please provide a copy of all written instructions provided by HOL to Innovative in relation to customer engagement with respect to consumer choice in integrating new technologies like EVs, solar power, and battery storage.

c) Please describe all measures undertaken by HOL and Innovative to invite and ensure the participation of EV stakeholders and other DER customers (including EV drivers, owners of DERs, EV associations, and DER industry associations) in customer engagement activities.

In addition, please provide any and all notes from Innovative's customer engagement relating to EVs/DERs that are supplementary to the reports provided in Exhibit 2, Tab 2, Schedule 2, Attachment A

- d) Please identify and list, in chart format, any and all customer engagement questions and responses pertaining to: EVs, batteries, EV charging, energy storage, and DERs generally.

Question: 2-DRC-8

Reference: • Exhibit 2, Tab 4, Schedule 3, Section 8.1.6.4

- a) HOL estimated that, based on provincial EV per capita rates, Ottawa will have 2,959 EVs, as of 2018. By the end of 2019, this number is projected to rise to 4,832, a 63% increase. By 2039, the number of EVs within Ottawa is forecasted to grow to 511,332 and EVs will make up 66% of all light vehicles in Ottawa if trends continue. Please provide any and all working papers and analyses that were developed in arriving at the above estimates.
- b) Please update the above analysis based on any and all new information that may be available to HOL as of mid-2020 and provide the most recent estimate of the number of EVs within the HOL service territory. If an update is available, please indicate whether it alters the 2039 forecast of the number of EVs in Ottawa and the share of light vehicles that are expected to be EVs.
- c) Please indicate if the growth projection has been amended with 2019 sales of EVs, and if so, how have those projections been affected?
- d) HOL began a pilot study in 2018 to gather EV charging data from select participants to better understand charging patterns. Please provide any and all reports, working papers and analyses that have been prepared (in draft or in final form) in connection with the study.
- e) Table 8.9 reports demand forecast by 2025 with EVs for three different on-peak penetration charging diversity factors.

Please explain how HOL arrived at each of the charging diversity factors and provide any and all underlying working papers or other material. Please confirm whether HOL has any comment on the likelihood of one on-peak penetration scenario over another.
- f) Applying the 50% on-peak charging diversity factor results in an increase in the demand forecast by up to 212 MW by 2025, according to Table 8.9.

The data in Table 8.9 is reported in MVA, whereas the above statement with respect to 2025 is in MWs. Please confirm that MVA may be considered as equivalent to MW for the purposes of interpreting Table 8.9.

- g) HOL states that the 37MVA of additional demand expected under the 13% on-peak penetration scenario by 2025 is not expected to significantly shift the station capacity planning utilization factor shown in Figure 8.4 since EVs will be spread across different areas of HOL's service territory.
- Please discuss the expected impact on the station capacity planning utilization factor for the 25% and 50% on-peak penetration scenarios.
- h) HOL states that it would typically install 50kW transformers to connect a maximum of 10 customers. Taking into consideration future increases in EV penetration, the standard transformer size has increased to 100kW for a maximum connection of 12 customers.
- Please provide any and all supporting material, working papers, and analysis for the above statement.
- Please confirm whether HOL intends to implement an increase to the standard transformer size and indicate the expected effective date.
- i) Do HOL's analyses of station level and distribution transformer EV impact consider the use of EVs as energy storage resources (e.g., "vehicle to grid" (V2G) or "vehicle to X" (V2X))? If so, please explain how. If not, please explain why not.

Question: 2-DRC-9

Reference: • Exhibit 2, Tab 4, Schedule 3, Attachment E

Preamble: HOL's MiGen program "consists of projects that enable and empower customers to participate in a smart transactive energy future" and focus on resolving the many stressors on the electricity grid including cost, grid management, climate change, and electrification, while delivering customer centric solutions with behind the meter technologies. Projects may be initiated by HOL or third parties.

- a) Please provide any and all working papers, reports, and analysis conducted on or in support of the MiGen program.
- b) Please provide a brief summary of the MiGen Phase 1 progress to-date, including the number of customers involved and any impacts of EVs or EV-related DERs on the MiGen Transactive Grid System.
- c) Please provide an outline of the proposed steps in Phase 2 of the MiGen program.

Question: 2-DRC-10

- Reference:
- Exhibit 2, Tab 4, Schedule 3, Attachment F
 - Exhibit 4, Tab 1, Schedule 5, Attachment D

Preamble: Of HOL's current fleet of 278 vehicles and equipment, 250 (90%) will be at or beyond their replacement criteria age in the 2021 to 2025 period (p. 11). HOL indicates that it is committed to the acquisition of vehicles with hybrid technology where there is an operational and financial business case for doing so (p. 37). HOL intends to purchase 77 replacement light duty vehicles (capital expenditure of \$4.291m), 14 replacement medium duty vehicles (capital expenditure of \$2.468m and 23 replacement heavy duty vehicles (capital expenditure of \$9.742m) over the 2021 to 2025 period as part of its planned fleet renewal investment (Table AF - 5).

HOL also continues to invest in green fleet vehicles and technology, where it is available for commercial fleets, and to replace vehicles, as per the established fleet replacement schedule, with the following:

- Hybrid or more energy efficient vehicles, where available;
- Hybrid technology to operate hydraulics for aerial devices, where it is effective;
- Battery technology to eliminate idling for heating and lighting, while servicing underground cabling; and
- Electric vehicles, where appropriate.

