May 12, 2023

Ministry of Energy, Energy Supply Policy Division
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Re: Enwave's Comments on the IESO Pathways to Decarbonization Study (ERO #019-6647)

Enwave Energy Corporation appreciates the opportunity to provide feedback to the Ministry of Energy (MOE) on the IESO's Pathways to Decarbonization report, published in December 2022. The energy transformation needed in Ontario will be a significant effort. The IESO notes the need for tens of thousands of new clean megawatts will be needed to meet future electricity demands that are expected to be three times what they are today. Policymakers and regulators will increasingly need to look for other sources of clean resources to meet our net zero goals. It is worth recognizing that district energy, while not mentioned in the report, has the potential to play a critical role in a decarbonized grid.

For additional background, Enwave is an industry leading commercial operator of community-based thermal energy systems that provides innovative, commercial, and sustainable energy solutions at scale. A private corporation owned by Ontario Teachers' Pension Plan and IFM, Enwave has assets in Toronto, Markham, Windsor, London, and Charlottetown. Through our district energy plants, we provide lower carbon, more efficient heating and cooling to our customers, reducing the need for traditional on-site boiler and chiller systems. The centralized nature of our thermal energy assets will allow for more efficient adoption of low carbon technology across our network, enabling buildings connected to our system to benefit as we decarbonize our operations over time.

Through local energy networks, district energy relieves the demands on the larger provincial grid's generation and transmission system and improves local energy resilience in a cost competitive manner to the consumer. Our customers include residential, commercial, institutional, municipal, hospitals and industrial users, many of which are critical infrastructure providing services to cities, the province and the country.

With respect to the questions posed in the MOE's public consultation on the Environmental Registry of Ontario (ERO), Enwave would like to provide feedback on some specific aspects that are most relevant to our business, and where we feel that district energy can provide the most benefit to Ontario's electricity grid as we plan for a net zero future.

Question 2: The IESO's Pathways Study recommends beginning work on planning and siting for new resources like new long-lived energy storage (e.g., pump storage), nuclear generation and waterpower facilities.

What are your expectations for early engagement and public and or Indigenous consultations regarding the planning and siting of new generation and storage facilities?

With regards to battery storage, we recommend a review of the regulatory measures. There is an opportunity to implement behind-the-meter battery storage to enable increased load-shedding by large users. Additionally, to incent further implementation of battery storage, the ultralow electricity rate provided to residential customers should be considered for multi-residential buildings, and commercial and industrial sites for greater impact. A broader implementation of the ultralow electricity rate would likely also lead to an increased use of thermal storage which would further reduce strain on the grid.

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Similarly, a review of regulatory requirements for microgrids, including safety measures in place, should take place. In certain communities, implementation of a microgrid would alleviate strain on the broader electrical system, particularly if power is distributed across multiple properties.

Question 3: The IESO's Pathways Study shows that natural gas-fired generation will need to continue to play an important role in the system for reliability in the short to medium term. The IESO's assessment shows that most of the projected Ontario demand in 2035 can be met with the build out of non-emitting sources, but some natural gas will still be required to address local needs and provide the services necessary to operate the system reliably.

Do you believe additional investment in clean energy resources should be made in the short term to reduce the energy production of natural gas plants, even if this will increase costs to the electricity system and ratepayers? What are your expectations for the total cost of energy to customers (i.e., electricity and other fuels) as a result of electrification and fuel switching?

We do believe that additional investments should be made in the short term to reduce energy production from natural gas plants. It is imperative that the long-term benefits of decarbonizing the grid be considered presently, as it is crucial to have a clean grid as we focus on electrifying industrial processes and building heating. It is also critical to remove the barriers currently in place to use existing infrastructure for load shedding. That is, there should be a push to retrofit generators for emission controls so that they can connect to existing loads and help manage peaks. This could help avoid new short-term gas infrastructure, as there is not a lot of available resources to meet this need currently. Using existing infrastructure to manage loads is one solution that can enable the transition to a decarbonized grid, and with no additional capital investment required.

