Enbridge's Feedback on the Electrification and Energy Transition Panel's Consultation

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About Enbridge Inc.

At Enbridge, we safely connect millions of people to the energy they rely on every day, fueling quality of life through our North American natural gas, oil or renewable power networks and our growing European offshore wind portfolio. Enbridge Gas, a subsidiary of Enbridge Inc., is Canada's largest natural gas storage, transmission and distribution company based in Ontario, with more than 175 years of service to customers. The distribution business provides safe, affordable, reliable energy to about 3.9 million homes, businesses and industries and is leading the transition to a clean energy future through net zero emissions targets and investments in innovative low-carbon energy solutions. We're investing in modern energy delivery infrastructure to sustain access to secure, affordable energy and building on two decades of experience in renewable energy to advance new technologies including wind and solar power, hydrogen, renewable natural gas and carbon capture and storage. We're committed to reducing the carbon footprint of the energy we deliver, and to achieving net zero greenhouse gas emissions by 2050.

Headquartered in Calgary, Alberta, Enbridge's common shares trade under the symbol ENB on the Toronto (TSX) and New York (NYSE) stock exchanges.

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Introduction

Enbridge Inc. (Enbridge) recognizes the urgency of addressing climate change and is committed to being part of the solution. While maintaining significant investments in traditional oil and gas energy systems and renewable power, Enbridge is also a prominent North American project developer in the low-carbon sector. In addition to renewable power, our initiatives include ventures in low-carbon hydrogen; carbon capture, utilization, and storage (CCUS); and renewable natural gas (RNG). As part of our broader sustainability goals, we aim to achieve net zero greenhouse gas (GHG) emissions by 2050 and reduce our emissions intensity by 35 percent by 2030.

We appreciate the opportunity to submit our comments on the Electrification and Energy Transition Panel's (EETP) *Open Call for Written Submissions 2023*. Enbridge is pleased to provide recommendations in alignment with the five major themes outlined in the Discussion Paper: Energy Planning, Governance and Accountability, Emerging Technologies, Community and Customer Perspectives, Affordability and Energy Sector Objectives, and Facilitating Economic Growth.

Executive Summary

The energy transition in Ontario necessitates an inclusive approach encompassing all energy sources to meet the future's requirements for affordable, reliable, and low-emissions energy. Enbridge Gas commissioned Guidehouse to conduct the Pathways to Net Zero Emissions for Ontario (P2NZ) study, which evaluates two distinct pathways to achieve net zero emissions by 2050. The study emphasizes the significance of integrating low-carbon opportunities such as renewable electricity, battery storage, hydrogen, RNG, and CCUS into the energy system.

The P2NZ study shows that energy transition should not be considered synonymous with electrification, and that a diversified approach, combining targeted electrification with leveraging the existing gas pipeline infrastructure for delivering low- or zero-carbon gases, also achieves net zero. The findings of the P2NZ demonstrate that a diversified scenario achieves net zero with greater:

- Affordability - Achieves the same outcome at $50 billion less cost.
- Reliability - Meets the energy needs of Ontario homes and businesses, even on the hottest and coldest days of the year.
- Resiliency - Protects against impacts from extreme events, such as weather and cybersecurity incidents.
- Consumer choice - Allows consumers the flexibility to make choices on the path to net zero.
- Competitiveness - Provides more affordable energy to help businesses stay competitive and thrive.

The Canadian Energy Regulator recently issued its "Canada's Energy Future 2023" report that also recognizes the need for a diversified approach.[1] The report concludes that while electrification is a cornerstone of a net zero world, and technologies that displace fossil fuels with electricity (EVs and heat pumps) will gain significant customer adoption, low carbon fuels like hydrogen and biofuels and CCUS will be required to achieve net-zero targets.

In prior submissions to the EETP, Enbridge Gas has also highlighted the significant resilience benefits of its 151,500 kilometres of its largely underground gas transportation, distribution, and service infrastructure and over 290.8 billion cubic feet of net working storage relative to the 179,000 kilometres of above ground distribution electrical infrastructure and 30,000 kilometres of largely above ground electrical transmission infrastructure.[2] Ontario's existing connections to approximately 3.9 million homes and businesses are also

[1] https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/canada-energy-futures-2023.pdf
[2] OEB, "2020 Yearbook of Electricity Distributors," pg. 12, 2020 https://www.oeb.ca/oeb/_Documents/RRR/2020_Yearbook_of_Electricity_Distributors.pdf; and https://www.ieso.ca/localcontent/ontarioenergymap/index.html

highly affordable, with homeowners paying an average cost of under $50/month to stay connected to a highly resilient and reliable system. Preserving the ability of all customers to stay connected to gas keeps energy costs affordable for homes, businesses, and industry.

Ontario energy transition planning must factor all energy sources into a technology-agnostic plan and not bet on a subset of technologies to achieve a net zero future. The EETP has a significant opportunity to better integrate and enable low-carbon opportunities, including renewable electricity, battery storage, hydrogen, RNG, and CCUS. As the government establishes a technology-agnostic approach to an integrated energy plan, it is imperative to prioritize near-term decarbonization opportunities while advancing the building blocks for long-term prospects. By focusing on viable and readily implementable solutions, such as energy efficiency, hybrid heating, CCUS, and RNG, we can ensure that Ontarians continue to benefit from affordable, resilient, and reliable energy sources. These measures not only contribute to immediate emission reductions but also pave the way for a smooth transition toward achieving net-zero targets. Simultaneously, it is crucial to advance the building blocks for long-term opportunities like hydrogen, laying the foundation for innovative technologies that will shape the energy landscape in the coming years. Striking this balance enables us to achieve the energy transition to net zero in the most cost-effective manner, securing a sustainable, affordable future for both the environment and Ontarians.

