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RE: ERO Number: 019-6647
IESO Pathways to Decarbonization Study
Alectra Submission

I. OVERVIEW

Alectra Utilities ("Alectra") is pleased to offer its response to the Independent Electricity System Operator's ("IESO") Pathways to Decarbonization Report ("P2D" or, the "Pathways Report") ERO Posting 019-6647. Alectra is proud to be an established thought leader in the distribution sector while delivering reliable, safe, and affordable energy to over 1 million Ontario families and businesses.

The following submission is presented from Alectra's perspective, as a trusted local distribution company ("LDC") that continually challenges itself to evolve and innovate. With deep visibility and understanding of Ontario's distribution grid, Alectra respectfully submits the following overall framing to the comments and recommendations contained herein:

The single most significant action that Ontario can take today is to invest in its robust distribution network. This area has been overlooked in P2D. Investments in the distribution grid have the potential to empower customers and enable emerging technologies to participate in the grid to provide flexible and low cost, short, medium, *and* long-term incremental benefits on the pathway to decarbonization.

The P2D "no-regret" recommendations reflect the scope and magnitude of the efforts needed to support a successful energy transition. The pathway assessment illustrates a system designed to meet demand peaks almost three times the size of what they are today. To achieve this, the pathways assessment includes 69,000 megawatts ("MW") of non-emitting supply and 5,000 MW of conservation efforts, at an estimated capital transmission and generation cost of $375 billion to $425 billion, in addition to the current system and committed procurements. This estimate does *not* include future distribution costs. Alectra is committed to partnering with the Government to secure the necessary supply to address future capacity needs.

Transmission line development, nuclear refurbishment and investments in innovation are all important aspects of the pathway to decarbonization. That said, these are all long-term actions with lead times sometimes spanning decades. An overlooked no-regret decision is the one right in front us: the short- and medium-term solutions offered by our existing distribution network that will enable the benefits of other long-term actions. Ontario's

robust distribution network contains untapped potential, that once unlocked, will serve to meet Ontario's objectives.

To this end, Alectra's submission is organized into the following sections:

Grid Modernization is a Prerequisite to a Modern Grid
Potential of Distributed Energy Resources ("DER")
Without Prudence There is No Transition
Customers First
No-Regret: Unleash the Power of Distribution

Ultimately, every stakeholder in Ontario's energy system has a role to play. The pathway to decarbonization necessitates a coordinated approach that leverages our collective strengths to solve the unprecedented challenges ahead. Ontarians are looking to the government for decisive leadership, the regulator for oversight, to planning agents for thoughtful advice, and to their local energy providers for innovation problem solving and execution.

II. GRID MODERNIZATION IS A PREREQUISITE TO A MODERN GRID

In planning for the future, local utilities will need to have stable, and predictable access to capital to prepare for electrification and ensure the grid remains resilient. The modernization of Ontario's grid has not yet been a priority for investment; instead, capital spending has been focused on new generation projects, with roughly 90% of investment in the last 15 years focused on generation and transmission. The precise costs of transition are not known, but it's clear that significant capital deployment will be required. For example, Alectra estimates that in our growing communities, the cost of accommodating managed EV charging, and the electrification of 15% of building heat would be around $8 billion. At 30% conversion to electric heat pumps, that number reaches $10 billion.

A modern distribution grid is the master key that unlocks investments at both the bulk and local levels to operate as intended. Without a modern grid, Ontario risks stranding billions of dollars in value on the path to decarbonization. The features of a modern grid include:

- Protection and control modernization programs.
- Advanced control room operations.
- Distribution automation and management.
- Process enhancements backed by enabling technology and systems.
- Renewable energy integration-included distributed resources.
- Network protection, monitoring, and control.
- Data collection and processing.
- Cybersecurity services.
- Safety enhancements.

- Forward looking physical asset replacement and upgrades.

It is imperative that distributors are granted the approvals they need in order to make necessary investments in their distribution systems to connect and integrate DERs. Modernizing the grid is essential for maximizing the potential of DERs for regional opportunities that support or directly benefit the distribution system. The desired results will not materialize in the timeframes anticipated by customers, innovators, and policymakers without an urgent and persistent commitment to modernizing the technical, operational, and administrative capacities of LDCs.

The utility of the future must be able to invest in assets and technology (i.e., capital expenditures) and in the services it provides (i.e., operating expenses) in advance of the emergence of acute needs. Proactive investment is the only way to prevent the types of operational bottlenecks that will derail the pathway to decarbonization. This is not a new solution. Other jurisdictions have addressed the significant investment required to meet load and EV growth through incentive-based and outcome-based mechanisms that enabled LDCs to identify and implement cost-effective DER solutions.[1]

Recommendations
Enable proactive investment for projected system needs and upgrades that will facilitate more efficient delivery of electricity.
Enable remuneration and cost recovery mechanisms to incent appropriate outcomes.

