Power Workers' Union (PWU) Submission on the OEB's Regulatory Framework Reform, EB-2022-0302

May 3, 2023

On April 19, 2023, the Ontario Energy Board (OEB) held a stakeholder webinar to discuss its response to the October 21, 2022, Letter of Direction from the Minister of Energy. The OEB identified three areas in which they have been asked to provide advice:

1. Opportunities to incorporate environmental and economic development considerations;
2. Approaches to integrating regulation of the electricity and natural gas systems
3. Enhancements to how the OEB and Market Surveillance Panel (MSP) oversee the acquisition of energy resources, regulate the Independent Electricity System Operator (IESO) and review long term planning efforts

The PWU supports the Government's Direction to the OEB as they reflect the PWU's previous recommendations to the Ministry for Energy, Northern Development and Mines' (MENDM) 2021 consultation on the Long-Term Energy Planning Framework[1]. At the recent webinar, the OEB asked stakeholders to provide written feedback on five areas: Long Term Energy Planning; OEB Objectives; Leave to Construct approvals; Electricity Distribution Activities; Indigenous Relationships; and, Innovation. This PWU submission focusses on the OEB objectives, long term planning and economic innovation within the electricity distribution activities. This submission draws on the PWU's recommendations made to the MENDM in 2021 and also to the OEB on the outcomes of the OEB's Framework for Energy Innovation (FEI) activities.[2]

Context

The PWU previously applauded the MENDM's prior 2021 call to reform Ontario's electricity sector as very timely due to several factors: the growing complexity of managing Ontario's energy system transition to a net zero economy; the need to take immediate, affirmative action to address climate change; and the growing risk profile on multiple policy fronts for government should these challenges not be addressed.

These factors continue to present growing risks for Ontario's energy future: achieving real carbon emission reductions in the electricity sector and across the economy; ensuring Ontario's growing supply gap does not result in an energy shortage; the vital need to include other energy resources, such as natural gas, hydrogen and biomass, as part of the "energy" plan and to cost-effectively integrate rapidly-emerging technologies; and, manage the over-all cost implications of the energy transition for ratepayers.

In the two years following the MENDM's consultation, the need to address these critical issues has become even more urgent. Addressing these complex issues during the transition of Ontario's energy

[1] PWU Feedback to the MENDM on its Reforming the Long-Term Energy Planning Framework Consultation April 27, 2021 [See Appendix 1 for attached copy]

[2] PWU Feedback on the FEIWG and subgroup reports – EB-2021-0118, August 29, 2022; PWU submission to the OEB, Considerations for Developing a DER BCA Framework, Jan 2023. Accessible at https://www.pwu.ca/pwu-connects/submissions/

system warrants an integrated energy plan — electricity, natural gas and the emerging hydrogen economy.

The PWU's previous submission to the MENDM made two important recommendations that remain relevant today:

Recommendation ES-1: The energy planning framework should mitigate government risks by ensuring transparency and accountability in the associated processes and roles.

> Improving the efficacy of Ontario's energy planning requires a transparent framework, including clearly defined stakeholder roles and accountabilities and goal-driven policy.

Recommendation ES-2: Ontario needs a transparent, accountable and effective long-term energy planning framework to develop reliable and affordable energy infrastructure.

> As advised in the previous PWU submissions, Ontario has yet to implement a credible planning approach for procuring the requisite acquisition of new resources and the required procurement process for new resources will still not be underway for at least another year. This will further hobble Ontario's ability to meet the forecast needs and exacerbate the IESO's continued exclusion in its planning of the impacts of electrification.[3] The current recognized capacity shortfall coupled with the unfolding rapid increase in demand from electrification requires immediate policy action.

Three Part Solution

The effectiveness of a comprehensive energy planning framework involves three critical elements — Policy Priorities, Planning Roles, and Implementation — to ensure a transparent, accountable, and successful process. These elements speak directly to the above noted questions posed to the OEB.