Enbridge recommends that the EETP report recognizes the importance of: (1) coordinated energy planning, (2) enhanced governance and accountability measures, (3) enabling mechanisms and support for emerging technologies, (4) consideration of community and customer perspectives, and the importance of (5) leveraging Ontario's gas system to cost-effectively maintain energy system resiliency, provide consumer, choice and facilitate economic growth. The main recommendations that Enbridge has for the EETP report include:

1. Energy Planning
    a. Establish a coordinated energy planning framework in Ontario with appropriate and realistic fact-based milestones that aligns all energy mix elements, including electricity, gaseous and liquid fuels, and emerging technologies like geothermal heating/cooling and hydrogen, to develop the most cost-effective, reliable, and resilient pathway to emissions reductions and avoid unintended consequences.
    b. Foster coordination between gas and electricity system planning, with the Ontario Energy Board (OEB) as the facilitator and Enbridge Gas as a partner in the energy system and distribution planning to enhance energy system resilience, reliability, and customer choice.
    c. Facilitate collaboration and coordination between Enbridge's Demand Side Management (DSM) programming and the IESO's Conservation and Demand Management (CDM) programming to maximize energy savings, reduce GHG emissions, and ensure effective long-term energy planning.
2. Governance and Accountability:
    a. Ensure the OEB's role as an economic regulator aligns with public policies while regulating gas and electricity rates and maximizing the use of existing energy infrastructure to ensure lower emissions, energy affordability, system reliability, resiliency, and innovation.
    b. Prioritize secure and reliable energy at the lowest cost by considering the significant investments made by ratepayers in the gas system, its useful life, and the lower unit capital cost compared to electricity while encouraging collaboration with energy providers, regulators, and governments to achieve a net zero path and ensure the recovery of investments in Ontario's energy systems.
    c. Focus OEB objectives on enabling "safe bet" actions that maximize energy efficiency, coordinate energy system planning, and encourage the adoption of renewable technologies and low-carbon fuels, such as RNG, hydrogen, and CCUS. Update statutory objectives for the 'gas' sector to include facilitating innovation.
    d. Streamline regulatory processes, approval, and permitting frameworks to support timely investments in clean generation, transmission, and energy infrastructure; raise Leave-to-

construct (LTC) thresholds; establish market rules and guidelines for emerging technologies like battery power storage, hydrogen production, and underground storage; and finalize regulations for wind and solar development.

e. Ministry of Energy must ensure that IESO has the necessary policy direction and a mandate to develop and annually provide a procurement roadmap covering the next seven-to-ten-year period, including product to be procured (e.g., capacity/energy), eligible technologies, known mandatory requirements, operational dates, etc.

3. Low Carbon and Emerging Technologies
    a. Provide policy support and framework for additional renewable power and green hydrogen development in Ontario.
    b. Define binding medium (2030) and long-term (2045) low-carbon fuel blending targets for H2 and RNG while investigating market measures that can bolster low-carbon fuel adoption in Ontario.
    c. Expand the regulatory oversight of the OEB to include hydrogen, hydrogen derivatives and the associated supply, transport, and storage infrastructure.
    d. Take a whole-of-government approach and work with the industry on developing a streamlined regulatory framework for CCUS investments, leveraging best practices from Alberta.
    e. Ensure policies encourage all technologies and measures with substantial emission reduction potential to provide choices for consumers, such as enabling the adoption of hybrid heating systems through conservation programs that support the adoption of electric heat pumps as alternatives to A/C units in existing and new buildings. Providing a wide range of options for consumers will support the energy transition, as not all consumers have the same circumstances, and consumer outcomes should not be prescribed.

4. Community and Customer Perspective, Affordability, Energy Sector Objectives
    a. Government can provide expanded financing support to lower costs for Indigenous equity partnerships in energy projects and facilitate information sharing and discussions on successful program policies and requirements that have effectively supported Indigenous participation objectives.
    b. Natural gas utilities need to be given the flexibility to invest in carbon reduction alternatives and innovation, including RNG, hydrogen, CCUS, hybrid heating in partnership with electric utilities, other low-carbon innovations, and research.
    c. Provide early clarity on policy and direction, particularly on the electrification policy for DSM/CDM. Enbridge and IESO are in the early stages of working on the next DSM/CDM plan terms, and a coordinated DSM/CDM electrification policy is critical as conservation efforts are stepped up over time.

5. Economic Growth
    a. Leveraging Ontario's gas system provides an economic advantage, supports emissions reductions using low-carbon fuels and maintains a critical, reliable, resilient, and affordable energy supply.
    b. Maintaining natural gas connections in Ontario is vital as it preserves resiliency while allowing industry to benefit from low gas rates by sharing infrastructure costs with 3.9 million households, fostering affordability, enhancing economic growth, and preserving industrial competitiveness.
    c. The EETP must clarify that any changes made to the OEB and the IESO to add regulatory efficiency and transparency do not inadvertently add new red tape or uncertainty to the planning process and should be focused on the planning process at IESO, as opposed to operations and procurements.

Theme One: Energy Planning

An energy planning framework that integrates and coordinates all energy mix elements, including electricity, gaseous fuels (natural gas, hydrogen, RNG), geothermal heating and cooling, and other solid or liquid fuels, would benefit Ontario. This technology-agnostic framework should prioritize near-term decarbonization opportunities, such as energy efficiency, hybrid heating, CCUS, and RNG, which provide immediate emission reductions and resilient energy sources while also laying the building blocks for longer-term decarbonization prospects like hydrogen that offer innovative solutions for the future. This balanced approach ensures a smooth transition to net-zero targets while securing affordable and reliable energy sources for Ontarians.

Decarbonizing the energy Ontarians use today and along the path to net zero means that the electricity and gas systems will become more interconnected and grow to accommodate demand shifting away from liquid fuels in the transportation sector. As they do, electricity system planning must take a holistic view of the evolving energy system and closely align with gas system planning while being mindful of the changing demand for liquid fuels. For that to occur, energy planning in Ontario needs to change.

The coordinated planning process must develop regulatory structures that value energy system resilience, reliability, customer choice and economic competitiveness. There should be a role for the competitive market and customer choice to drive investments and plan for the province's energy needs. The increased reliance on intermittent renewable sources establishes the need for increased consideration of the energy system's resiliency. Policies that foster complementary operations of electric, power storage, and pipeline systems will strengthen the energy system's resilience.

