ELECTRICITY DISTRIBUTORS' ROLE IN A NET-ZERO FUTURE

Submission to Environment and Climate Change Canada
RE: A Clean Electricity Standard in Support of a Net-Zero Electricity Sector

PREFACE

The Electricity Distributors Association (EDA) is grateful for the opportunity to provide comments on 'a clean electricity standard in support of a net-zero electricity sector: discussion paper'.

The EDA represents local hydro utilities in Ontario, the part of the electricity system that is closest to customers. Ontario's local hydro utilities are on the front lines of power and work to keep our electricity system safe, reliable and affordable for households, small businesses, farms and commercial/industrial customers. Because we are so close to our customers, the EDA is a crucial source of information and helpful advice to governments – and we are essential partners in delivering on energy policy.

Between 2000 and 2017, Ontario's electricity GHG emissions declined from 43.4 MT CO2e to 2.0 MT by entirely phasing out coal generation. Today, people and businesses in Ontario enjoy 94% emissions free electricity, which helps support a robust society and economy.

Ontario has been Canada's leader in decarbonizing grid scale generation, achieving the most significant net reductions to date. Ontario is now poised to lead the path that will address the final incremental emissions from electricity generation. This final 6% is known to be the most challenging and costly, because it is entirely comprised of combined-cycle gas generation which guarantees the reliability of the grid unlike any other resource can at present.

With economic recovery well underway, Ontario's system operator and planners are projecting significant load growth over the next two decades. Broad electrification is Ontario's opportunity to completely decarbonize its economy. With this opportunity, comes significant challenges that can only be addressed through coordination between all levels of governments, local utilities, other stakeholders and end-consumers.

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I. EXECUTIVE SUMMARY

Climate change is the biggest environmental, social, and economic threat facing our planet today. Thorough and immediate action is required to address the root cause of climate change, namely the emission of greenhouse gases (GHGs) from the combustion of fossil fuels to power our homes, modes of transportation and economy. Local hydro utilities, (or "local distribution companies" or LDCs, as they are known in Ontario) will need to navigate the environmental changes in the electricity industry that will occur and plan the adoption of new policies to support Canadian net-zero goals. This paper aims to inform distributors of opportunities related to net-zero initiatives and to identify regulatory barriers that need to be addressed to enable LDCs to achieve these goals. This will assist distributors in determining which roles their utilities can undertake to facilitate and support net-zero initiatives.

Summary of Recommendations for the Net-Zero Report:

1. LDCs should be enabled to provide a broader range of services to customers, including:

    a. EV charging infrastructure, make-ready investments, and fleet services,
    b. On-site solar energy and storage solutions, including facilitating installation, financing and operations,
    c. Options for renewable energy supply,
    d. Customer support for beneficial electrification (e.g., fuel switching), and
    e. Options for customer adoption of energy efficiency measures.

2. To enable effective distribution system planning in Ontario, additional guidance from the Ontario Energy Board (OEB) will be required, including:

    a. Providing flexibility to LDCs to implement non-wires solutions as a procured service or a capital asset owned by the utility (e.g., energy storage),
    b. Scenario planning related to potential demand forecasts resulting from net-zero initiatives, and
    c. Cost recovery for grid modernization investments related to visibility and operations of distributed energy resources (DERs)

3. The utility remuneration framework that supports cost recovery and regulated return on investment should establish performance metrics related to the achievement of climate-friendly targets, including the connection of non-emitting DERs, supporting the adoption of EVs, and deploying energy efficiency program

4. LDCs are encouraged to form partnerships within the communities they serve to support achievement of net-zero goals

5. Ontario's LDCs must be part of planning and decision-making to ensure customers can successfully transition to low-carbon energy options.

II. ELECTRICITY DISTRIBUTORS ASSOCIATION COMMENTS

a. Introduction

The *Canadian Net-Zero Emissions Accountability Act* became law in 2021 and commits the Government of Canada to achieving net-zero emissions by 2050. Action by the federal government is widely supported by the Canadian public, and municipalities across Canada are also establishing their own climate action plans or net-zero goals. Many Ontario municipalities have publicly announced their net-zero commitments, including, but not limited to, Kingston, Guelph, Toronto, London, Ottawa, Thunder Bay, Halton Hills, Burlington, and St Catharines.