1. *Policy Priorities and opportunities to incorporate environmental and economic development considerations*

The Minister asked the OEB about how it could enable opportunities to incorporate environmental and economic development considerations. Much discussion occurred at the stakeholder webinar as to whether the objectives or mandate of the OEB should be modified. The general consensus at that meeting, as observed by the PWU, was that the OEB was already accountable to all policies that the government may set with respect to the energy system and the OEB's role as an economic regulator. However, ambiguity remains with respect to what those environmental and economic priorities are for the purposes of planning and overseeing the efficacy of the energy system. Ultimately government is responsible for making policy, such as the environmental and economic implications for the energy sector, and is accountable for the outcomes. It should not be incumbent upon the OEB to infer policy. For

[3] While they recently issued a Pathways to Decarbonization report, the IESO has been clear that it is not a planning references and has not yet been factored into its Annual Planning Outlook or Annual Acquisition Report processes. [Ref IESO APO webinar Jan 2023].

example, while there is no official Ontario government policy for achieving Net Zero, should the OEB be making decisions that impact ratepayers in order to achieve Net Zero?

A clearly articulated set of policy priorities is a prerequisite for Ontario's future energy planning to address the complexities of the province's energy transition and associated risks. Well-defined Policy Priorities help establish fair governance for the planning process and metrics for assessing performance and ultimately accountability.

It is well understood that energy Infrastructure investments can be leveraged to advance the economic prosperity of the province and achieve a broad range of the Government's policy objectives. These Policy Priorities should be comprehensive. Situational analysis shows that whole-of-government objectives should inform and shape both Policy Priorities and procurement criteria for the energy sector such as those to be used by the IESO.

The PWU made two recommendations in its earlier MENDM submission:

> ***Recommendation ES-3:*** Government should provide clear, transparent, non-prescriptive Policy Priorities than can be planned for and are sufficiently measurable to support accountability.
>
> ***Recommendation ES-4***: Policy Priorities should establish goals and objectives for areas such as: total cost to ratepayers; emission reductions; job creation; GDP; energy security; and other government policy objectives e.g., indigenous peoples.

2. *Planning Roles and the Role of the OEB in overseeing the acquisition of energy resources, regulating the IESO, and reviewing long term planning efforts*

The OEB identified several potential roles for the OEB in their webinar materials, including a coordinated planning document and processes and for making recommendations to the IESO and government. With respect to these and the government's above-noted ask of the OEB, the PWU continues to advance the following recommendation:

> ***Recommendation ES-5***: The IESO should adopt "Living Plan" approach, supported by the OEB's participation and annual reporting against the Government's Policy Priorities. This could require minimal change to existing roles, create negligible burden to planning timelines, and provide the accountability required to bolster the process.

Analyses show that robust governance structures are needed to promote transparency and accountability in planning. This could be achieved by making minimal changes to the current practices of the IESO and the OEB while improving public trust and reducing government risk. The effectiveness of the planning process can be improved through:

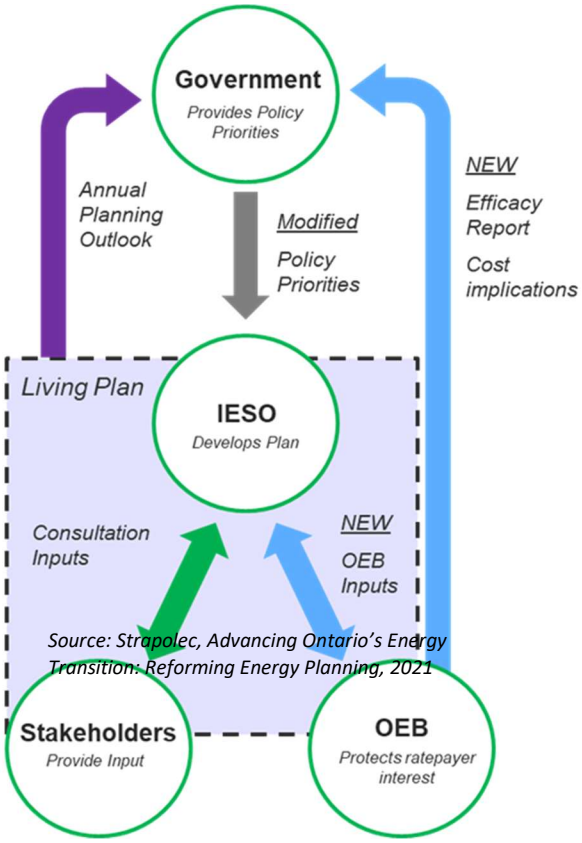
- Government's Policy Priorities for energy planning that are transparently communicated to the IESO and the OEB.