Question 4: The IESO's Pathways Study highlights emerging investment needs in new electricity infrastructure due to increasing electricity demand over the outlook of the study. The IESO pathway assessment illustrates a system designed to meet projected demand peaks almost three times the size of today by 2050, at an estimated capital cost of $375 billion to $425 billion, in addition to the current system and committed procurements. Please see supporting materials for illustrative charts on capacity factor and cost by resource type.

Are you concerned with potential cost impacts associated with the investments needed? Do you have any specific ideas on how to reduce costs of new clean electricity infrastructure?

In addition to optimization of existing infrastructure to manage peak loads as described above, Distributed Energy Resources can also play an integral role in electricity infrastructure planning. DERs can provide value to both the bulk system and local distribution systems by contributing to peak load management, which could alleviate the need to build out generation for peaking, as well as the need for new or upgraded transmission lines. Regulatory constraints that exist for the buildout of DERS should be reviewed and additional funding pathways should be considered.

Question 6: The IESO's Pathways Study recommends greater investment in new non-emitting supply, including energy efficiency programs.

Following the end of the current 2021-2024 energy efficiency framework how could energy efficiency programs be enhanced to help meet electricity system needs and how should this programming be targeted to better address changing system needs as Ontario's demand forecast and electrification levels grow?

Efficiency will be critical in meeting electricity demand requirements in the future. Enwave has a series of recommendations on this topic:

- We recommend reviewing municipal and provincial building codes and standards and implementing revisions that better fit with advanced technologies and future-proof for the implementation of new

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technologies. With a push to standardize building codes across the province, including provisions that take into account increasingly stringent levels of energy efficiency will be key.

- Increase the value of and access to incentives for retrofitting buildings, both residential and commercial, to encourage uptake in retrofitting energy efficient, low carbon heating and cooling solutions. Residential incentives currently only cover a small portion of the costs required to retrofit a home. Commercial retrofit incentives are challenging to access and are generally program-based with extensive application processes.
- Encourage efficiency at an aggregate building scale to achieve a greater impact. Programs have traditionally been designed for single buildings; however, there are greater opportunities for energy reduction through efficiency measures across multiple buildings connected to a district energy source.
- Adjust current CDM frameworks to increase eligibility for new building connections. In the current framework, all programs require baseline data and follow a retrofit model for incentives. A program that incentivizes a district energy connection versus traditional boilers and chillers will increase adoption of district energy across Ontario. For both heating and cooling, a district connection reduces the electricity requirements for the building compared to traditional on-site solutions (for example, for cooling, the energy requirements are 0.37 kw/ton compared to 0.9-1.2 kw/ton for a traditional chiller).
- Shift to a more enduring CDM framework so that entities participating in CDM have more certainty over their investments, rather than the time-limited frameworks that have existed to-date.
- Incentivize low carbon heating solutions such as geoexchange, which produces heating 3x more efficiently than an air source heat pump, and thereby reduce grid demand. Projects that provide solutions with less energy requirements should be incentivized to a greater degree as they ultimately will decrease strain on the grid.
- Provide R&D funding for feasibility studies and pilot projects for technologies such as deep geothermal and geoexchange as a way to re-risk commercial deployment of these technologies
- In order to optimize current systems, upgrades to current system controls are required in order to make data more visible and usable. Significant operational benefits on large systems, such as district energy networks, can be achieved through improved instrumentation and real-time tracking, load forecasting, and equipment dispatch strategies. Operational improvements such as these often have low payback periods.

Enwave continues to be a leader in the energy transition and is aligned with the province's commitment to achieve zero emissions in the electricity sector. We will continue to do our part to support the decarbonization of Ontario's energy system while providing reliable, affordable, low-carbon heating and cooling services to our customers. We appreciate the opportunity to provide comments and look forward to ongoing collaboration in support of shared objectives.

Sincerely,

Carlyle Coutinho
President, North America
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