Many businesses and investors are responding to the calls for climate action and establishing environmental, social, and governance (ESG) mandates and targets and ESG investment factors are now embedded within capital markets. In addition to being viewed as good 'business sense', ESG goals are now also relevant for financial valuations of companies and leading to more sustainable financial markets and better outcomes for societies.

In Ontario, the provincial government is embracing ESG goals to attract investment to the province. The government recently adopted climate-friendly policies including exploring a moratorium on new gas-fired generation and path to zero-emissions grid and establishment of a clean energy credit (CEC) registry to support voluntary purchases of CECs to enable customers in meeting their clean energy goals.

Transforming to a net-zero economy requires an evolution of the energy systems that power day-to-day activities from the residential sector through to large industrial processes. Simultaneously, this transformation requires an increase in zero-emissions electricity supply and an increase in the use of electricity in processes and systems as an alternative to fossil fuel energy.

Beneficial electrification is central to net-zero strategies and will have a significant impact on the distribution system, where the vast majority of electricity load is connected. Increased electricity demand is expected as customers adopt electric vehicles (EVs), electrify building heating (e.g., heat pumps) and install new industrial equipment, such as electric arc furnaces. With a greater reliance on electricity for transportation, building heating, and industrial processes, the reliability and resilience of the electricity system is also critical as the economy evolves.

Given their central role in connecting and delivering electricity to customers, LDCs play a critical role in meeting net-zero goals of governments and customers. To achieve a net-zero economy, two changes are certain to take place that will transform the traditional operations of the electricity distributor:

- The energy supply mix will shift to non-emitting and renewable sources of energy, and

- There will be an increase in consumer demand for electricity as the economy shifts away from the use of fossil fuels.

LDCs must navigate the changing electricity landscape, recognizing that innovative approaches will be required to connect more electric load and operate the grid with more renewable energy supply and variable load. With these trends on the horizon, LDCs are to assess their preparedness for the development of a new electricity business model and plan their distribution systems to support the net-zero economy. This includes investing in grid modernization to ensure consistent and reliable distribution of clean energy at the lowest cost.

b. LDCs in the Transition to a Net-Zero Economy

LDCs have a central role in the net-zero economy supporting both customers and local, provincial and federal governments in their electrification and decarbonization strategies. The core functions of LDC operations include:

- Connecting customers to the distribution grid,
- Delivering electricity to customers,
- Planning, maintaining, and operating a reliable and affordable distribution grid,
- Providing accurate metering and billing for services provided, and
- Enabling customer participation in programs, including conservation and demand management and net metering.

In many jurisdictions distribution utilities are stepping up activities in recognition of the changing electricity landscape. This includes initiatives to ensure that the distribution grid is not only ready to accommodate growth but is equipped to continue to provide high-quality services with lower emissions. Examples from other jurisdictions include:

- National Grid (New York, Massachusetts, Rhode Island) has committed to a net-zero grid by 2050 through a variety of measures, including reducing demand through energy efficiency and demand response, integrating innovative technologies to decarbonize heat, interconnecting renewables and enabling and optimizing distributed generation, utilizing storage, advancing clean transportation, and investing in large scale carbon management.
- Eversource (Connecticut, Massachusetts and New Hampshire) has committed to being carbon neutral by 2030 and will achieve its targets by adopting EVs for its fleet, reducing methane leaks, facility and building energy efficiency projects, adopting innovative solutions to reducing sulfur hexafluoride (SF6) emissions at substations, and reducing line losses within its wires infrastructure.
- Southern Company (Alabama, Georgia, Mississippi) has also committed to a net-zero goal by 2050 and is undertaking a range of initiatives, including connecting more renewables and storage, investments in grid modernization and smart grid technologies,

utilizing DERs to enhance reliability, and investing in innovative pilot projects such Smart Neighborhood projects (e.g., community solar).