- IESO APOs that are explicitly responsive to the Policy Priorities and modifications to the existing process to transition to a 'Living Plan' approach to stakeholder engagement, including Indigenous Peoples.
- OEB participation in the IESO's "Living Plan" to improve accountability for achieving a broader set of Policy Priorities and to provide an annual performance report to Government. The OEB's mandate already considers a broad range of government policy areas and regulates natural gas and electricity.

The *Policy Priority* and *Living Plan* processes may obviate the need for periodic Long-Term Electricity Plans (LTEPs), at a minimum its scope, while providing more flexibility and responsiveness during Ontario's energy transition and periods of rapid change.

Additional details can be found in Appendix A. The importance and considerations relevant to the development of policy priorities and planning roles of the government, OEB and the IESO were also communicated by the Green Ribbon Panel, of which the PWU is a member.[4]

Figure 1: Roles in an Updated Planning Framework



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

3. Infrastructure Implementation and approaches to integrating regulation of the electricity and natural gas systems

The PWU has been recommending that Ontario begin procuring baseload, low-carbon energy as soon as possible and this recommendation was included in its MENDM submission:

> ***Recommendation ES-6:*** Procurements for low emission baseload supply should start now.

Ultimately, energy planning culminates in the development and delivery of infrastructure. It is in this implementation of energy infrastructure that the outcomes of the planning framework are determined and where ultimate accountability is measured and falls. Policy Priorities should help transparently shape procurement criteria and the framing of the anticipated cost-benefit outcomes and accountabilities in the early stages of the decision-making process.

[4] Green Ribbon Panel, Submission for the Ministry of Energy, Northern Development and Mines - review of Ontario's long-term energy planning framework, 2021. Accessible at https://www.greenribbonpanel.com/reports-and-publications/

Advancing the procurement process should present little, if any, risk to Ontario as demand analyses clearly show the significant need for low emission, baseload electricity.[5] The evidence demonstrates that Ontario faces a greater risk of under procurement. In addition to this capacity gap, Ontario's emission profile will be affected by the continuing trends in consumer-driven electrification. Low greenhouse gas (GHG)-emitting baseload would displace baseload natural gas-fired generation and limit its use for its most suitable role - providing peak and reserve capacity.

In support of the above framework, the PWU's prior submission to the MENDM included several additional recommendations:

Recommendation P1: Planners require a clear mandate to independently identify and explore emerging risks and their implications for Ontario's energy system and government established Policy Priorities.

Recommendation P2: Policy Priorities must recognize that climate action is driving an indisputable and significant need for electrification that must be included in Ontario's energy plan.

Recommendation P3: Policy Priorities should recognize the need for integrated planning across electricity, natural gas, hydrogen and biomass economies as emerging technology innovations could affect the need for capacity buildout.

Recommendation P4: Sustaining system reliability through the energy transition warrants planning now for the future.

- ***Recommendation P4-1:*** Long-term procurement planning should place a policy priority on acquiring non-emitting resources.

Recommendation P5: A new resource acquisition planning framework should prioritize a "low system cost" approach while concurrently addressing the evolving nature of demand, including regional needs.

- ***Recommendation P5-1:*** Planning for new resource acquisitions must consider the cost implications and benefits of integrated bulk, regional, and local solutions.

Recommendation I2 – Specifying Ontario's demand needs—baseload and intermediate—is the solution that allows the province to act both early and prudently to satisfy its future energy requirements.

The above suite of recommendations speak to several priorities for the OEB:

- Ensuring an affordable lowest cost reliable and sustainable energy system for rate payers
- Optimizing the effectiveness of planning activities across local, regional and the bulk systems

The OEB has also asked for feedback on implications for rate setting and facility applications.

