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August 29, 2019

**Kirsten Walli**  
Board Secretary  
Ontario Energy Board  
P.O. Box 2319, 27<sup>th</sup> 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 (the **Proceeding**). Please find attached DRC's final submissions in the Proceeding, filed yesterday in accordance with Procedural Order No. 9. Please note that the filed document was corrupted, with the last retrievable version being filed while the matter was remedied. The clean, uncorrupted version is attached.

Sincerely,

A handwritten signature in black ink, consisting of a stylized 'L' followed by a long, sweeping horizontal stroke that ends in a small upward curve.

Lisa (Elisabeth) DeMarco

- c. All Parties to EB-2018-0165  
Distributed Resource Coalition

**ONTARIO ENERGY BOARD**

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

**AND IN THE MATTER OF** an application by Toronto  
Hydro-Electric System Limited for an order or orders  
approving or fixing just and reasonable distribution rates  
and other charges, effective January 1, 2020 to December  
31, 2024.

**EB-2018-0165**

**SUBMISSIONS OF**  
**DISTRIBUTED RESOURCE COALITION (DRC)**

**August 28, 2019**

## INTRODUCTION AND OVERVIEW

1. We are counsel to the Distributed Resource Coalition (**DRC**) in the Ontario Energy Board (the **Board**) EB-2018-0165 proceeding to review Toronto Hydro-Electric System Limited's (**Toronto Hydro's**) application pursuant to section 78 of the *Ontario Energy Board Act*, 1998, as amended, for approval of its proposed (i) electricity distribution rates and other charges effective January 1, 2020 and (ii) Custom Price Cap Index (**CPCI**) framework to set distribution rates effective for the five year period from January 1, 2021 to December 31, 2024 (collectively, the **Application**).
2. This is the first major custom incentive rate application that the Board is being asked to consider in an electricity distribution context that has changed significantly<sup>1</sup> - and continues to fundamentally<sup>2</sup> change - as a result of the use and integration of distributed energy resources including electric vehicles and energy storage (**DERs**) into the distribution grid. It is the first major application that requires the Board to consider the potential capital, operational, load, and productivity impacts of bi-directional electricity flow on the distribution grid over the next five (5) years and arrive at just and reasonable rates for all Toronto Hydro customers during this dynamic period of change.
3. Virtually all external experts providing evidence to the Board in the Application confirm that DERs are a new and relevant consideration that impacts each and all of electricity supply and demand,<sup>3</sup> customer preferences,<sup>4</sup> productivity,<sup>5</sup> reliability, and capital expenditures relevant to Toronto Hydro Rates.<sup>6</sup> Toronto Hydro's own Chief Financial Officer also confirmed that electric vehicle adoption is a material and therefore relevant

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<sup>1</sup> Hearing Transcripts, Volume 3, 150-154

<sup>2</sup> Hearing Transcripts, Volume 3, 157:8-28

<sup>3</sup> Mr. Taki (referencing London Economics, Hearing Transcripts, Volume 3, 153:1-5)

<sup>4</sup> Mr. Lyle, Hearing Transcripts, Volume 8, 13:8 to 24:19

<sup>5</sup> Dr. Lowry Hearing Transcripts, Volume 10

<sup>6</sup> Mr. Lyle Hearing Transcripts, Volume 8, 13:8-28 ( ), Dr. Lowry, LEI, Dr. Petrunic (Exhibit M2, Hearing Transcripts, Volume 11: 39-100, DRC Responses to Interrogatories); Mr. Lyberogiannis at Undertaking J.4.4 confirming that electrified vehicles and electrified transit are the largest contributors to demand from 2027-2030; Exhibit No. K3.4, Pages 310-349, JTC4.24, Appendix A

risk to asset management and operations that Toronto Hydro identifies in its audited financial statements.<sup>7</sup>

4. DRC includes end-use residential consumers with DERs that may act as producer-consumers or “prosumers” in a bi-directional electricity grid. It is the only intervenor before the Board in this Application that is focussed on the new context of electricity distribution that is, and will be, significantly impacted by DERs.
5. DRC’s commissioned expert evidence of Dr. Petronic<sup>8</sup> and submissions on the Application are intended to assist the Board in understanding the new and evolving impact of DERs on traditional rate determinants. DRC makes these submissions for the purpose of assisting the Board in: (i) optimizing proposed and existing distribution system assets and investments for the long term benefit of all customers, (ii) efficiently facilitating the integration and connection of existing and innovative DERs to achieve long term customer and grid efficiencies, and (iii) better understanding direct customer needs, preferences, and opportunities relating to DERs.
6. DRC’s submissions are largely focused on Issue 3 (Rate Base and Capital Plan), particularly Issue 3.2,<sup>9</sup> and Issue 4 (Load and Other Revenue Forecast), particularly Issue 4.1.<sup>10</sup>

They are organized as follows:

- I. The rapidly, changing electricity distribution context associated with DERs.**
- II. Potential DER related load growth and productivity enhancements**

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<sup>7</sup> Ms. Cipolla, Hearing Transcripts, Volume 3, 162;1-27

<sup>8</sup> Exhibit M2

<sup>9</sup> **Issue 3.2:** Is the level of proposed 2020-2024 capital expenditures and capital in-service additions arising from the distribution system plan appropriate and is the rationale for planning and pacing choices, including trade-offs between capital and operating costs, appropriate and adequately explained?