III. POTENTIAL OF DISTRIBUTED ENERGY RESOURCES ("DER")

Utilities need to be allowed to evolve to provide new grid-edge services and enable customers' transition to becoming prosumers. This can be achieved through a Distribution System Operator ("DSO") model where the technology is ownership agnostic, while providing services to LDC customers.

Targeted assets installed at the distribution level are proven to allow energy to be circulated back to the grid to perform distribution system functions and provide additional value beyond capacity and energy.

[1] Between 2023 and 2030, the EU would save between €11.1 and €29.1 billion yearly in investment requirements. This accounts for 27% to 80% of the projected investment requirements for low- and medium-voltage distribution grids today. Due to lower electricity production costs, 294 GW flexibility (DER) power would save 37.5 million tonnes (Mt) of annual GHG emissions and €4.6 billion.

Source: Armenteros, Heer, Fiorini, (smarten and DNV*), Demand-side flexibility in the EU: Quantification of benefits in 2030*, September 2022, accessed online: smarten.eu/wp-content/uploads/2022/09/SmartEN-DSF-benefits-2030-Report_DIGITAL.pdf

While bulk grid investment will continue to feature prominently in Ontario's electricity system, targeted asset deployment, such as rooftop solar and distribution connected storage, can enable communities to produce and distribute their own electricity, thereby offering them greater flexibility, more choice, and reducing their reliance on the provincial electricity system. As DERs can be situated close to urban centers, the demand for new or improved transmission lines can be reduced (or eliminated), which also lowers system costs.

Adapting to two-way energy flows adds a new layer of complexity to grid management in an unprecedented way for Ontario. This has the potential to more than double the efficiency of system operations – which is the type of efficiency gain that is a prerequisite for a decarbonized electricity system.

To help inform Ontario's path forward in enabling DERs, the IESO commissioned a DER Potential Study, published in September 2022. The primary objectives of the study were to determine the types and volumes of DERs that exist and can be expected to emerge in Ontario's grid over a 10-year timeframe (from 2023-2032), as well as identify the potential for these resources to provide wholesale electricity services. The report's objectives of determining the potential for DERs in Ontario were achieved, and it further demonstrated that a wide range of DERs are both practically feasible and economically viable over the next 10 years. It also acknowledges that LDCs and transmitters will need to build and dedicate resources to the management of DERs. In Alectra's service territory alone, DER potential reaches approximately 500MW in 2025, climbs to 2,000MW in 2035, and reaches 4,000MW by 2040. Alectra's service territory contains approximately 20% of the potential for administering DERs in the province, making this a feasible resource to develop and implement into the distribution system. [See *note 3* for extra jurisdictional commentary.]

A target for forecasted DER capacity/energy is required to facilitate the value of distribution. While the features of a DER enabling policy and regulatory framework have yet to be determined, the implementation of a target would prompt policymakers to work through unresolved issues more urgently and towards a structure that will allow this established target to be achieved. DERs will be valuable in the energy transition as a short, and medium-term tool to address resource adequacy and also to help maintain and enhance both reliability and resiliency, while simultaneously working to decarbonize the grid.

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[2] In the United Kingdom (2022), distribution utilities tendered 3.7 GW of distribution network flexibility. This tendered flexibility will enable networks to free up almost 4 GW of capacity to manage network congestion. That is the equivalent of supporting the connection of over half a million 7kW electric vehicle charge points, or providing electricity to over four million homes across the UK, with no new cabling required.

Source: Energy Networks Association, July 14, 2022.
accessed online: https://www.energynetworks.org/newsroom/britain-breaks-flexibility-records-for-four-years-running-almost-4gw-tendered-in-12-months.

As we begin to integrate DERs into the electricity system, the government should establish a clearly defined implementation process. Each type of generation has a distinct set of characteristics, which means that not all types of generation can be replaced by DERs. It is important to understand what types of generation will realize efficiencies and how such generation should be utilized. Guiding the market through implementation, while avoiding rigid centralized planning strikes the right balance to deliver the most reliable and cost-effective DER grid.

Recommendations
Expand, clarify and expedite the objectives and operationalization of the OEB's Framework for Energy Innovation to enable DER investment through the DSO model discussed in section III above.

IV. WITHOUT PRUDENCE THERE IS NO TRANSITION

According to the Pathways Report, non-emitting resource innovation and investment will be necessary to replace the flexibility that natural gas currently provides the electricity system to achieve zero-emissions by 2050.