The OEB's critical mandate as the economic regulator of Ontario's energy system requires that it ensure appropriate energy resource acquisitions are made to secure, reliable, sustainable and affordable energy for all Ontarians. The OEB's mandate was the subject of an intense consultation process regarding

[5] Strategic Policy Economics, Electrification Pathways for Ontario, 2021. Accessible at https://strapolec.ca/publications/

Distributed Energy Resources (DERs) undertaken by the Framework for Energy Innovation (FEI) working group. As a participant in FEI, the PWU emphasized several recommendations in its final submission:[6]

- **Establish an Initial Framework and Template for Benefit Cost Analysis (BCA)** including "*the development of Ontario-specific assumptions, inputs, and methods for a BCA analysis*."[7]
- **Provide guidance on where DERs may provide value and what that value may be writ large to Ontario's electricity sector.** To best inform the OEB and potentially government with respect to policy options and their urgency, that guidance could potentially be in the form of a BCA in aggregate for the province. The provision of reliable quantitative guidance from such analyses is the important evidence-base to inform initiatives of the OEB and IESO, the degree to which societal value elements should be considered, and the prioritization of planning integration, alignment and coordination across the electricity and natural gas sectors.

A high-level integrated view on the drivers for DER adoption and the magnitude of costs saved, incurred and avoided is absent in current analyses. In fact, the cost-effectiveness of DERs in Ontario has not yet been quantifiably established. The IESO's recent DER Potential study shows that DERs may only offer 1250 MW of capacity under its current planning assumptions and most are Behind the Meter energy management solutions.[8] As a result, contrary to the FEIWG statement, it is not currently determined that "*the sector should prepare for a high DER penetration future*."[9]

The PWU concluded that important work remains to establish a DER integration policy framework that ensures the cost-effective adoption of emerging technologies that will provide rate payers with the lowest cost solutions that reliably meet Ontario's emerging electricity system needs. In January 2023, the PWU provided a supplementary set of comments on the BCA.[10]

In that submission, the PWU recommended that an effective framework for innovation to develop the lowest-cost, reliable electricity system should include:[11]

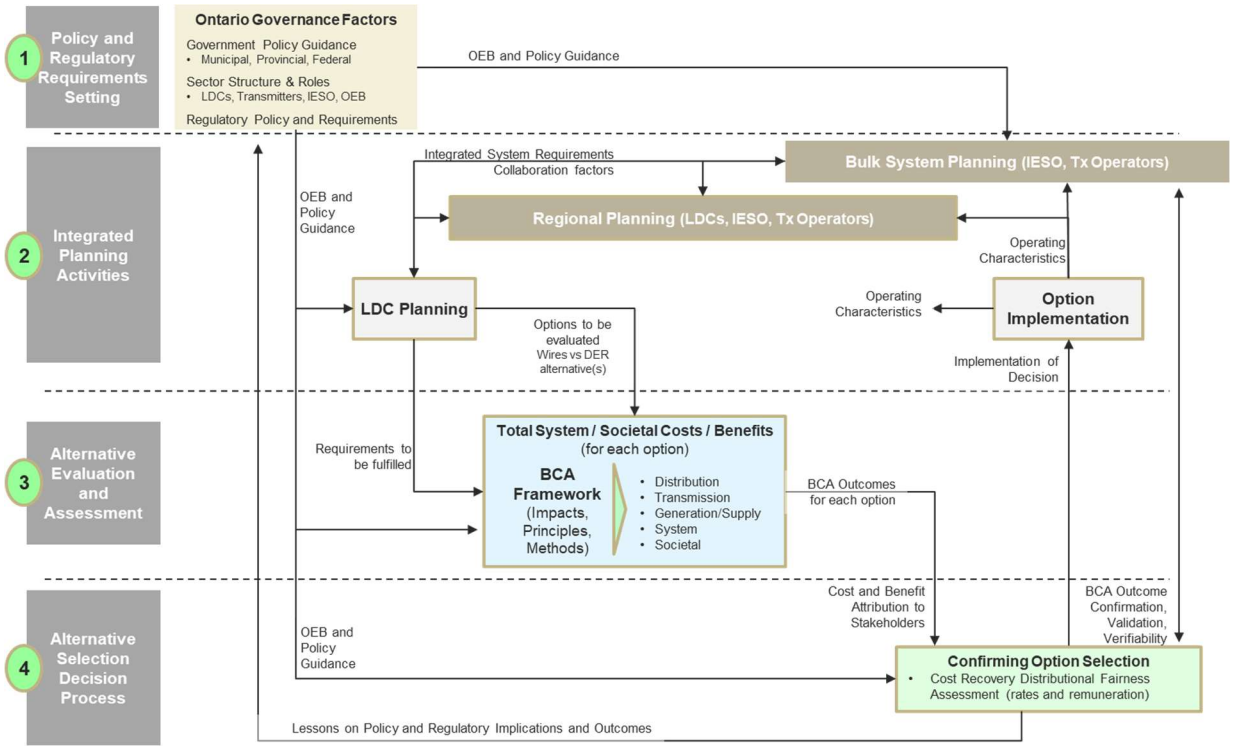
- Integrated planning at all levels; with the provision of information for both planning and operating purposes; and,
- A method for ascertaining cost-effective alternatives for meeting system needs.

