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April 11, 2019

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319, 27th Floor
2300 Yonge Street
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: Toronto Hydro-Electric System Limited
Application for order or orders approving or fixing just and reasonable distribution rates and other charges, effective January 1, 2020 to December 31, 2024
Board File No. EB-2018-0165

We are counsel to the Distributed Resource Coalition (**DRC**) in the above-referenced proceeding. Further to Procedural Order No. 6, please find enclosed DRC's responses to the interrogatories received from Ontario Energy Board Staff.

Yours very truly,

Lisa (Elisabeth) DeMarco

c. Charles Keizer and Arlen Sternberg, Torys LLP
Andrew Sasso and Daliana Coban, Toronto Hydro
Distributed Resource Coalition

DRC RESPONSES TO STAFF INTERROGATORIES

Interrogatory: M2-Staff-1

Reference: Exhibit M2 / p. 5

Preamble: The Canadian Urban Transit Research & Innovation Consortium (**CUTRIC**) urged the OEB to facilitate Toronto Hydro's integration of electric vehicles (**EVs**), battery electric buses (**BEBs**), and charging infrastructure into its 2020-2024 distribution system plan (**DSP**) and revenue requirement.

CUTRIC also states that its evidence does not advocate for a specific model for the ownership of EV, BEB and charging infrastructure. CUTRIC states that all of the benefits can be achieved regardless of whether the utility pursues a regulated or unregulated EV charging business model (Exhibit M2 / p. 5).

Question(s):

a) Please provide a summary of the key recommendations in the evidence in terms of the findings that CUTRIC seeks the OEB to make as part of the current proceeding. As part of the response, please specifically advise whether it is CUTRIC's proposal that Toronto Hydro should include capital and OM&A costs of EV charging infrastructure in its 2020-2024 revenue requirement to be funded by ratepayers.

Response(s):

a) CUTRIC files this evidence in support of the Distributed Resource Coalition's (**DRC's**) intervention in the current proceeding and is not making direct recommendations as an intervenor in the proceeding. The CUTRIC evidence examines the customer efficiencies that may be effected through progressive integration of EVs (including BEBs) and related distributed energy resources (**DERs**) into electricity distribution systems. We model and examine case studies considering EVs, charging infrastructure, BEBs, and potential EV-related energy storage. We conclude that there are a

number of distribution and other customer efficiencies that are likely to result from EVs and EV-related DERs during the five year 2020-2024 rate period that is the subject of the proceeding. We also note that the integration of EVs and related DERs may reasonably assist in: optimizing the distribution network and facilitating reliability; helping Toronto Hydro achieve OM&A savings; and the development of new EV and BEB rates and tariffs that may contribute to revenues. We understand that DRC has commissioned this evidence in order to facilitate the consideration of EVs and related DERs as valid investments to assist in distribution efficiency and reliability, whether or not such infrastructure is directly owned by the utility, a competitive affiliate, or an arm's length entity.

We note that the Board has actively encouraged distributors to consider cooperation and the the use of DERs, where efficient, as a valid distribution investment in its recent March 7, 2019 Decision and Order in EB-2017-0049. We also understand that DRC hopes to ensure that efficient EV and EV-related DERs are not precluded from consideration as efficient options for Toronto Hydro in optimizing the distribution system.[1]

In summary, CUTRIC recommends that, in light of the overall customer efficiencies and general trends in EV integration, the Board allow distributors including Toronto Hydro to actively consider cost effective EV, and EV-related DER strategic initiatives as a valid Distribution System Plan (**DSP**) investments to enhance distribution efficiency and customer savings during the 2020-2024 period. The CUTRIC evidence takes no position on the ownership structure or investment model. The evidence highlights the distribution and other

[1] This clarification appears to be necessary in light of: (i) the discriminatory effect that would result from excluding only EV and EV-related DERs from the breadth of DERs that may validly be considered to assist in grid optimization; (ii) historical Board decisions (EB-2010-0142, EB-2011-0123) related to EV DER pilots; and (iii) the Board Staff's July 7, 2016 Bulletin providing that a distribution license is not required for owning and operating an EV charging station.

customer efficiencies that are likely to result from known and anticipated EV and EV DER initiatives. CUTRIC takes no position on whether Toronto Hydro *should* include capital and OM&A costs of EV charging infrastructure in its 2020-2024 revenue requirement to be funded by ratepayers. CUTRIC's evidence does, however, support the DRC view that Toronto Hydro *should not be precluded from* including, cost effective and efficient capital and OM&A costs of EV charging infrastructure in its 2020-2024 revenue requirement. The Board may wish to clarify same and direct Toronto Hydro to report on its integration of EVs and EV DERs into the distribution system and the DSP, its EV customer specific stakeholder consultations, and the outcome of any EV and EV-related DER initiatives as part of the Board's annual reviews and/or Toronto Hydro's 2025 rebasing. CUTRIC is of the view that failure to reasonably address current and projected EV and EV-related DER realities may result in inefficiencies, distribution system gaps, and potentially stranded assets.