The Report's analysis clearly shows the complex nature of phasing out natural gas, while highlighting the strategic opportunities of this transition. Natural gas use will need to be reduced over the long term to keep pace with emerging social preferences, mandates, and economic trends. Resource flexibility and the use of DERs will make it possible to eventually replace natural gas with non-emitting resources in the long-term.

During the transition, however, natural gas fired generation is likely the only viable bridging mechanism. Natural gas fired generation represents less than 8% of Ontario's electricity output but provides essential capacity for the homes and businesses of Ontario during peak times.

It is important to acknowledge that natural gas fired generation has been a key element of Ontario's pathway to decarbonization. It is a cleaner, more efficient alternative to coal fired generation, which much of the world continues to rely upon. Ontario has been able to achieve one of the cleanest grids in the world in part because of the flexibility of natural gas fired generation. Ontario should recognize that these existing assets will continue to be an important part of the solution for the next decade and probably beyond.

V. CUSTOMERS FIRST

Electrification is certain to have a material impact on electricity costs. Customers may start to see an increase in electricity rates as old assets are retired and new technologies are built. This is particularly true as society prioritizes electrification and the associated increases in electricity demand and consumption.

Alectra attributes much of its success to putting customers first. It is the customer that will bear the cost of any new investment, and therefore it is incumbent upon decision-makers to drive policy according to customer preferences.

As an industry, we must clearly communicate that rising electricity costs are a direct effect of investing in a decarbonized grid. It is important to be transparent about the long-term value propositions, risks, and development objectives. As well, to recognize cost mitigation elements, including how more electric use is expected to result in less alternative fuel use (i.e., a savings for customers), the greater use of existing assets can result in greater efficiency, and higher demand and consumption will mitigate a per unit rate growth in some measure.

VI. TOTAL DSO vs DUAL DSO

LDCs will need to evolve as the province continues to push DERs to actively participate in electricity markets and offer non-wires alternatives. By using the Distribution System Operator (DSO) framework, LDCs will assume a system operator-like role at the regional level.

The two main types of DSO models include a Total DSO model, and Dual/Hybrid Participation DSO model:

- The Total DSO model is where all, or a subset of resources connected to the distribution level, participate in transmission or local markets to enable interactions between DERs and all markets. The DSO can act as an aggregator on behalf of its system or be a neutral market facilitator for all assets on its network.

- The Dual/Hybrid Participation DSO model is where TSO and DSO take shared responsibility for the network, and work together to resolve system issues. It requires complex communication and coordination between transmission and distribution system operators and 3rd party DER aggregators. In a dual participation model, each system is coordinated independently prior to going to market which leads to suboptimal system operations and market conditions. The limited coordination will not allow for an opportunity to coordinate pricing, create a combined price signal, or harmonize needs. This model requires point-to-point independent integration between each entity and/or their systems. Furthermore, IESO envisions communication protocols that rely on DERs to convey all communication between IESO, DER, and LDC.

For our market structure, the total DSO model can optimize the integration of DERs to participate in current and future markets. According to this model, LDCs are neutral market facilitators with the capacity to offer complete market visibility. The network is run optimally by the system to maximize the MWs and Mvars procured. In order to provide the lowest connection costs, this structure also eliminates connection barriers.

VII. NO REGRET: UNLEASH THE POWER OF DISTRIBUTION

As provincial regulations and market rules push for more active DER participation and deployment of non-wires alternatives, operational management must evolve. This evolution necessitates a real-time system operator for an active distribution network that manages and coordinates DERs at a local level and enables easy access to wholesale markets.

The LDC is best placed to take on the role of regional operator at the local level, through a Total Distribution System Operator (DSO) framework:

- The Total DSO model is an approach where all, or a subset of resources connected to the distribution level, participate in transmission or local markets, and are orchestrated via the DSO to enable interactions between DERs and all markets. The DSO can act as an aggregator on behalf of its system' be a neutral market facilitator for all assets on its network.[3]

LDCs can act as neutral market facilitators and would be able to provide full market visibility across all markets to DERs. Furthermore, it would create new value streams for DERs through the creation of DSO services. They have the expertise and institutional knowledge to remove connection barriers, enabling the lowest connection costs.

Ultimately, a successful energy transition requires everyone to do their part. Ontario's distributors are experts in distribution. Alectra strongly recommends LDC's be given a clear mandate that unlocks the power of distribution.

[3] For example: Germany (with 900 distribution utilities) pursues a total DSO model. Trading on the liberalized wholesale market is either carried out over the counter or via the European Energy Exchange (EEX).