The PWU proposed framework is illustrated in Figure 1. It consists of four groups of activities:

1. Policy and Regulatory Requirements Setting
2. Integrated Planning Activities
3. Alternative Evaluation and Assessment
4. Alternative Selection Decision Process

[6] PWU Feedback on the FEIWG and subgroup reports – EB-2021-0118, August 29, 2022
[7] FEIWG BCA Subgroup Report, June 2022, Page 33.
[8] IESO DER Potential Study webinar materials, June 22, 2022, page 24.
[9] FEIWG Final Report, June 2022, page 4.
[10] PWU submission to the OEB, Considerations for Developing a DER BCA Framework, Jan 2023. Accessible at https://www.pwu.ca/pwu-connects/submissions/
[11] FEIWG DERI Subgroup Report, June 2022, pages 4, 5.

Figure 1 – LDC DER-related Decision-making Process and Validation Needs



Each of these activities represent critical steps that help to ensure: cost-effective investment decisions; checks and balances for assumption validation; appropriate investment recovery rates for all affected parties; and, an operational data feedback loop in the planning process. Each activity includes key features, process communications and feedback loops intended to support the overall efficacy of the framework.

1. Policy and Regulatory Requirements Setting

   Currently, the integration of DERs into Ontario's electricity system is being shaped by government policies, the roles of sector structure and decision-making stakeholders and OEB regulatory policies and requirements.

   Government policies and regulatory drivers impact the other activities in Figure 1. These include the individual planning activities of the sector stakeholders, the key requirements to be considered in the BCA and the drivers of resource procurement outcomes. An effective BCA framework will require clear, transparent, consistent application of decision-making requirements across all of these activities.

   Recommendation: The OEB should compile the relevant guidance and clear requirements in support of resource decision-making.

2. Integrated Planning Activities

   Ontario's electricity planning occurs on three levels: the bulk system led by the IESO and the Tx operators (e.g. Hydro One); regional planning led by the IESO in collaboration with the LDCs and local

stakeholders; and, at the local level by the LDCs. As illustrated in Figure 1, these planning activities are influenced by OEB and provincial policy guidance.

For LDCs to make optimal local resource decisions requires integrated local, regional and bulk system planning processes. Since locally determined DERs may have benefits that accrue to the overall system, a mechanism is required to articulate the relevant integrated system requirements.

An important element of integrated planning is the confirmation, validation and verification of the BCA outcomes by affected stakeholders, including the underlying assumptions and inclusion of the benefits of DERs in subsequent planning cycles for the regional and bulk systems. This helps ensure that the identified benefits of DER integration are captured and not double counted.

Recommendation: The OEB should ensure that the stakeholders in affected regional and bulk system planning are engaged in the OEB-determined Option Selection process for approving LDC investments in DERs.

3. Alternative Evaluation and Assessment

The primary purpose of the FEIWG's development of a Benefit Cost Analysis (BCA) framework is to support the evaluation and assessment of DER alternatives to wires solutions. BCAs should provide a rational, transparent, verifiable and deterministic method for determining the net benefits of compared options on an equivalent basis by decision makers.[12]

The BCA framework is intended to make benefit cost assessments more economically rational, transparent and consistent to help assist the OEB, utilities and stakeholders with planning, decision-making, communication and adjudication. A critical outcome from a BCA is a clear, transparent articulation of the assumptions, costs and benefit impacts that can be attributed to each stakeholder in Ontario's electricity sector. This fidelity is critical to validating the reasonableness of the benefits assumed to be realized by affected stakeholders.[13]

4. Alternative Selection Decision Process

The last stage in the process confirms the options that will be selected. There will be three decisions that the BCA outcomes should inform.

   a. Which option has the greatest net benefits to rate payers?
   b. Is there a reasonable distribution of expected cost and benefits among stakeholders?
   c. Can the costs and benefits be fairly distributed among affected stakeholders?