<sup>10</sup> **Issue 4.1:** Is Toronto Hydro's load forecast reasonable?

**III. DRC position on specific DER-related capital and operations expenditures that may result in long term productivity benefits for all Toronto Hydro customers.**

7. Generally, DRC submits that: (i) DERs and EV related DER growth and integration are resulting in fundamental changes to the distribution grid that will impact electricity supply and demand, customer preferences, capital expenditures, operations and maintenance load and productivity during rate period, (ii) DER related growth and capital investments may result in productivity enhancements proposed; but further tracking, monitoring and reporting is required, and (iii) a number of Toronto Hydro's DER – related investments may be beneficial to customers.
8. DRC respectfully requests that the Board:
  - (a) Include a consideration of the material and relevant evidence on the DER context in its decision on the Application.
  - (b) Require Toronto Hydro to transparently track and report upon its capital expenses, operating expenses, and actual or estimated savings associated with its DER related grid modernization, EV customer integration (including the TTC electric bus fleet), and the Toronto Hydro vehicle fleet, in a manner similar to that required by the US utilities referred to in the evidence of Mr. Lowry at Exhibit L1, Tab 1, Schedule 2, Attachment A at p.19 of 83.
  - (c) Require Toronto Hydro to report and track its capital, and operations and maintenance costs associated with EV deployment in a manner similar to National Grid as per the evidence of Dr. Lowry (Hearing Transcripts, Volume 10, 77:17-28)) and associated with and its own vehicle fleet as requested by Dr. Petrunic (Hearing Transcripts, Volume 11:, page 86-88);
  - (d) Require Toronto Hydro to track and report on the load impacts of the City of Toronto/Toronto Transit Commission bus electrification initiative, including the

TTC Arrow Garage and related electricity storage facilities in each year over the 2020-2024 rate period (Hearing Transcripts, Volume 11, 90-92).

- (e) Request that Toronto Hydro consider customer and stakeholder research and outreach, potentially in coordination with relevant transportation ministries, agencies, and the Toronto Transit Commission, to ascertain the existing number of EV DER customers and the growth rate of such customers in its service territory;
- (f) Consider the customer benefits and potential productivity gains associated with Toronto Hydro Capital Plan DER-related investments including Area Conversions, Energy Storage Systems, Stations Expansions, and Control Operations Reinforcements.
- (g) Require Toronto Hydro to support all vehicle fleet capital and operations costs with detailed financial information on capital, fuel, and maintenance costs, and consider available electric vehicle incentives; and
- (h) Consider exempting certain DER capital investments from the stretch factor that the Board arrives at in relation to the proposed C-factor, if such capital investment are demonstrated to be net productivity enhancing in Toronto Hydro's annual reports during the 2020-2024 rate period.

***I. The rapidly changing electricity distribution context associated with DERs.***

- 9. DRC submits that growth and integration of DERs, including electric mobility DERs, resulting from the electrification of transportation are fundamentally changing the distribution of electricity. Specifically each and all of electricity supply and demand, customer preferences, capital expenditures operations and maintenance, and load are being materially impacted by DERs.
- 10. The Independent Electricity System Operator (IESO) defines DERs as “electricity-producing resources or controllable loads that are directly connected to a local

distribution system or connected to a host facility within the local distribution system.”<sup>11</sup>  
DERs may include solar panels, combined heat and power plants, electricity storage, small natural gas-fuelled generators, electric vehicles, and controllable loads (such as HVAC systems and electric water heaters).<sup>12</sup>

11. London Economics International confirmed the significant integration of nearly 800 MW of DERs (see Figure 1<sup>13</sup>) in Ontario finding that:
  - (a) Ontario has seen very significant DER growth, which has impacted distributor operations across the province with respect to monitoring and control of energy delivery and management;
  - (b) Growth of DERs has given distributors some of the reliability responsibilities traditionally reserved for transmission utilities;
  - (c) Electricity distribution grids are undergoing fundamental changes as a result of advancement of DERs, smart grids, and integration of EVs; and
  - (d) Growth in small scale generation and other DERs means that distributors at times need to manage bi-directional flow of electricity between the utility and consumers.<sup>14</sup>
12. **Supply and Demand.** Mr. Taki confirmed that DERs are in fact changing Toronto Hydro's traditional supply and demand parameters and playing an important role in related services.