- a) The 2019 federal budget provided for financial incentives of up to \$5,000 for qualified zero emission vehicles purchased or enhanced capital cost allowance deductions.
- (i) Please advise whether HOL's planned fleet renewal investments qualify for the 2019 federal budget financial incentives and/or enhanced capital cost allowance deductions.
 - (ii) Please advise whether the capital expenditure figures reported reflect the 2019 federal budget financial incentives and/or enhanced capital cost allowance deductions.
- b) Please complete the following chart indicating the breakdown of vehicle type in HOL's current vehicle fleet:

Vehicle Type	Fully Electric	Hybrid	Non-EV/Hybrid	Total
Heavy Duty Vehicles				
Medium Duty Vehicles				
Light Duty Vehicles				

- c) What proportion of HOL's planned fleet renewal investment will involve fully electric and/or hybrid vehicles? Please supplement the information provided in Table AF - 5 by completing the following chart indicating HOL's anticipated breakdown of vehicle type in HOL's planned fleet renewal investment (2021 to 2026):

Vehicle Type	Fully Electric	Hybrid	Non-EV/Hybrid	2021-2026 Total
Heavy Duty Vehicles				23
Medium Duty Vehicles				14
Light Duty Vehicles				77

- d) Please indicate the estimated quantum of efficiency savings (including fuel cost savings) that HOL anticipates it will achieve by utilizing hybrid vehicles and EVs rather than traditional internal combustion engine vehicles.

Question: 2-DRC-11

Reference: • Exhibit 2, Tab 4, Schedule 3, Attachment H

- a) Please identify any and all instances in which electrification, electric mobility, EVs, and electrified transportation charging were included or considered as mitigating or aggravating factors in HOL's Distribution System Climate Risk and Vulnerability Assessment.

Question: 3-DRC-12

Reference: • Exhibit 3, Tab 1, Schedule 10, Attachment B

Preamble: HOL engaged Itron to complete a 2021-2025 sales and energy forecast to reflect both short- and long-term load growth. The load forecast provides an important indication as to areas where additional capacity will be required (Section 5.3.1). HOL's load forecast considers the impact of CDM and distributed generation.

- a) Please discuss whether Itron and HOL's load forecast considers the impact and integration of EVs and EV charging infrastructure and provide any and all related analysis, working papers, and/or reports.
- b) Please provide, in the chart format below, an assessment of the impacts on loads and demands — including the load forecast — of your estimate of EVs and distributed generation in each year and any supporting references.

	2021	2022	2023	2024	2025
EVs (number, kW or kWh)					
EV charging infrastructure (number, kW or kWh)					
Distributed Generation (number, type, kW or kWh)					
etc.					

- c) In the *Made-in-Ontario Environment Plan* (the **Environment Plan**; available online at the following link: <https://prod-environmental-registry.s3.amazonaws.com/2018-11/EnvironmentPlan.pdf>), the Ministry of Environment, Conservation and Parks estimates that 16% of targeted greenhouse gas emissions reductions will come from low-carbon vehicles (i.e., primarily EV adoption). Please indicate:
- (i) whether HOL's assumptions regarding EVs and greenhouse gas emissions reductions resulting from EVs in its service territory are consistent with this;
 - (ii) if not, what were HOL's assumptions;

- (iii) whether HOL has altered its perceived impact of EV adoption on load forecasts in light of the Environment Plan or any federal plan or program, including proposed green stimulus programs following the COVID-19 pandemic;
- (iv) whether HOL will update its overall demand assumptions and EV related assumptions in light of
 - a. the Environment Plan;
 - b. any federal plan or program, including proposed green stimulus programs following the COVID-19 pandemic;
- (v) what are the estimated total and annual capital expenditures and operating expenditures regarding EV charging infrastructure that HOL has included in the application during the rate period; and
- (vi) what capital expenditure and operating expenditure funding (federal, provincial, or otherwise) is available to HOL specific to EVs and DERs.

Question: **4-DRC-13**

Reference: • Exhibit 4, Tab 1, Schedule 5, Attachment D

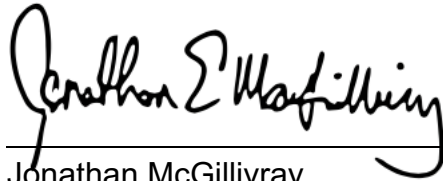
Preamble: The use of technology allows HOL to remotely disconnect and reconnect customers reducing the need to dispatch workers and vehicles, and thus further reducing its impact on the environment. Hydro Ottawa encourages its employees to carpool, take public transit, bike to work, and drive electric vehicles. Electric vehicle charging stations, including solar powered stations, are available in both the visitor and employee parking lots of HOL's two new campuses at a cost to the users.

- a) Please provide details of how HOL encourages its employees to use EVs.
- b) Please provide the details of HOL's charging stations, including its solar powered stations.

ALL OF WHICH IS RESPECTFULLY
SUBMITTED THIS
11th day of May, 2020



Lisa (Elisabeth) DeMarco
DeMarco Allan LLP
Counsel for DRC



Jonathan McGillivray
DeMarco Allan LLP
Counsel for DRC