Gas and electricity system integration is already happening behind the meter through technologies like hybrid heating, where gas and electricity are optimized for building space heating. Leveraging the electricity system for space conditioning in the shoulder seasons and the gas system for winter heating loads means Ontarians can continue to benefit from the inbuilt gas system resiliency to withstand and adapt to sudden spikes in energy demand without having to duplicate and build the same type and level of resilience in the electricity system. The P2NZ analysis shows that substantial adoption of residential hybrid heating systems can save Ontario at least $9 billion compared to alternative scenarios while achieving climate goals. Governments must ensure that updates to Building Codes preserve the optionality of leveraging the existing gas infrastructure to deliver low- and zero-carbon fuels. Doing so will ensure that a diversified approach that offers more cost-effective and resilient paths to decarbonizing building heat is preserved, allowing consumers the flexibility to make choices on their path to net zero.

The coordination and integration of energy planning will be increasingly important with the increasing expansion of hydrogen's role in the future energy system. Electricity supply will be critical to scaling up green hydrogen supply and meeting hydrogen demand. Hydrogen supply will also be essential in meeting peak electricity demand through hydrogen-fired gas turbines. Hydrogen will become a critical long-term energy storage option complementing battery storage and distributed energy resources (DERs).

In conjunction with coordinating gas and electricity system planning, the EETP should assist the government in establishing agency leads and process clarity for geothermal heating/cooling, hydrogen, RNG, CCUS, and other emerging technologies to better support the energy transition. Clear government and/or agency leads would benefit from these energy sources or decarbonization technologies to create equal footing for their ability to deliver on Ontario's evolving energy needs.

The integration of long-term energy planning between LDCs, Hydro One, the IESO, and Enbridge Gas would be advantageous, and we suggest they include the following:

a) Overlaying Enbridge Gas's distribution and transmission systems onto the IESO's regional planning areas, Hydro One's asset map, and the electric LDCs distribution systems.
b) Modelling gas usage and the electric distribution and transmission systems to deliver energy to all sectors.

c) Modelling energy system and end-user costs, including the value of resiliency and reliability and the cost of assets that may become stranded due to energy transition.
d) Coordinating on key items, such as demand forecasting and planning horizons, to support the alignment of the investments to be brought forward in the following 5-year and 10-year planning periods and through the energy transition to meet identified energy needs.

Regarding planning approaches and roles, today, Enbridge Gas is a fully integrated utility with clear planning expertise and accountability equivalent to combining the IESO and the LDCs. Enbridge Gas has 175 years of experience planning and operating gas storage, transmission, and distribution assets within Ontario that safely deliver 30 percent of the energy used annually, compared to just 16-17 percent for electricity and four to five times the peak energy demand of the electricity system.

Enbridge understands that vertically integrated electricity system planning occurs via the IESO's integrated planning process in cooperation with Hydro One, focused on bulk system planning and transmission with distribution system planning done separately by LDCs. A single source of electricity transmission planning information, electricity system needs, and planned procurements and electricity infrastructure projects would support the IESO's planning process. This will significantly help electricity generators develop renewable energy, storage, and other low-carbon electricity generation projects in the province.

In developing a coordinated energy planning process, the government and its agencies would be remiss by not taking advantage of the unique nature of Enbridge Gas's role in Ontario's energy planning process. To achieve the goal of a fully integrated energy system, formalizing Enbridge Gas as the gas system planner would be recommended, particularly given that the planning expertise for the gas system today and how it can evolve to support energy transition resides within Enbridge Gas. **Achieving the goals of a coordinated energy system in Ontario will be difficult, if not impossible, unless Enbridge Gas has an equivalent seat at the system planning table with the IESO and the OEB and at the distribution table with LDCs**.

Given that the IESO and Enbridge Gas oversee the complex nature of energy planning for most of Ontario, these roles and responsibilities needn't be duplicated. Horizontal planning should be done at the regional level, looking at distribution system planning which then gets incorporated at the transmission and storage level.

From Enbridge's perspective, **the OEB is the logical entity to facilitate long-term energy planning over creating a different or separate entity or expanding the IESO's mandate (except for potentially enabling better coordination with the LDCs).** The OEB has teams with knowledge of both sectors and already regulates all the parties involved. Further, Enbridge recommends that the OEB should lead the development of an integrated energy planning working group involving major electricity and gas utilities and the IESO. This group should focus on identifying gaps in planning (i.e., gaps in data or misaligned assumptions), how to solve them, and support the implementation of those measures while working in a coordinated manner with stakeholders, system operators, and utilities. For example, the work of this group could inform an Integrated Resource Plan for the electricity sector providing clear plans and timelines into the IESO and LDC procurement plans over multi-year periods, which could then be actioned without further intervention from the working group. This additional certainty would foster new investment in the province and reduce the risk of stranded assets, further reducing overall ratepayer costs.

Additionally, there is a need to further facilitate the coordination of Enbridge's DSM programming and the IESO's CDM programming. The two parties have a history of collaborating in areas with the most benefit for energy consumers. However, during this energy transition period, it is critical for appropriate policies to be established and coordination of the DSM—CDM plans to ensure all conservation activities are working together to produce the greatest level of energy savings and reductions in GHG emissions. A common roadmap and/or framework plus facilitation before developing new CDM and/or DSM plans would ensure

that impacts across both energy systems are considered. An example of the required policies and coordination is the DSM--CDM programming on converting building heating from natural gas to hybrid heating systems or electrification of building heat through heat pumps. Clarification of policy needed was explicitly noted in the OEB's DSM Plan decision (EB-2021-0002).[3] Enbridge and the IESO must understand the policy considerations before developing any conservation plan. These considerations include how much electrification should be included in a DSM—CDM plan, the type (hybrid fuel system versus electrification), how programs should be funded (gas rates/electric rates/tax base), and, finally, what guardrails and/or coordination policies should be in place to ensure energy system capacity is planned and reliability maintained in line with the levels of increased electrification proposed in CDM and DSM programming.

The OEB's long-term energy planning coordination and integration must be undertaken to ensure the most cost-effective, reliable, and resilient pathway to GHG emissions reductions is developed and that it's done so in a manner that considers both consumer choice and economic competitiveness and avoids unintended consequences. Enbridge, IESO, and the LDCs will then be well-positioned to execute their portion of the plan as best meets the agreed-upon objectives.