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<sup>11</sup> Exhibit K3.4 (DRC Compendium for Panel1), Tab 3, p. 018 (IESO, Ontario's Power System, Distributed Energy Resources). During the oral hearing phase of the proceeding, Mr. Taki agreed that DERs can be defined in this matter and was comfortable proceeding with further questions on the basis of this definition (Hearing Transcripts, Volume 3, 152:5-7).

<sup>12</sup> Exhibit K3.4 (DRC Compendium for Panel1), Tab 3, p. 018 (IESO, Ontario's Power System, Distributed Energy Resources).

<sup>13</sup> Figure 1: Exhibit 2B, Section E8.1, Appendix A, pp. 15.

<sup>14</sup> Exhibit 28, Section E8.1, Appendix A, pp. 15-16.

"Ms. DEMARCO: Yes, no problem. Your evidence appears to confirm that innovation, including distributed energy resources, are changing Toronto Hydro's traditional supply and demand parameters. Is that correct?" Mr. TAKI: Yes." <sup>15</sup>

13. **Customer Needs.** Mr. Lyberogiannis confirmed that DERs including energy storage are also driving beneficial system service investments at low or no cost to customers and over 8000 inquiries. <sup>16</sup>
14. **Customer Preferences.** Mr. Lyle confirmed that large customers found the following two DER issues to be a top priority outcome from Toronto Hydro (i) "enhancing the electrical system to enable the mass adoption of electric vehicles and the redemption of GHGs; and (ii) "priority behind the meter electricity solutions and services, energy storage for quality distributed generation". <sup>17</sup>
15. Mr. Lyle's surveys also found that about 90% of customers surveyed found behind the meter DERs and the capital expenditures associated with them to be "important, very important or extremely important". And a majority of customers found electric vehicles to be important, very important, or extremely important. <sup>18</sup>
16. **Demand and Load Growth.** Toronto Hydro confirmed that there are a number of additional policy initiatives that may further increase and accelerate the penetration of electric mobility DERs and related impacts on the distribution system. These include:
  - (a) The 2019 federal budget that provides a significant \$5000 incentive for electric vehicles and further incentives for electrification of vehicle fleets for a period of 3 years, as well as incentives to vehicle dealers;
  - (b) The Ontario Government's Environment Plan that includes low carbon vehicles as part of the planned GHG reduction;

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<sup>15</sup> Hearing Transcripts, Volume 3, 153: 1-23

<sup>16</sup> Hearing Transcripts, Volume 3, 153:19- 154:6

<sup>17</sup> Hearing Transcripts, Volume 8, 13:8-28

<sup>18</sup> Hearing Transcripts, Volume 8, 14:15



- (c) The City of Toronto's green fleet initiative that contemplates integrating over 10,000 electric vehicles;
  - (d) The TTC's purchase and delivery of 60 electric buses in 2019;
  - (e) The Board Advisory Committee on Innovation recommendation of November 2018, which include enhancing customer choice and solutions through DERs;
  - (f) And Toronto Hydro's on vehicle fleet electrification initiatives.<sup>19</sup>
17. **System Benefits.** There are several well-reported benefits of DERs. Toronto Hydro cited several benefits of energy storage identified by the Electric Power Research Institute in a 2010 report in support of its Energy Storage Systems program proposal (the EPRI Benefits).<sup>20</sup> DRC submits that the EPRI Benefits may apply to all DERs, including energy storage facilitated by EVs (commonly known as “vehicle to grid”), and are not restricted to the traditional energy storage context. They include: (i) economic benefits (optimized generator operation, deferred generation capacity investments, reduced ancillary service cost, reduced congestion cost, deferred transmission capacity investments, reduced electricity losses, reduced electricity costs); (ii) reliability benefits (reduced sustained outages, reduced momentary outages, reduced sags and swells); and (iii) environmental benefits (reduced CO2 emissions, reduced SOx, NOx, and PM-10 emissions).<sup>21</sup>
18. DERs are the subject of three ongoing Board consultations (EB-2018-0287, EB-2018-0288, and EB-2019-0207, respectively). However these proceedings are not conducive to the detailed consideration of proposed DER related investments in the Toronto Hydro Capital Plan and Distribution System Plan.

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<sup>19</sup> Hearing Transcripts, Volume 3, 160-176

<sup>20</sup> Exhibit 28, Section E7.2, Appendix A.

<sup>21</sup> Exhibit 28, Section E7.2, Appendix A (Table 21).