DRC RESPONSES TO STAFF INTERROGATORIES

Interrogatory: M2-Staff-2

Reference: Exhibit M2 / p. 3

Preamble: CUTRIC stated that it is reasonable to assume the Toronto Transit Commission's (TTC) fleet of buses would need to be at least 30% electrified by 2025 to achieve the TTC's goal of zero-emissions by 2040, which would result in new revenues to Toronto Hydro of approximately $6 million per annum by 2025.

The $6 million revenue figure seems to have been calculated based on the current time-of-use commodity rates.

CUTRIC stated that the $6 million in revenue could be distributed across the customer base in the form of savings or utilized to offset the costs of utility-owned, operated and maintained EV charging infrastructure (Exhibit M2 / p. 3).

Question(s):

a) Please advise whether it is CUTRIC's position that Toronto Hydro should invest the capital necessary to achieve the 30% electrification of TTC buses cited in the evidence. If so, please provide an estimate of both the capital investment and ongoing annual OM&A spending required (including a detailed breakdown of the types of capital and OM&A costs that would be incurred).

b) Please advise whether it is CUTRIC's position that Toronto Hydro should use revenues generated through commodity rates (which Toronto Hydro does not retain, and merely collects on behalf of the IESO) to offset the capital and OM&A costs of installing and operating EV charging infrastructure.

Response(s):

a) CUTRIC clarifies that its evidence at p. 3 speaks to the TTC's 2017 Staff Report recommending the purchase of only zero

emission (electric) buses starting in 2025 to achieve its goal of a 100% zero emission bus fleet by 2040. The TTC has already purchased 30 BEBs in 2018 in furtherance of this goal, and CUTRIC TRiPSIM© modelling indicates that at least 30% of the TTC bus fleet will need to be electrified by the last year of Toronto Hydro's effective rate period, 2025. The ongoing electrification of the TTC bus fleet will result in significant additional electricity demand and personal vehicles (while decreasing emissions). CUTRIC notes that approximately 40 EV models are currently available to customer and a number of automakers have announced that many or all of their new vehicle models will be electric in the near future, resulting in greater EV penetration.[2] We clarify that the anticipated additional (new) distribution revenues to Toronto Hydro would result from the distribution revenues associated with the sale of an estimated $6 million of additional power per annum by 2025 (conservatively resulting solely from the 30% electrification of the TTC bus fleet and not including or accounting for the electrification of other personal vehicles and vehicle fleets, where cumulative year-over-year EV growth is now estimated to be in the range of 140%).[3]

CUTRIC believes that the DSP and proposed capital plan should prudently reflect the electrification of transportation and TTC buses in the Toronto Hydro service territory.[4] CUTRIC takes no position on: (i) how Toronto Hydro should address, and invest the capital necessary to achieve, the 30% electrification of TTC buses; and (ii) how Toronto Hydro

[2] Many automakers are planning significant new development of EV and hybrid vehicle models (including Ford, General Motors, BMW, Mercedes-Benz, Toyota, and Audi) and some automakers have announced plans to largely or completely phase out conventional internal combustion engines in the short-term (Volvo aims for 50% electric sales by 2025 and Volkswagen will stop producing gas and diesel vehicles in 2026).
[3] FleetCarma, "Electric Vehicles Sales Update Q2 2018, Canada" (August 10, 2018), available online at: https://www.fleetcarma.com/electric-vehicles-sales-update-q2-2018-canada/
[4] Only very unrelated limited references to electric vehicles appear in the DSP (Exhibit 2B, E6.1 Area Conversions; Exhibit 2B, E7.2 Energy Storage Systems; Exhibit 2B, E8.1 Control Operations Reinforcement). See also Toronto Hydro's response to interrogatory 2B-DRC-8.

should best accommodate the significant electrification of personal vehicles and vehicle fleets across its service territory anticipated during the 2020-2024 effective period.

CUTRIC notes that 30% TTC fleet electrification is a reasonable forecast mass transit electrification in Toronto by 2025. In order to achieve that forecast, meaningful clusters of high-powered charging systems for transit and related capital investments and operations and maintenance arrangements are likely required to ensure safe and standardized charging supply equipment. Advanced distribution system planning for public fleets (including heavy-duty buses and trucks on the electricity grid) is strongly recommended in order to avoid distribution reliability issues and service gaps.

CUTRIC takes no position on whether such activities are properly carried out by the utility, an affiliate, or an unregulated entity, but notes that the ultimate distribution planning responsibility and authority for the DSP rests solidly with Toronto Hydro. As a result, the Board may wish to encourage Toronto Hydro to prudently consider and plan for current and increasing EV, BEB and EV fleet integration in and around the DSP, and proposed capital and O&M spending specifically related to EV and EV-related DERs. Toronto Hydro should not be precluded from considering cost effective and efficient EV DERs as part of its capital and distribution plans.

b) CUTRIC clarifies that the anticipated additional (new) distribution revenues to Toronto Hydro would result from the distribution revenues associated with the sale of an estimated $6 million of additional power per annum by 2025 (conservatively estimated solely from the 30% electrification of the TTC bus fleet and not including or accounting for the electrification of other personal vehicles and vehicle fleets, where cumulative year-over-year EV growth is now estimated

to be in the range of 200%).[5] It is not proposing any redistribution of electricity in commodity revenues owing to generators. However, additional loads, demand, distribution revenues, capital and O&M costs and savings associated with reasonably and conservatively estimated electrification of transportation and vehicle fleets should be prudently addressed as part of Toronto Hydro's DSP and proposed capital and operations plans.