Theme Two: Governance and Accountability

The OEB is an economic regulator mandated to ensure fairness and minimize consumer costs and risk. Enbridge believes the OEB can fulfil its role as an economic regulator and consider public policies. Germaine to this discussion, Enbridge only recommends that the OEB regulates gas and electricity rates (wholesale or retail) within any oversight it currently exercises. In addition to ensuring energy remains affordable, **the OEB should consider energy transition and ensure energy system reliability, resiliency, and innovation.**

As the EETP makes energy transition pathway policy recommendations, it must consider how moving away from the gas system would strand significant assets and lead to a less resilient and reliable energy system. Importantly, Ontario ratepayers have already made significant investments into the gas system, which has a net present value of $16.7 billion and still has a useful life and the ability to support energy transition. Secondly, the unit capital cost of delivering annual and peak hour energy in the form of natural gas is approximately a quarter of the unit cost of delivering annual and peak hour electricity in Ontario.[4] These costs do not reflect the much higher cost of burying electrical infrastructure to provide equivalent resiliency of the natural gas system's over 150,000 kilometres of the underground network. Energy providers, regulators, and governments working together can achieve a net-zero path that prioritizes secure, reliable energy at the lowest cost while also ensuring that investments made into Ontario's energy systems can be fully recovered in keeping with the OEB's statutory objective to maintain a financially viable gas industry for the transmission, distribution, and storage of gas.

Enbridge notes that any update to the OEB's objectives should not be based on net zero or electrification before the government determines the approach the province will take in the energy transition. Until the government sets GHG reduction targets beyond 2030 and chooses the appropriate pathway to achieve them, **the OEB's objectives should focus on enabling the development of "safe bet" or "no-regret" actions, which Enbridge Gas and the IESO have identified.**

These actions include maximizing energy efficiency; optimizing and integrating energy system planning; and investing in wind and solar generation, battery energy storage, and new technologies, including low-

[3] Decision and Order EB-2021-0002, page 3; "The OEB is of the view that further direction and any mandate to electrify the energy system, or portions of it, will be developed with the necessary stakeholders, including the Government of Ontario and the IESO. Once the central policy is developed, further action can be taken to ensure all conservation activities in Ontario are working together to produce the greatest level of energy savings and reductions in greenhouse gas emissions."
[4] Enbridge Gas Rate Rebasing Application - EB-2022-0200, Exhibit I.1.10-SEC-28
https://www.rds.oeb.ca/CMWebDrawer/Record/786111/File/document

and zero-carbon fuels such as RNG and hydrogen and CCUS. Enbridge suggests that the statutory objectives for "gas" be updated to include "to facilitate innovation in the gas sector," consistent with the electricity sector's statutory objectives. Energy transition presents a unique opportunity for the energy sector to modernize and innovate, and this should be encouraged for the electricity and gas sectors.

The province also has a major role to play. Predictable and timely regulatory, approval, and permitting processes will be essential to support new investments in clean generation, transmission, and related energy infrastructure. These processes include interconnection studies and processes, clear environmental permitting frameworks for newer technologies like power storage, hydrogen, and CCUS, and predictable transmission and pipeline environmental permitting and approvals.

Leave-to-construct (LTC) thresholds need to be raised. The government should streamline LTC reviews for smaller pipeline projects to be delivered cost-effectively and timely, as the current timelines are not competitive in getting projects to market. Raising the LTC threshold does not remove the need for consultation or environmental approvals but expedites the permitting process. While we support the debate on the robust regulatory framework for these projects, streamlining project approvals is key to maintaining Ontario's competitiveness. We urge prompt action to address this red tape. The current LTC thresholds and conditions are 20 years old and need to catch up with the complexities of modern infrastructure projects and inflation. The government should raise the LTC thresholds to $10 million in cost and increase the pipe diameter to 16" with a corresponding increase in operating pressure for proven operators with a strong safety record to support the timely delivery of government and local priority projects.

Currently**, there are no market rules, permitting guidelines, or established approval processes for battery power storage, hydrogen production, and underground CO2 storage projects.** This creates a lot of regulatory and economic uncertainty for developers, for which risk must be priced into contracts. Similarly, since the repeal of the Green Energy Act, there has been uncertainty on several permitting and land access issues related to wind and solar development. Enbridge understands that the IESO and the Minister of Environment, Conservation, and Parks are working to address these regulatory gaps and look forward to participating in those regulatory processes. Enbridge recommends prioritizing finalizing these regulations promptly within the coming months. As such, Enbridge proposes a date for resolution of 120 days or September 1, 2023, to allow for the necessary consultations with a finalized date 30 days from then or September 30, 2023, to ensure Ontario maintains a competitive advantage.

The IESO will likely conduct annual procurements for the next ten years. Therefore, the approach to interconnection and transmission capacity assessments taken in the Expedited LT1 RFP cannot be the standard operating procedure. The Deliverability Assessment process was time-consuming and provided developers with little usable information. In addition, Hydro One (HONI) did not interact with developers during the RFP process. We have seen some improvement under the LT1 process and urge the IESO and HONI to continue working to improve the process. The lack of information on available transmission creates a significant development risk, increasing rates bid into procurements. **Enbridge recommends that the IESO and HONI (including the LDCs) consider alternative approaches to support more detailed information being available to developers on available transmission**, including the IESO providing system information that developers can then rely on when considering project locations. This could then be updated after each RFP.

Theme Three: Low Carbon and Emerging Technologies

Energy efficiency will be essential to the success of any pathway to net zero. Enbridge's DSM programs have helped customers save 32.6 billion m^3 of natural gas, representing a cumulative GHG reduction of 61.3 MT between 1995 and 2022.

The province should continue to support increasing cost-effective electric and gas conservation in Ontario, balancing bill impacts with the level of savings pursued. It is also essential the government continue to coordinate DSM and CDM offerings with new federal, provincial, or municipal government funding for energy efficiency and GHG emissions reduction programming. This must be done to ensure

new funding does not displace or duplicate existing programs and that delivery is coordinated, where reasonably possible, to benefit program participants.