In Ontario several distributors have demonstrated leadership with respect to setting net-zero targets. This includes:

- Hydro One Networks' goal to achieve net-zero emission by 2050, including initiatives to adopt EVs, reducing SF6 emissions at substations, installing building automation and energy efficiency retrofits, supporting reduction in diesel fuel dependence in remote communities, and investments in carbon capture and biodiversity.
- Alectra's goal to achieve net-zero by 2050, with plans to achieve its target through building energy efficiency and adoption of EVs, among other activities to be determined.
- London Hydro has partnered with Sifton Properties Ltd on a 10-year project to build one of the province's first sustainable, net-zero communities. The community is being designed and built using SMART and net-zero technologies and will ultimately generate all the electricity that it uses.
- Utilities Kingston's Strategic Plan (2021-2025) has committed to developing a Climate Action Leadership Plan by the end of 2025. Kingston Hydro has partnered with the City of Kingston to build supportive net-zero policies and developments to reduce GHG emissions. Supporting climate change objectives includes plans to support EV adoption, home energy retrofit programs, green standard community improvement plans and replacing fleet with electric or hybrid models.
- Hydro Ottawa has recently committed to sustainability one step-further by accelerating its transition to net-zero operations by 2030 with plans forthcoming for achieving these targets. Hydro Ottawa is recognized as an industry leader distributing clean renewable energy across the nation's capital through its subsidiary company, Portage Power, that produces green power through hydroelectric, solar, and landfill gas to energy generation. In October 2020, Hydro Ottawa partnered with Zibi Canada and Kruger Products to introduce zero-carbon thermal district energy to the 34-acre waterfront site in downtown Ottawa and Gatineau.

As demonstrated above, LDCs play an important role in supporting enabling technologies and energy efficiency, and by leading by example in their communities to establish net-zero or carbon neutrality mandates. Overall, utilities should be positioned as partners with municipalities in achieving net-zero emissions policy goals and enacting proactive strategies to decarbonize the grid.

c. DERs Supporting Net-Zero Objectives

Distribution-connected generation, energy storage, and load control (i.e., demand response) are uniquely positioned to support net-zero objectives. They are a local source of electricity and can also provide valuable grid services. Specifically, DERs provide:

- A source of clean energy supply, such as solar energy systems that are either directly connected to the distribution grid or connected behind-the-meter of a distribution customer, and
- An affordable non-wires alternative to traditional grid expansion projects, such as battery energy storage or demand side management programs (including controllable EV charging) to maximize the ability of the existing grid infrastructure to support electrification and provide increased operational flexibility.

i. Role of distributed clean energy supply

To supply the required electricity to power the economy, new zero-emissions electricity supply can be connected to both the bulk transmission and distribution systems. While large scale energy projects may have economies of scale, distribution connected projects offer certain advantages, including:

1) Customer benefits – behind-the-meter electricity projects can reduce a customer's electricity bill, provide reliable back-up generation (e.g., solar plus storage), and meet customer sustainability goals (e.g., ESG goals),
2) Community support – smaller scale projects or customer-sited projects often have higher community acceptance compared to larger scale projects,
3) Speed to deployment - smaller distribution connected projects can be developed, constructed, and connected in a relatively shorter timeframe relative to larger transmission scale projects which require complex permitting and approvals, and
4) Reduced line losses – electricity produced and consumed locally reduces the need to transmit electricity over long distances resulting in reduced electricity losses.

Given the potential benefits and overall cost-effectiveness of distribution-connected clean energy supply, LDCs should continue to plan for connection requests from customers. Solar PV will likely continue to be the dominant form of distributed generation given the relative ease of its adoption by customers.

Customer facing programs supporting adoption of renewable electricity have existed in the electricity market for decades recognizing the potential benefits for customers. Most jurisdictions in North America support a form of net metering for renewable energy, which enables customers to inject electricity on to the grid in exchange for credit which offsets the customer's electricity bill. Modern programs consider the total value of generation, such as New York's Value of DER initiative which compensates customers for injected electricity based on the total value of generation, including energy, capacity, and environmental attributes.