[5] FleetCarma, "Electric Vehicles Sales Update Q2 2018, Canada" (August 10, 2018), available online at: https://www.fleetcarma.com/electric-vehicles-sales-update-q2-2018-canada/

DRC RESPONSES TO STAFF INTERROGATORIES

Interrogatory: M2-Staff-3

Reference: Exhibit M2 / p. 5 / Table 1

Preamble: CUTRIC provided the following summary table of load and revenues generated from the electrification of the TTC bus fleet and privately-owned light vehicles in Toronto.

	TTC's (ebus) electrification (100% of fleet by 2040)	TTC's (ebus) electrification (30% of fleet by 2025)	Toronto's EV (car) electrification (5% by 2025)
Total GWh	203	61	189
$	$20,015,800	$6,004,740	$18,635,400

Question(s):

a) Please advise whether it is CUTRIC's proposal that the estimated 2020-2024 load associated with the electrification of TTC buses and privately-owned light vehicles should be added to Toronto Hydro's load forecast for the 2020-2024 period. If so, please provide the estimated load for each year of the 2020-2024 period that should be included. Please also provide all supporting calculations.

Response(s):

a) The ongoing electrification of the TTC bus fleet, other vehicle fleets, and personal vehicles is anticipated to result in an increase in electricity load/demand during the 2020-2024 effective period. We have estimated the increased demand from the TTC bus fleet electrification and personal vehicles (not other fleets) to be in the range of 250 GWh by 2024.

CUTRIC is unclear how, if at all, Toronto Hydro has addressed demand from EVs and related DERs in its load forecast and it would appear to be prudent for it to include and account for EV and EV related DER electricity demand growth

assumptions in its evidence. Similarly, there does not appear to be a consideration of the impacts that EV, EV fleets and charging infrastructure and facilitated overnight charging may have on the DSP.

CUTRIC has not undertaken estimates of load growth and modelling of the potential load increases on an annual basis. Further detailed analysis and modelling with Toronto Hydro data and cooperation would be required to provide EV and EV-related DER annual load growth estimates. We note that the modelling work should include a consideration of load caused by clustered chargers (450kW-1MW), storage devices, varying bus makes and models (as they create differing loads), and announced TTC routes in order to facilitate greater accuracy in any EV related annual load growth projections. Modelling and estimates should also consider the impact of the recently announced federal EV incentives, updated EV adoption and sales figures, and significant anticipated changes in EV and internal combustion engine (ICE) new vehicle offerings over the 2020-2024 time period.

DRC RESPONSES TO STAFF INTERROGATORIES

Interrogatory: M2-Staff-4

Reference: Exhibit M2 / p. 11

Preamble: CUTRIC stated that the overhead charging system in York Region will be owned, operated and maintained by Newmarket-Tay Power Distribution Limited for the purpose of rapid charging of the electric buses of York Region Transit (Exhibit M2 / p. 11).

Question(s):

a) Please advise whether Newmarket-Tay Power Distribution Limited proposes to own the noted EV charging assets as part of its regulated business or through an affiliate.

Response(s):

a) We are not aware of the specific ownership and governance structure that Newmarket-Tay Power Distribution Limited and or its subsidiaries and affiliates intend to pursue for holding and operating the overhead charging system for the purpose of rapid charging of the electric buses of York Region Transit.

DRC RESPONSES TO STAFF INTERROGATORIES

Interrogatory: M2-Staff-5

Reference: Exhibit M2 / p. 13

Preamble: CUTRIC stated that Toronto Hydro should develop a strategic initiative that considers a number of factors (Exhibit M2 / p. 13).

Question(s):

a) Please further explain the "strategic initiative" that CUTRIC is requesting that Toronto Hydro undertake. Specifically, please provide the goals of the initiative as they relate to the distribution of electricity in Toronto and advise whether a report on this initiative should form part of Toronto Hydro's evidence in its 2025 rebasing proceeding.

Response(s):

a) Section 4 of the CUTRIC evidence at p. 13 examines the California Transit Association's 2018 study to examine electricity rate structures that may be applicable and economic for electrified transit, and in particular buses. The study included differing bus routes, rate designs, and the role of demand charges and smart charging. CUTRIC recommends that Toronto Hydro, in cooperation with the TTC initiate a strategic examination of similar considerations, implications and potential rate structures for electrified bus transit in the Toronto Hydro service territory.