The P2NZ study demonstrated that energy conservation, hydrogen, RNG, and CCUS, alongside electrification, can play meaningful roles in decarbonizing Ontario's energy systems. In line with this, the Canadian Energy Regulator's "Canada's Energy Future 2023" report's conclusions support the P2NZ findings.[5] Both the report and the study recognize the imperative of a diversified approach to energy in achieving net-zero targets. This approach entails incorporating various strategies such as electrification, low-carbon fuels like hydrogen and biofuels, and CCUS technologies. The P2NZ analysis also demonstrated that a diversified pathway combining low- and zero-carbon fuels with electrification is less costly than complete electrification and less disruptive by avoiding the need for extensive retrofits in existing buildings. In the near term, hybrid heating can immediately reduce the building sector's GHG emissions while preserving long-term energy optionality and resilience for the consumer. Blending RNG and hydrogen into the gas grid does not require new heating systems and reduces operational emissions to near zero. Only in the longer term, with a gas system providing 100% hydrogen, would hydrogen-ready heating systems be needed.

In addition, a bidirectional electricity grid will become increasingly important to facilitate efficient electrification. DERs, power storage, and hydrogen will allow Ontario to efficiently use excess supply from installed generation and shape load where possible. Clear regulations for interconnection and market rules for participation in the electricity market will help free up investment in non-wires alternatives to optimize the grid better. Delays on these frameworks and Market Renewal have maintained unnecessary risk levels in recent years, and we encourage concluding these outstanding processes.

End Use Technology

Hybrid heating provides a readily available opportunity to reduce peak electricity demand, provide for wider adoption of electrification, and achieve greater GHG emission reductions in the near term. In the long term, operating hybrid heating systems with low- and zero-carbon gases provides the opportunity to continue minimizing the electrical peak impacts of space heating demand while reducing GHG emissions. Hybrid heating reduces the electricity requirements for space heating at peak times to similar levels as what is experienced today.

Wide-scale deployment of hybrid heating systems provides an opportunity to reduce energy system costs as a form of behind-the-meter demand response, which can be leveraged to mitigate peak electricity demands and reduce required investments in new electricity supply resources and transmission infrastructure. Since the expansion of the electricity system supply and transmission are the driver of the electricity unit cost increases described by the IESO in their Pathways to Decarbonization report,[6] hybrid heating could reduce the forecasted increase in electricity cost.

As an integrated behind-the-meter managing solution, hybrid heating is also indicative of the gas and electricity systems integration to satisfy energy demands. As the energy transition manifests in Ontario, functional integration of the energy systems necessitates more closely aligned planning between electricity and gas system planners. Enbridge believes that collaborative energy system planning is a safe bet required to deliver the most optimal pathway to a net zero future for Ontario.

Enbridge believes conservation programs providing incentives to encourage adopting electric heat pumps as alternatives to A/C units in existing and new buildings are appropriate. These hybrid systems are the right step for many consumers who may not be able to replace the entire heating system. This will enable emissions reductions at the building level through hybrid heating systems, preserve consumer choice and energy optionality, and allow for future upgrades to smart controls for

[5] https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/canada-energy-futures-2023.pdf
[6] IESO Pathways to Decarbonization, 2022, page 34 Available: https://www.ieso.ca/-/media/Files/IESO/Document-Library/gas-phase-out/Pathways-to-Decarbonization.ashx

further energy system optimization. The EETP should clarify that conservation policy frameworks should not limit choices for consumers that can result in meaningful near-term reductions in emissions as part of the Energy Transition.

Another end-user technology that offers significant energy savings and GHG reductions (20-50%) is natural gas heat pumps (GHP). GHPs are a cost-effective solution for space heating, cooling, and domestic hot water heating with efficiencies greater than 100%. GHPs for commercial applications are already available, and residential models are expected to be commercially available in late 2023.

Enbridge believes conservation programs providing incentives to encourage adopting gas heat pumps as alternatives to furnaces, boilers, and water heaters in existing and new buildings are appropriate, as they offer significant reductions in GHG emissions, energy costs and gas peak demand.

Natural gas utilities must be given the flexibility to invest in carbon reduction alternatives and innovation, including RNG, hydrogen, CCUS, hybrid heating in partnership with electric utilities, other low-carbon innovations, and research. The energy sector needs to evolve and identify cost-effective solutions that reduce costs and broaden the acceptance of current low-carbon technologies.

CCUS

CCUS is a safe, proven technology that offers an important pathway for GHG reductions, particularly for hard-to-abate industries like steel, cement, and fertilizer. The International Energy Agency and the Canadian Energy Regulator agree that CCUS are among the most critical decarbonization technologies.[7] The Ontario Ministry of Natural Resources and Forestry has recently published a "Roadmap towards regulating geologic carbon storage" and has indicated its intention to support and enable CCUS for large emitters in Ontario.[8] Further, Enbridge is pleased to see the Government of Ontario has taken initial steps including through Bill 46 that removes legislative barriers prohibiting CCUS and through Bill 91 to set up for further regulatory developments that would enable "special projects." These are important first steps, but further action is needed. A whole-of-government approach is needed to work with the industry in establishing a streamlined regulatory framework for new CCUS projects. CCUS is fundamental in reducing GHG emissions from natural gas, critical for heavy industry with few other decarbonization alternatives, and can play a key role in decarbonizing power generation. CCUS will also enable low-carbon hydrogen production, further supporting the development of a hydrogen industry in Ontario, lessening the provincial dependence on energy imports, and creating well-paying jobs in the energy space.

Enbridge recommends that the Government of Ontario:

- **Take a whole-of-government approach and work with the industry on developing a streamlined regulatory framework for CCUS investments.**
- Modernize the OGSRA and other relevant legislation (e.g., Mining Act) to enable CCS opportunities.
- Adopt a Crown Vesting approach that leverages best practices from Alberta and British Columbia to maximize the potential of Ontario's finite pore space for the greatest benefit to Ontarians and larger emitters.
- Establish a clear and transparent regulatory framework that requires proponents to meet world-class safety, technical and financial credentials.