In addition, utility-owned rooftop solar programs have been launched by at least 11 US utilities with a range of program designs. For example, Arizona Public Service launched a pilot program to provide solar energy to customers in exchange for on-bill credits for 20 years. Another pilot project offered by Tucson Electric Power provided solar energy to customers in exchange for a 25-year fixed solar payment covering 100% of on-site usage and eliminating the customer's

monthly electricity bill. In Texas, CPS Energy launched a pilot program to install solar energy at host customer sites (connected on utility-side of the meter) and, in exchange, the participating customers receive a monthly payment for the use of the roof space. Further, in California investor-owned utilities are authorized to own/operate customer sited solar projects and execute power purchase agreements consistent with meeting renewable portfolio standard requirements.

As evidenced by these examples, utilities can play an important role in supporting customer adoption of affordable, renewable supply.

ii. Role of non-wires alternatives

Demand growth from electrification is both an opportunity and a challenge for LDCs. With customers electrifying and requesting connection of distributed generation, EVs, batteries and other devices, there will be increased pressure to maintain affordability of electricity distribution services. Significant changes to the grid, resulting from two-way power flows and increased variability, will require LDCs to adopt new planning and operational approaches.

The use of DERs by LDCs is considered a non-wires alternative to traditional - 'poles-and-wires' - distribution expansion projects. Non-wires alternatives may consist of one or more DER-types, including energy storage, distributed generation, or demand-side management measures such as load control, energy efficiency or behind-the-meter energy storage. With greater adoption of EVs, additional demand-side measures could be explored by utilities, such as the use of smart charging controls to avoid charging during peak periods, or the use of EV batteries to inject electricity to the grid during periods of supply constraints (i.e., vehicle-to-grid projects). Another example of a non-wires solution is the use of electricity pricing and rate design to encourage off-peak EV charging.

Strategic deployment of DERs as a non-wires alternative can:

1) Defer or displace the need to invest in traditional capital assets resulting in a more affordable distribution system (i.e., reduced capital expenditures lead to reduced cost of service),
2) Provide planning flexibility since DERs can be deployed incrementally, whereas traditional investments require long-term forecasts for load growth, and
3) Deliver incremental services and products to grid operators and customers beyond distribution system benefits (i.e., services to wholesale market, services to customers).

For example, energy storage may be deployed by an LDC as an alternative to a transformer expansion project. The energy storage device may hold a charge in reserve and may discharge energy onto the grid during peak periods to alleviate system constraints. The energy storage asset may be scaled up over time as load growth forecasts become more certain. The use of the energy storage asset during peak periods also has a capacity value that benefits the bulk transmission system, reducing the need for the procurement of bulk system supply resources.

When the asset is not providing distribution grid services, it may also be available to provide operating reserve or regulation capacity to the wholesale market.

There are multiple examples across North America of distribution utilities deploying cost effective non-wires alternatives. One example is Con Edison's Commercial Energy Storage project, which is part of New York's Reforming Energy Vision (REV) Demonstration Project. The non-wires solution consists of four commercial host sites each hosting a 1 MW/1 MWh battery installation. The batteries are connected in front-of-the-meter and Con Edison has priority dispatch rights during critical peak system events (i.e., under contract with owner). During non-call events, the owner participates in NYISO's wholesale markets and revenues are shared between Con Edison and the system owner.

Another example is Southern California Edison's distribution energy storage integration project (DESI 1), which was constructed to defer a distribution upgrade that would have otherwise been required to meet the needs of a large manufacturing customer with a particularly peaky load. The project is owned and operated by the utility while maintained by a competitive third party. In addition to capacity, the battery project also provides reactive power for voltage regulation.

Overall, the use of DERs can support the integration of variable renewable electricity into the distribution grid, as well as defer the need to invest in capital assets as demand grows on the distribution system due to electrification.