19. The Central Toronto Area Integrated Regional Resource Plan (the IRRP) prepared by the IESO on behalf of the Central Toronto Area Working Group (which includes Toronto Hydro) identified long-term needs for electricity planning.
- (a) Recent trends (including policy changes supporting distributed generation) are changing the landscape for regional electricity planning. "Traditional", wire-based approaches to electricity planning may not be the best fit for all communities.<sup>22</sup>
  - (b) The "community self-sufficiency" approach to regional electricity planning places emphasis on meeting community needs largely with local, distributed resources, which include, inter alia, demand response, distributed generation and storage, smart grid technologies, and EVs.<sup>23</sup>
  - (c) Integrated energy planning at the community level provides an opportunity for broader consideration of land-use, development and growth, infrastructure requirements, and technology solutions that include, inter alia, energy storage technologies, battery EV storage capabilities (especially for load intensification cluster applications), micro-grid and micro-generation capabilities.<sup>24</sup>
  - (d) There is a strong community interest in the "community self-sufficiency" approach to planning.<sup>25</sup>
20. Electric mobility related DERs are also expected to have a very significant impact on load growth over the rate period and out to 2030. In fact, Mr. Lyberogiannis confirmed that electrified vehicles and electrified transit are the highest categories of load growth per Toronto Hydro from 2027 to 2030 in Undertaking J.4.4

“MS. DEMARCO: Okay. So I was going to walk you through it. Certainly these charts appear to indicate a very significant increase in EVs that are going into your load forecast over time. In fact, let's

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<sup>22</sup> Exhibit 2B, Section B, Appendix E, p. 85.

<sup>23</sup> Ibid., p. 86.

<sup>24</sup> Ibid., p. 90.

<sup>25</sup> Ibid., p. 89.

just take Rexdale. In 2041, it is one of the -- it is in fact the highest, no second-highest. It and transit are the second -- are the two highest categories of demand. Is that fair?

MR. LYBEROGIANNIS: What this is showing is that in 2041 on the particular bus, the BY bus, transit would be of the specific load drivers that are identified, transit would be the largest, followed by electric vehicles.

MS. DEMARCO: Instead of asking you to do this on the record now, can I ask you to undertake and just confirm in that in virtually all instances, EV and transit are some of the highest categories of the demand at virtually all of the stations? MR. LYBEROGIANNIS: In 2041?

MS. DEMARCO: Yes, over the course of that period.

MR. LYBEROGIANNIS: I can review it and provide you a response to that.

MS. DEMARCO: Thank you. Those are my questions.

MR. MILLAR: So that will be J4.4.”<sup>26</sup>

21. Undertaking J4.4 provides that:

Reference(s): Exhibit No. K3.4, Pages 310-349, JTC4.24, Appendix A. To undertake and confirm in that in virtually all instances, EV and transit are some of the highest categories of the demand at virtually all of the stations RESPONSE: From 2027 to 2030, the EV category or Transit category are the largest contributors. Further Mr. Lyberogiannis also confirmed that those elements of load growth do not simply start in 2027. Load from electrified transit is steadily inscreasing and they simply has not broken down 2027.<sup>27</sup>

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<sup>26</sup> Hearing Transcripts Volume 3, 31:27 to 32:27

<sup>27</sup> Hearing Transcripts, Volume 4, 31:18-22

**B. CUTRIC Evidence: key findings and recommendations**

1. DRC commissioned expert evidence prepared by Dr. Josipa Petronic, Executive Director and CEO of the Canadian Urban Transit Research & Innovation Consortium (**CUTRIC**), to assist the Board in this proceeding. Dr. Petronic's report titled "Electrified Transportation Systems in the Context of Utility Planning: Light-Duty and Heavy-Duty Applications" is filed on as Exhibit M2 (the **CUTRIC Evidence**). DRC commissioned the CUTRIC Evidence in order to facilitate consideration of EVs and related DERs as valid investments to assist in ensuring distribution system efficiency and reliability. Dr. Petronic received and responded to interrogatories on the expert evidence. Dr. Petronic was qualified as an expert witness and made available for direct and cross examination during the oral hearing phase of the proceeding on July 16, 2019. We ask that the Board afford full weight to Dr. Petronic's evidence given the depth and breadth of her recognized expertise, experience, and publications. This request is supported by the demonstrated independence of both Dr. Petronic and CUTRIC, which has an extremely and intentionally broad and representative membership, and a governance regime that is designed to ensure objectivity in its detailed research and analysis.
2. The CUTRIC Evidence examines the customer efficiencies that may be effected through progressive integration of EVs (including battery electric buses (BEBs)) and related DERs into electricity distribution systems. CUTRIC modelled and examined case studies considering EVs, charging infrastructure, BEBs, and potential EV-related energy storage and concluded 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 to 2024 rate period that is the subject of the proceeding.
3. CUTRIC also noted 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.