[7] International Energy Agency, *Net Zero by 2050: a Roadmap for the Global Energy Sector* (October 2021 4th rev.), pp. 7, 60, 79-80; and Canadian Energy Regulator, *Canada's Energy Future 2021* (2021), pp. 10, 16, 60, 76-78

[8] See - https://www.ontario.ca/page/geologic-carbon-storage

RNG

While the supply of RNG in Ontario is currently small, the province has a significant RNG production potential. Torchlight Bioresources estimated Ontario's RNG potential to be between 40 PJ per year of RNG from wet organic wastes, including landfills and up to 224 PJ per year if agricultural residues are included. This RNG potential represents four percent to 26 percent of Ontario's annual gas demand.[9] Most of Ontario's RNG is currently exported, and with other provinces setting ambitious RNG blending goals, this trend may continue. Such a trend may limit Ontario's ability to access the lowest-cost local RNG supplies in the near term. The province of Quebec has announced in its Green Economy Plan that it aims to increase its renewable gas (including RNG and hydrogen) supply to 10 percent of its total gas supply by 2030. The British Columbia government has a 2030 goal for 15 percent of gas consumption to come from renewable gas, which may include RNG and hydrogen.[10]

Enbridge recommends the Ministry of Energy:

- **Defines binding medium-term (2030) and long-term (2045) RNG blending targets.** Adopting binding RNG targets will provide a clear long-term planning horizon and investment certainty for RNG market players. A mandated blending target would allow the gas utility to recover the incremental costs of RNG.
- The Ministry should investigate supply and demand market measures that bolster RNG adoption in Ontario (e.g., guarantees of origin, RNG registers and certificates, low-carbon fuel incentives, waste reduction policies, and clean energy credits).

Enbridge recommends the Ministry of Environment, Conservation and Parks:

- Recognize book and claim reporting under the Emissions Performance Standards (EPS), which would allow RNG delivered through the gas delivery system to be subtracted from the annual GHG emissions of EPS participants, where the purchase contract clearly demonstrates ownership of the environmental attributes. This reporting recognizes that although the end-users may not physically combust the actual molecule of RNG, they have the sole right to claim the emission reductions in their GHG reporting by contract.

Enbridge recommends the OEB:

- Works with the Ministry of Environment, Conservation, and Parks to ensure existing and future environmental regulations support RNG production.
- Allow utilities to recover the cost of RNG consistent with the RNG market price.

Hydrogen

While electrification is a powerful tool for reducing GHG emissions in many sectors, electrification is not practical for all sectors. Sectors like heavy transport or industries with high-temperature processes like steel manufacturing or chemical production have considerable carbon footprints. They are challenging or next-to-impossible to decarbonize through electrification. Hydrogen and CCUS are attractive options for these hard-to-abate sectors as Ontario moves toward its 2050 net zero-targets.

This is not to say that hydrogen is not without uncertainties, as it is nascent and further research is required to maximize utility in the long term. For example, metal pipelines in natural gas systems will require engineering assessments before the system can be used to transport hydrogen. Nevertheless, Ontario's pipeline system is ideally suited to be repurposed to a hydrogen network, as the province's

[9] Torchlight's 224 PJ estimate is based on anaerobic digestion and landfill potential and does not reflect more advanced RNG production technologies like biomass gasification or power-to-gas, which are not yet commercially available. Of the 224 PJ estimate, landfill gas accounts for approximately 21 PJ, equivalent to 9%.

[10] Government of British Columbia (2021). CleanBC Roadmap to 2030. p.60. Available: https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf

newer pipelines, typically made of polyethylene, are already largely hydrogen-ready. Enbridge will undertake a full system-wide study of its extensive 150,000 km gas pipeline system to determine maximum tolerable blending amounts, up to and including 100% hydrogen.

Underground geologic formations in Southwestern Ontario include salt caverns, aquifers, and depleted reservoirs. The International Energy Agency (IEA) is conducting studies to prove the viability of underground hydrogen storage salt caverns (HyStock, Netherlands) and gas fields (Sun Storage, Austria and Hychico, Argentina), although there are currently hydrogen storage projects in operation salt caverns globally, resulting in a higher technology readiness level for salt caverns over depleted reservoirs/gas fields.[11] Enbridge has 288 Bcf of natural gas storage in 35 underground depleted reservoirs that may be capable of hydrogen and hydrogen-blend storage. Research needs to be done to explore if hydrogen storage in porous (depleted reservoirs or aquifers) and non-porous (salt caverns) geological formations can provide the means to ensure a continuous and reliable hydrogen supply. Hydrogen storage would provide the means to ensure a continuous and reliable hydrogen supply, mimicking the current natural gas system's ability to offer seasonal terawatt-hour storage capabilities.

A study in Europe has shown that repurposing natural gas pipelines for hydrogen is less than a quarter of the cost of building new hydrogen pipelines.[12] Utilizing the existing pipeline system allows consumers to continue benefitting from the reliability and resiliency inherent in the system (which is mostly underground) and the competitiveness it offers Ontario's industries.

Achieving net zero emissions by 2050 requires actions by all Ontario stakeholders. Policymakers, regulators, and utilities must consider the outlook to 2050 when evaluating different GHG emissions reduction pathways because some options that achieve 2030 goals may not cost-effectively achieve net zero emissions by 2050.

The hydrogen market must be shaped, just like how the natural gas market was, by numerous regulatory and legislative changes and technological advances and sophistication. Regulatory oversight in the natural gas market has become increasingly more sophisticated. It has adapted to the condition of the market over the years, and this same sophistication can be brought to the hydrogen market.

Enbridge recommends the Ministry of Energy:

- **Defines medium-term (2030) and long-term (2045) planning targets for hydrogen supply** much like the strategic ambitions set by other countries such as the UK (5 GW), France (6.5 GW), Spain (4 GW) and by the European Commission (40 GW) as soon as possible in conjunction with industry.
- Investigates market measures and incentives that support hydrogen adoption, such as low-carbon fuel incentives, carbon pricing, clean energy credits, targets for FCEV and hydrogen-fueled appliance deployment, RNG mandates, and research and development.
- **Expands the regulatory oversight of the OEB to include hydrogen, hydrogen derivatives and the associated supply, transport, and storage infrastructure. The electricity supply needed to power H2 production would remain with IESO.**
- Supports the development of hydrogen hubs in the province to establish a robust network for hydrogen supply matched to the anticipated and current design.
- Collaborate with the relevant ministries to enable CCS for blue hydrogen production.
- Establishes a fixed maximum hydrogen energy production cost of $35/MWh for electricity being used for hydrogen production in the province. This could also be tied to a contract for difference setup.