LDCs in Ontario should be provided the flexibility to own and operate larger scale DERs as they are effective solutions in supporting net-zero targets and help to defer capital intensive investments in the electricity grid.

d. Distribution System Planning for Net-Zero

As evidenced above, distribution system planning will become increasingly complex with the transition to a net-zero economy. While LDCs may be prepared to respond to new customer connections, it will be challenging to forecast when new load will materialize on the grid, or when customers may make significant investments in fuel-conversion projects such as electric furnaces. Customer electrification initiatives are "lumpy" and tend to result in sharp increases rather than smooth growth over time. For example, a commercial customer may convert its vehicle fleet to electric vehicles leading to a stepwise change in load at the site while the fleet is charging. The same is also true for the development of EV fast-charging stations along highway and commuter corridors.

In addition to planning complexity, the distribution grid will become increasingly complex to operate. As a result, utilities will need to make investments in grid visibility and new platforms that enable the control and operations of DERs on the grid to maintain grid reliability. It is expected that with increased adoption of DERs, including EVs, LDCs will require DER Management Systems for monitoring and to communicate with DERs that are serving as non-

wires solutions. For example, LDCs will require increased visibility related to charging load to effectively coordinate EV smart-charging efforts.

e. Regulatory Barriers

LDCs face uncertainty and financial risks related to the scale and pace of change and requirements for grid investments. The changes to the distribution grid are spurred by the desire to electrify and interconnect a greater amount of renewable energy.

To enable effective distribution system planning in Ontario, additional guidance from the OEB will be required, including:

- Providing flexibility to LDCs to implement non-wires solutions as a procured service or a capital asset owned by the utility (e.g., energy storage),
- Scenario planning related to potential demand forecasts resulting from net-zero initiatives, and
- Cost recovery for grid modernization investments related to visibility and operations of DERs.

Other regulatory barriers relate to the core functions of distribution utilities. Regulated distributors are licenced to provide distribution services and are unable to provide other services that are not prescribed by regulation or approved by the OEB. To achieve net zero targets, LDCs should be enabled to provide a broader range of services to customers, including:

- EV charging infrastructure, make-ready investments, and fleet services,
- On-site solar energy and storage solutions, including facilitating installation, financing, and operations,
- Options for renewable energy supply, such as GreenChoice programs (i.e., programs that enable large customers to procure renewable energy from their utility),
- Customer support for beneficial electrification (e.g., fuel switching to electric), and
- Options for customer adoption of energy efficiency measures.

The utility remuneration framework that supports cost recovery and regulated return on investment should establish performance metrics related to the achievement of climate-friendly targets, including the connection of non-emitting DERs, supporting the adoption of EVs, and deploying energy efficiency programs.

III. SUMMARY AND CONCLUSION

Ontario's electricity grid is at the cusp of major transformation. Not only is Ontario undergoing a renewal to secure new electricity supply[1], but a significant amount of new distribution load will be connected as the economy electrifies and customers adopt EVs. We expect that

[1] See 2021 Annual Planning Outlook produced by the Independent Electricity System Operator

Ontario's local hydro utilities will continue to be partners for local businesses and governments in achieving net-zero goals, and that more LDCs will lead by example in preparing their own plans to decarbonize.

The changes to the electricity sector will impact the core business of LDCs, including distribution planning and investments in grid innovation. The challenges and opportunities of the evolving electricity grid is also acknowledged within the OEB's five-year planning objectives[2], which reflect the objectives of decentralization and distributed energy resources, consumer profiles, electrification, climate change and decarbonization in a world of uncertain forecasts.

Overall, it is imperative that LDCs are encouraged to form partnerships within the communities they serve to support achievement of net-zero goals, including the delivery of services to support GHG emissions reductions and broader electrification. As the Ontario and Canadian governments move forward with policies to drive zero-emissions grids to power the economy, Ontario's LDCs must be part of planning and decision-making to ensure customers can successfully transition to low-carbon energy options.

[2] See OEB Strategic Plan