4. In summary, the CUTRIC Evidence recommends that, in light of the overall customer efficiencies and general trends in EV integration, the Board should 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 to 2024 period.
5. The CUTRIC Evidence takes no position on the ownership structure or investment model. It highlights the distribution and other customer efficiencies that are likely to result from known and anticipated EV and EV DER initiatives. The CUTRIC Evidence also 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.
6. The CUTRIC Evidence does, however, support the 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 to 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. The CUTRIC Evidence supports DRC's submission 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.

In summary on this point, DERs currently are having and will continue to have a significant impact on virtually all material rate parameters. The changing DER context should therefore, be actively considered by the Board in setting just and reasonable rates for Toronto Hydro for the 2020 to 2024 rate period.

## ***II. Potential DER related load growth and productivity enhancements***

22. While the Toronto Hydro evidence references DERs, it does not expressively quantify the potential of its DER capital investments to enhance both load growth and productivity. Toronto Hydro recognizes its role in its service territory as evolving as new DER technologies emerge and are changing Toronto Hydro's traditional supply and demand parameters.<sup>28</sup> Toronto Hydro states:

Technology and innovation are driving a more dynamic system that is transitioning away from usual patterns of supply and demand towards more complex interactions and inputs in electricity generated and consumed. The role of the utility continues to evolve to support the new smart grid ecosystem, comprising renewable and other distributed energy resources, microgrids, electric vehicles, and growing interest in energy storage for power quality, off-peak storage, and grid resilience.<sup>29</sup>

7. Toronto Hydro further recognizes that the adoption of electric vehicles is a material operations and asset management risk to its business. Specifically, in its Financial Report for the year-ended December 31, 2018, Toronto Hydro notes that "it must make upgrades to keep pace with urban intensification and electrification and ensure good stewardship of the distribution system."<sup>30</sup> As adoption of EVs and fuel-switching increases, the pressure on its system may increase and drive a need for incremental capital expenditures for system upgrades to handle increased loads. DRC submits that proactive and certain efficient DER related capital and operations expenses may therefore be prudent.
8. Toronto Hydro is also part of the Electric Vehicle Work Group, which collaborated with the City of Toronto's Environment and Energy Division (collectively, TransformTO) to develop the Electric Mobility Strategy Framework (the Framework).<sup>31</sup> The Framework includes several objectives, including establishing a robust network of EV charging infrastructure that supports the City of Toronto's targets for the conversion of the City's

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<sup>28</sup> Hearing Transcripts, Volume 3, 152:22-153:17

<sup>29</sup> Exhibit 18, Tab 1, Schedule 1, p. 17.

<sup>30</sup> Exhibit U, Tab 1C, Schedule 4 (Financial Report), p. 28; Exhibit U, Tab 1C, Schedule 5 (Annual Information Form).p. 34; Hearing Transcripts, Volume 3, 161:10-162:27.

<sup>31</sup> Exhibit K3.4 (DRC Compendium for Panel 1 ), Tab 1, p. 011; Hearing Transcripts, Volume 4, 4:8.

vehicle stock and advances Transform TO's guiding principles.<sup>32</sup> Those targets include: (i) all electric buses by 2040; (ii) all new personal and light duty vehicles are electric by 2030; and (iii) all City-owned vehicles are electric by 2042.<sup>33</sup>

9. Yet there does not appear to be any quantification<sup>34</sup> of the impact of DERs on load forecasting, capital, operations, reliability, and productivity. Toronto Hydro's updated load forecast at Exhibit U, Tab 3, Schedule 1 does not incorporate EV or distributed generation estimates despite this evidence.<sup>35</sup>
10. In 2017 alone, Toronto Hydro responded to over 8,000 inquiries from DER customers. Distributed generation connections in Toronto are expected to reach 800 MW by the end of 2024,<sup>36</sup> even while excluding energy storage facilitated by EVs.<sup>37</sup>
11. Further, Toronto Hydro confirmed that from 2027 to 2030, EV and electrified transit growth are the largest load drivers.<sup>38</sup>
12. It is therefore difficult to reconcile how DERs are immaterial to load growth during the rate period, in the face of this evidence or any other quantification analysis to assess Toronto Hydro's determination of immateriality.
13. Dr. Lowry indicates that information on DER and electric mobility related impacts of DERs on load growth and productivity has been determined to be material in this and other jurisdictions.<sup>39</sup> Further, Dr. Lowry indicates such information on DERs may assist the Board in considering capital expenditures that may increase costs in the short term but result in greater efficiency in the longer term.<sup>40</sup>

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<sup>32</sup> Exhibit K3.4 (DRC Compendium for Panel 1 ), Tab 1, p. 006.

<sup>33</sup> Exhibit K3.4 (DRC Compendium for Panel 1 ), Tab 1, p. 007.

<sup>34</sup> Hearing Transcripts, Volume 4, 10:14-15.

<sup>35</sup> Exhibit 3, Tab 1, Schedule 1, p. 11.