[11] https://www.iea.org/articles/proving-the-viability-of-underground-hydrogen-storage
[12] Guidehouse (2021). European Hydrogen Backbone: Analysing the future demand, supply, and transport of hydrogen. Available: https://gasforclimate2050.eu/wp-content/uploads/2021/06/EHB_Analysing-the-future-demand-supply-and-transportof-hydrogen_June-2021.pdf

- Works with the IESO and stakeholders to find a path to addressing the Global Adjustment that would enable Corporate and Virtual Power Purchase Agreements (PPAs). These agreements will be critical to enable non-emitting electricity to power hydrogen electrolyzers. Virtual PPAs will enable renewable energy projects to locate where resources are most economical and still sell power directly to hydrogen electrolyzers that can be conveniently located close to pipelines, minimizing investments in new transmission infrastructure.
- Requires the IESO and Hydro One to perform a joint electricity transmission impact assessment to identify future network impacts of green hydrogen production on transmission capacity requirements and regional energy flows.
- Establishes clear definitions of low-carbon hydrogen, including a carbon intensity score based on lifecycle emissions that is equal to or lower than that of natural gas, verification requirements, and eligible resources. This should be done via consultation with the electricity and gas sectors' participants.

The OEB will play a large part in helping advance hydrogen and should:

- Develop a regulatory framework for hydrogen supply, infrastructure, and storage promptly to compete with other jurisdictions like the US. Without clarity on how hydrogen supply, storage and infrastructure investments will be regulated, utilities and end users can only rely on the existing natural gas framework as an example.
- Gather stakeholder views and investigate how other jurisdictions are developing hydrogen regulatory frameworks. Findings deemed advantageous to Ontario's hydrogen ecosystem should be implemented without delay to capitalize on the competitive nature emerging in the development of the hydrogen market.
- Allow utilities to recover the cost of hydrogen at a different cost than natural gas and in line with the market price of hydrogen.
- Provide clear regulations and market rules to enable electricity generators and hydrogen producers to have diverse economic partnership and agreement options. This will ensure efficient investment and ensure new hydrogen development does not negatively impact other ratepayers.
- Support and enable Enbridge's proposed Low Carbon Voluntary Program.

<u>Renewable Electricity Generation and Storage</u>

Complete transparency into specific system needs (e.g., energy versus capacity, type of resource, location of resources, the timing of the commercial operation, and transmission capacity and/or upgrades planned) would support future investment from electricity generators. Such transparency will help undertake the years-long development process required to provide the electricity needed to support electrification and green hydrogen production.

Currently, limited data is available on what power will be procured in a coming year, much less five to seven years out as required to support meaningful development timelines. At the same time, several overdue critical regulatory processes make market dynamics, rates, and regulatory requirements difficult and/or impractical to forecast or model.

Enbridge recommends the Ministry of Energy:

- Provides clear policy direction to the IESO, empowering it to plan more than one year ahead for regional and bulk system needs, considering wind, solar, power storage, and longer lead generation, including pumped hydro storage and large hydro.
- Provides clear policy direction on the pathway to net zero on the electricity grid, which the recent study regarding future gas generation moratoriums and the pending Federal Clean Electricity Regulation will support.
- Provides direction to the IESO to propose potential Corporate and Virtual Power Purchase Agreement models that the Ministry can consider, as provincial action may be required to address the Global Adjustment.

Enbridge recommends the IESO:

- Works closely with HONI and LDCs to develop a more transparent map of the system, existing constraints, available capacity, and approved and planned upgrades.
- Develops a more detailed Annual Planning Outlook that considers a whole-system approach to net zero and energy delivery to predict electricity needs more accurately.
- Provides a more detailed Annual Acquisition Report that sets out key procurement details (e.g., energy vs capacity, technology types eligible and/or key mandatory requirements, and anticipated commercial operation date) so that generators can invest meaningful development spends in areas where the IESO and the system will most benefit from new generation.
- Completes key outstanding market rule updates according to the current schedule.

Theme Four: Community and Customer Perspectives, Affordability and Energy Sector Objectives

Indigenous Participation

Enbridge recognizes the importance of reconciliation between Indigenous communities and the broader society. Positive relationships with Indigenous Peoples, based on mutual respect and focused on achieving common goals, strengthen our projects and yield constructive outcomes for all Ontarians.

A key component of the successful transition and transformation of the energy sector will be Indigenous participation, including direct equity participation, providing services/technology in the infrastructure supply chain, and informing the development of assets. This is necessary to ensure successful infrastructure development that supports reconciliation in Canada. Currently, there are barriers to this participation despite governments' intent to actively encourage such participation, including financing costs presenting economic barriers for Indigenous partners and provincial programs that sometimes inadvertently impose barriers even where the province is actively looking to encourage such participation. **The government can help by providing expanded financing support to lower costs for Indigenous equity partnerships.** The government can also facilitate information sharing and discussions on successful program policies and requirements that have supported Indigenous participation objectives effectively.

Enbridge regularly engages with approximately 40 Indigenous groups in Ontario and is committed to fostering long-term, meaningful relationships based on our Life Cycle approach to engagement. The Life Cycle approach to engagement refers to engaging with potentially affected Indigenous groups from a project's infancy/project planning stage to decommissioning/abandonment.

Through our commitment to relationship building with Indigenous groups in Ontario, Enbridge has developed a deeper understanding of areas of interest raised by various Indigenous communities, and we work to ensure we meaningfully engage with communities to avoid or mitigate any impacts our projects or operations may have on their rights and interests.

Customer Perspective

Enbridge Gas, as part of its rate rebasing application, included the topic of energy transition in its customer engagement process, covering topics such as the future of natural gas and investments in new technologies or solutions. Customers, both residential and business, indicated they believe Enbridge Gas should minimize any environmental impacts as one of the priority outcomes that matter to them.

For residential customers, reducing environmental impacts was listed just behind providing affordable pricing and safely and reliably delivering natural gas. For small businesses and contract customers, it followed affordability, safety, and reliability. Medium and large business customers added predictable

pricing. Most customers indicate that Enbridge Gas should actively invest in low-carbon options and solutions to reduce environmental impacts and help customers reduce their natural gas usage. Among individual investment choices, which included increased hydrogen blending, creating an Innovation and Technology Fund and options to increase the proportion of RNG in the gas supply, were met with customer support across all segments.

Affordability

Ontarians deserve access to a reliable, resilient, and cost-effective energy system, now and in the future. The current cost of staying connected to the gas system for its low-volume customers provides unparalleled resiliency relative to the electricity system at under $50/month for the average customer. The unit capital cost of delivering annual and peak hour energy in the form of natural gas is approximately a quarter of the unit cost of delivering annual and peak hour electricity in Ontario. These unit costs do not include the much higher cost of building out the electric system in today's dollars, nor do they reflect the much higher cost of burying electrical infrastructure underground to provide equivalent resiliency.

A singular focus on electrification could significantly affect consumer and system costs, consumer choice, and reliability. Progress toward net zero will only succeed if customer affordability is maintained. If affordability impacts are manageable, the process will retain consumer support. Ontarians deserve access to reliable, resilient, and cost-effective energy now and in the future. Integrated, proactive, staged planning is critical to ensuring we are on an affordable pathway.

Electricity and gas consumers may require financial support in the early days of the energy transition. For example, passenger vehicle owners will need to update to electric vehicles and/or hybrids, or building owners will need to invest in extensive retrofits to accommodate electric heat pumps. In both cases, end-user tax rebates or other financial support could help mitigate the financial risk of changing cleaner technologies which will help support the downstream market establishment and/or expansion.

The EETP can recommend several steps to ensure the pursuit of affordable strategies and thereby maintain public support for the transition. Among those strategies would be the following recommendations:

- Charting a path for the province to wind down the Ontario Electricity Rebate as these subsidies will become even more unsustainable on the province's balance sheet as electricity needs increase and allow market forces to drive customer decision-making.
- Steer public discussion from a focus on electricity costs to energy costs – look at the full customer perspective.
- Conservation and demand management will be critical in managing costs during the transition, particularly ensuring that any incremental energy efficiency program efforts complement and do not displace successful programming already in the market.
- **Provide early clarity on policy and direction, particularly on the electrification policy for DSM and CDM. Enbridge and IESO are in the early stages of working on the next DSM and CDM plan terms, and a coordinated electrification policy is critical as conservation efforts are stepped up over time.** This is important for managing costs for customers. Failure of advanced planning generally results in higher costs.

Enbridge Gas looks forward to working with the electricity sector, customers, and stakeholders to ensure Ontarians have access to reliable, resilient, affordable, and lower emissions energy based on the government's energy transition policies.

Theme Five: Facilitating Economic Growth

Consumer choice and policy decisions will shape the nature and pace of energy transition investments and economic growth in Ontario. The pace of adoption of new technologies (e.g., EVs / heat pumps) and new generation sources (e.g., central generation, DERs) will be a function of consumer preferences, cost, innovation, global supply chains, and policy choices made at all levels of government, in turn driving the required investments in Ontario's industries and the energy systems that support them.

While transitioning to a clean energy future is the right thing to do, factoring long-term competitiveness into climate policy decision-making is essential. The energy transition approach directly impacts businesses and industry in Ontario – cost, reliability, choice, and competitiveness. Continued access to and maintenance of gas infrastructure is critical to industry, Ontario's economic future, and ensuring that Ontario's energy systems remain robust, reliable, affordable, and sustainable. **Ontario industry is afforded low gas rates today due to the benefit of sharing infrastructure costs with 3.9 million households**, an advantage that will diminish as that demand declines. A diversified "pipes and wires" approach to energy transition can achieve net zero emissions while maintaining this critical benefit for the industry in Ontario.

Companies with energy-intensive manufacturing processes that cannot be practically electrified, like steel and cement, depend on natural gas as an affordable and reliable energy supply, and as discussed in the section on Emerging Technologies, the gas system can be decarbonized via hydrogen, RNG, and CCUS. As far as CCUS is concerned, the government should work with the federal government to ensure that companies with energy-intensive manufacturing processes in Ontario are eligible for the federal Incentive Tax Credits and funding opportunities announced in the federal Budget 2023.

Reaching net zero emissions in Ontario means diversifying the provincial energy mix, including assessing the province's reliance on imports. Roughly 75% of Ontario's energy is imported.[13] In-province RNG and hydrogen production present an excellent opportunity to minimize Ontario's reliance on energy imports, promote energy independence, and create jobs in the energy sector while supporting Ontario's economic competitiveness with other jurisdictions.

Reducing regulatory barriers can serve as a low-cost approach to accelerate job creation and private-sector investment in energy infrastructure projects. **We recommend ensuring that any changes suggested by the EETP that add regulatory efficiency and transparency to the OEB and the IESO do not inadvertently add new red tape or uncertainty to the planning process and focus on the planning process at the IESO, as opposed to operations and procurements.** To optimize investment, it is important to shift the risk perspective away from a fear of overbuilding to prudently building enabling infrastructure while leveraging existing systems.

Conclusion

Enbridge reiterates the utmost significance of embracing a comprehensive and inclusive approach to Ontario's energy transition to achieve net-zero emissions while fostering economic prosperity. We strongly advocate for integrating crucial recommendations in the EETP report, including coordinated energy planning, enhanced governance, defined targets for low-carbon fuels, expanded regulatory oversight, community perspectives, affordability, and leveraging Ontario's gas system to drive economic growth. Enbridge earnestly requests the thoughtful consideration of these recommendations and welcomes the opportunity to meet with you to discuss the consultation and recommendations in further

[13] Government of Canada. (2022, July 28). Provincial and Territorial Energy Profiles – Ontario. Canada Energy Regulator. https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincialterritorial-energy-profiles/provincial-territorial-energy-profiles-ontario.html

detail. If you have any questions or require additional information, please do not hesitate to contact Islam Elsayed, Government Affairs Specialist (islam.Elsayed@enbridge.com).