<sup>36</sup> Exhibit 28, Section E8.1.3.3, p. 12; Hearing Transcripts, Volume 3, 154:2-13.

<sup>37</sup> Technical Conference Undertaking Response JTC2.30.

<sup>38</sup> Oral Hearing Undertaking Response J4.4.

<sup>39</sup> Hearing Transcripts, Volume 10, 80:24-88:11

<sup>40</sup> Hearing Transcripts, Volume 10, 76:15-28, 77, 79:4-26

14. In the absence of DER related load, expense and productivity data, or a related metric, Dr. Lowry indicates that the productivity measures may be skewed – particularly if the regulator does not take into account the new things the grid can do.<sup>41</sup>
15. Dr. Petronic therefore encouraged the Board to require further electric mobility and other DER related reporting and tracking by Toronto Hydro throughout the rate period.<sup>42</sup>
16. Specifically Dr. Petronic recommended, and DRC hereby requests, that the Board require Toronto Hydro to do the following:
  - Transparently track and report on capital expenses, operating expenses, and actual or estimated savings associated with its DER related grid modernization, EV customer integration (including the TTC electric bus fleet), Toronto Hydro vehicle fleet that are now and will continue to be incurred by Toronto Hydro in a manner similar to that required by the US utilities referred to in the evidence of Mr. Lowry at Exhibit L1, tab 1, Schedule 2, Attachment A at p. 19 of 83.
  - Report and track capital and operations and maintenance costs associated with EV deployment in a manner similar to National Grid as per the evidence of Dr. Lowry and associated with and Toronto Hydro's own vehicle fleet as requested by Dr. Petronic (Hearing Transcripts, Volume 11: 86-88)
  - Track and report on the load impacts of the City of Toronto/ Toronto Transit Commission bus electrification initiative, including the TTC Arrow Garage and related electricity storage facilities in each year over the 2020-2024 rate period (Hearing Transcripts, Volume 11, 90-92).
  - Consider customer and stakeholder research and outreach (potentially in coordination with relevant transportation ministries, agencies, and the Toronto

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<sup>41</sup> Hearing Transcripts, Volume 10, 80:24 to 88:11

<sup>42</sup> Hearing Transcripts, Volume 11



Transit Commission,) in order to ascertain the existing number of EV DER customers and the growth rate of such customers in its service territory.

***III. DRC position on specific DER-related capital and operations expenditures that may result in long term productivity benefits for all Toronto Hydro customers.***

23. Toronto Hydro's capital expenditure plan (the Capital Plan) is set out in the DSP<sup>43</sup> includes specific capital programs.<sup>44</sup> It proposes \$2.83 billion in capital expenditures over the 2020 to 2024 period. DRC is of the view that a number of proposed expenditures related to certain DERs may result in shorter term costs that, as Dr. Lowry suggest, may lead to longer term productivity and customer benefits. We have specifically considered the Capital Plan relating to:
- (a) E6.1 – Area Conversions (a component of System Renewal Investments);
  - (b) E7.2 – Energy Storage Systems (a component of System Service Investments);
  - (c) E7.4 – Stations Expansion (a component of System Service Investments);
  - (d) E8.1 – Control Operations and Reinforcement (a component of General Plant Investments); and
  - (e) E8.3 – Fleet and Equipment Services (a component of General Plant Investments).
17. Contrary to Board Staff submissions and the existing Board guidance on electric mobility DERs, DRC respectfully submits that the Board should prudently consider electrified transportation DERs as potentially eligible distribution investments, where they are economic, prudent and facilitate long term customer efficiency. DRC respectfully submits that the Board's should facilitate consideration of EVs infrastructure and related

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<sup>43</sup> Exhibit 2B, Section E.

<sup>44</sup> Exhibit 1B, Tab 1, Schedule 1, p. 29.

DERs as potentially valid investments to assist in ensuring distribution system efficiency and reliability.

**A. E6.1 – Area Conversions**

18. DRC supports Toronto Hydro’s proposed Area Conversions program on the basis of the improvements it will make to distribution system designs in certain areas, including high growth, high density areas, to facilitate DER and EV-related DER integration and connection.
19. The Area Conversions program funds the replacement of 4.16kV distribution system designs with updated standard 13.8 kV and 27.6 kV designs. The program is intended to address below-average customer reliability outcomes and mitigate public and employee safety risks and other operational and customer service deficiencies posed by legacy and aging assets.<sup>45</sup>
20. Toronto Hydro states that the program contributes to its customer service performance and customer satisfaction by, inter alia, “improving the speed and cost-efficiency of customer grid access (including generation and EV access) in high-growth areas of downtown Toronto by converting approximately 2,600 poles [...] to more efficient and flexible higher voltage standards.”<sup>46</sup> The program will therefore enhance Toronto Hydro’s ability to connect EV charging stations and renewable generation connections in high-growth areas of downtown Toronto where, to-date, legacy distribution assets have remained in use.
21. DRC supports the Area Conversion program to the extent that it will improve Toronto Hydro’s ability to connect EV charging stations, electrified fleets and other DERs to the distribution system, and do so at lower overall customer and developer costs.

**B. E7.2 – Energy Storage Systems**

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<sup>45</sup> Exhibit 28, Section E6 .1, p. 1.

<sup>46</sup> Exhibit 28, Section E6.1.2, p. 3 (Table 2).

22. DRC supports each and all of Toronto Hydro's Energy Storage Systems (ESS) program investment segments on the understanding that further tracking and reporting on their performance outcomes will be undertaken and filed by Toronto Hydro.
23. First, grid performance ESS benefits multiple customers and assists in remediating power quality problems, improving reliability, and increasing feeder capacity at peak.<sup>47</sup> The evidence of the TTC's intended use of its electrified buses in outage situations (Hearing Transcripts, Volume 3, 155:11-28) supports the potential use of DERs to enhance reliability. Second, renewable enabling ESS supports the growth of distributed renewable generation and may offset generation and transmission investments and produce environmental benefits.<sup>48</sup> While the Capital Plan does not put forward any EV ESS, Toronto Hydro notes that renewable enabling ESS may also, "cost effectively enable EVs to connect to the distribution system by addressing localized system constraints."<sup>49</sup> Third, the customer-specific ESS do not appear to add to rate base or the revenue requirements. During the 2018 to 2024 period, these include the Metrolinx Eglinton Crosstown Light Rail Transit ESS, the Metrolinx Finch West Light Rail Transit ESS, the Toronto Transit Commission (TTC) Arrow Road Garage ESS, and the Metrolinx Willowbrook Yard ESS. Each of these is within the sphere of transit electrification, and the TTC Arrow Road Garage ESS project explicitly supports the TTC's initiative to electrify its bus fleet.<sup>50</sup>
24. Board Staff supports the use of storage as an alternative to conventional assets to provide distribution service, where it is the lower cost solution over the long term, and is consistent with the general expectations articulated by the Board.<sup>51</sup> Board Staff and DRC are also aligned in the view that Toronto Hydro's grid enhancement and renewable enabling ESS projects are, conceptually, reasonable applications of storage for the

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<sup>47</sup> Exhibit 28, Section E7.2, p. 2.

<sup>48</sup> Exhibit 28, Section E7.2, p. 3.

<sup>49</sup> Exhibit 28, Section E7.2, pp. 2, 4, 32. See also Hearing Transcripts, Volume 3, 153:13-25.

<sup>50</sup> See Exhibit K3.4 (DRC Compendium for Panel 1), Tab 2, p. 014.

<sup>51</sup> Ontario Energy Board Staff Submission (August 21, 2019), p. 85.

distribution system that should be eligible for cost recovery.<sup>52</sup> Consistent with Board Staff, DRC respectfully requests that the Board require Toronto Hydro to undertake tracking and reporting to enable more rigorous cost-benefit assessment, including some estimation or quantification of the value of deferring other distribution system investment where applicable, to support future proposals for energy storage projects.<sup>53</sup>

25. In contrast to Board Staff, DRC submits that Toronto Hydro's customer-specific ESS may in fact constitute "distribution activities" given that the storage systems - particularly those for electrified public transit - do meet criteria established by the Board for distribution system assets and the proposed services are services that distributors are required to, and should, deliver,<sup>54</sup> in the public interest.<sup>55</sup>
26. DRC takes no general position at this time on whether EV charging services are "distribution activities", but notes that the BCUC has recently supported utility involvement in such services.<sup>56</sup> DRC also takes no position at this time on whether DER and EV infrastructure should be directly owned by a utility, a competitive affiliate, or an arm's length entity. However DRC hopes to ensure that efficient EV and EV-related DERs are not precluded from consideration as efficient options for Toronto Hydro and its customers in optimizing the distribution system.<sup>57</sup>

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<sup>52</sup> Ibid.

<sup>53</sup> Ibid., p. 86.

<sup>54</sup> Ibid., p. 87. See, for context, Ontario Energy Board Act, 1998, SO 1998, c 15, Sched B, s 71.

<sup>55</sup> Ibid., p. 91. Board Staff further submits that this is consistent with the July 7, 2016 Board Staff Bulletin, which sets out Board Staff's view that "the ownership or operation of an EV charging station, and the selling of EV charging services from that facility, do not constitute distribution or retailing." [OEB Staff Bulletin on Electric Vehicle Charging (July 7, 2016), p. 2.]

<sup>56</sup> BCUC Project No. 1598941. The BCUC's Phase One and Phase Two reports are available online at: <https://www.bcuc.com/ApplicationView.aspx?ApplicationId=653>.

<sup>57</sup> 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-201 0-0142, EB-2011-0123) related to EV DER pilots; and (iii) the Board Staffs July 7, 2016 Bulletin providing that a distribution license is not required for owning and operating an EV charging station.

27. While the Board has active DER policy proceedings (EB-2018-0287/0288; 2019-0207), these are not conducive to considering specific Toronto Hydro DER investments that may be beneficial to rate payers over the 2020-2024 period.

**C. E7.4 – Stations Expansion**

28. DRC supports the Local DR segment of Toronto Hydro's Stations expansion program, which includes non-wires investments to manage local capacity constraints while deferring larger, traditional wires investments.<sup>58</sup>
29. The next phase of local DR is expected to reduce peak load by about 10 MW over the 2020 to 2024 period, supporting the deferral of capital investments of approximately \$135 million by five to six years.<sup>59</sup> DRC submits that Toronto Hydro's information and financial modelling of the deferred investments in this case is helpful to the Board in assessing the relative merits of a project that realizes the benefits of DERs in relation to the distribution system. This deferred cost analysis should be extended to other areas of the Capital Plan where innovative strategies can assist in optimizing existing energy assets and efficiently facilitating the integration and connection of DERs to achieve customer and grid solutions, as recommended by Dr. Petrunic.

**D. E8.1 – Control Operations and Reinforcement**

24. DRC supports Toronto Hydro's dual control centre proposal, which will facilitate the utility's capacity to manage bi-directional flow of electricity, and enable several DER and EV-related DER efficiencies.<sup>60, 61, 62, 63</sup>

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<sup>58</sup> Exhibit 2B, Section E7.4, p. 2.

<sup>59</sup> See Oral Hearing Undertaking Response J4.1 and the additional references therein.

<sup>60</sup> Exhibit 2B, Section E8.1, p. 1.

<sup>61</sup> Exhibit 2B, Section E8.1, p. 3.

<sup>62</sup> Exhibit 2B, Section E8.1, Appendix A, pp. 15-16.

<sup>63</sup> Interrogatory Response 2B-DRC-11.

**E. E8.3 – Fleet and Equipment Services Fleet.**

25. Toronto Hydro's existing light-duty vehicle fleet has 9 EVs, 41 hybrid electric vehicles, and 153 non-EV/non-hybrid vehicles.<sup>64</sup> Approximately 25% of Toronto Hydro's light-duty vehicle fleet is therefore electrified. Its existing heavy-duty vehicle fleet has no EVs, 3 hybrid electric vehicles, and 226 non-EV/non-hybrid vehicles.<sup>65</sup> Toronto Hydro was unable to provide a comparison of the differences between the fuel costs for EVs versus non-EVs indicating that EV fuel costs are not tracked separately from combustion engine fuel costs.<sup>66</sup> DRC respectfully submits that any and all fleet investments should be supported by a break down of fuel, capital, and operating costs. The related legacy costs associated with internal combustion engine fleet vehicles should not be supported and included in the revenue requirements absent such information.
26. In addition to a purchase incentive for EVs of \$5,000,<sup>67</sup> the 2019 federal budget provides for a series of financial incentives directed at electrification of light-duty, medium-duty, and heavy-duty vehicle fleets. Capital costs for eligible ZEVs will be deductible up to a limit of \$55,000 plus sales tax, which is higher than the current capital cost limit of \$30,000 plus sales tax.<sup>68</sup> Toronto Hydro indicated in an undertaking response to DRC that closer to the time of procurement, and based on a number of factors such as availability, cost and business needs, the utility may consider Zero Emission Fleet Vehicles.<sup>69</sup> It further indicated that it does not have the information to determine whether or not it qualifies for the 2019 federal budget incentives.<sup>70</sup> DRC therefore submits that the Board should consider the available EV financial incentives its consideration of Toronto Hydro's proposal vehicle fleet capital and operating budget.

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<sup>64</sup> Oral Hearing Undertaking Response J5.1 0.

<sup>65</sup> Ibid.

<sup>66</sup> Oral Hearing Undertaking Response J5.1 2.

<sup>67</sup> See para Error! Reference source not found ..

<sup>68</sup> Exhibit K5.4 (DRC Compendium for Panel2), Tab 3, p. 014.

<sup>69</sup> Oral Hearing Undertaking Response J5.9.

<sup>70</sup> Ibid.

ALL OF WHICH IS RESPECTFULLY  
SUBMITTED THIS 28<sup>th</sup> day of August, 2019

A handwritten signature in black ink, consisting of a large, stylized 'L' followed by a long, sweeping horizontal stroke that ends in a small upward flick.

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Lisa (Elisabeth) DeMarco  
DeMarco Allan LLP  
Counsel for Distributed Resource Coalition

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