The BCA outcomes should definitively identify the net benefits of each option for each stakeholder and ultimately for rate payers. As mentioned above, the BCA assumptions and outcomes require validation by affected stakeholders. This validation should ultimately be extended to reflect the integration and realized benefits for the bulk and regional planning processes.

Recommendation: A process by which affected stakeholders can validate and verify the assumptions and implications of energy system options must be developed. This could be addressed in several

[12] Principles identified by the FEIWG BCA subgroup report, June 2022, Section 6.8, page 31.
[13] FEIWG BCA subgroup report, June 2022, page 31, states only benefits, that will actually be realized should be included and supported by an appropriate mechanism

ways: improvements to the regional planning process and/or guidelines and assumptions from the OEB.

Closing

The PWU supports the reform of Ontario's planning framework and the role that the OEB plays in ensuring an affordable, reliable, and sustainable energy system for Ontarians. The urgency to make improvements to Ontario's energy planning framework is evident. Ontario's future approach should include: transparent and accountable, integrated governance and planning of the electricity and natural gas systems; OEB oversight of the IESO's planning and resource acquisition activities; OEB provision of expert advice to the government; and, evidence-based benefit/cost analyses that support integrated energy system planning, including environmental, societal and economic considerations.

The PWU has a successful track record of working with others in collaborative partnerships. We look forward to continuing to work with the MENDM and other energy stakeholders to strengthen and modernize Ontario's electricity system. The PWU is committed to the following principles: Create opportunities for sustainable, high-pay, high-skill jobs; ensure reliable, affordable, environmentally responsible electricity; build economic growth for Ontario's communities; and, promote intelligent reform of Ontario's energy policy.

We believe these recommendations are consistent with, and supportive of Ontario's objectives to supply low-cost and reliable electricity for all Ontarians.

Appendix A – Power Workers' Union (PWU) Feedback to the MENDM on its Reforming the Long-Term Energy Planning Framework Consultation, April 27, 2021.

The Power Workers' Union (PWU) is pleased to submit comments and make recommendations to the Ministry of Energy, Northern Development, and Mines (MENDM) regarding the consultation on reforming Ontario's long term energy planning framework. The PWU is a strong supporter and advocate for the prudent and rational reform of Ontario's electricity sector and recognizes the importance of planning for low-cost, low-carbon, high-value energy solutions to enhance the competitiveness of Ontario's economy.

The PWU supports the MENDM's initiative to reform energy planning in Ontario and create an effective, transparent, and accountable energy planning framework.

The PWU has been a participant in Ontario's energy planning consultations, including IESO engagements related to Market Renewal, the Annual Planning Outlook, and Resource Adequacy. The PWU's recommendations have focused on the need to consider climate change, total system cost, and procurement approach reforms that cost-effectively leverage Ontario's energy infrastructure investment dollars. More specifically, the PWU has consistently highlighted the urgent need to reform Ontario's procurement process to avoid what now appears to be an inevitable supply shortfall.

Last year, the PWU submitted recommendations to the Ministerial Advisory Council (MAC) for the MENDM consultation regarding the impacts of COVID-19 on Ontario's energy sector and potential innovative approaches to help stimulate economic recovery. These recommendations included actions that would sustain Ontario's economic recovery and maximize the benefits from the province's energy infrastructure investments, including: new nuclear; hydrogen; and biomass. The opportunity also exists to leverage federal program funding to synergistically achieve interrelated policy objectives. The PWU's submission recognized the importance of ensuring that these recommended actions would not impose additional financial burdens on taxpayers or ratepayers.

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Executive Summary

The MENDM's call for reform is timely given several factors: the growing complexity of managing Ontario's energy system transition to a net zero economy; the need to take immediate, affirmative action to address climate change, as endorsed by Ontario's energy sector leaders[14]; and the growing risk profile on multiple policy fronts for government should these challenges not be addressed.

These factors present a tsunami of risks for the planning of Ontario's energy future: successfully achieving carbon emissions reductions in the electricity sector and across all sectors of the economy; ensuring that Ontario's identified supply gap does not result in an energy shortage; the imperative to include other energy resources, natural gas, hydrogen and biomass, as part of the "energy" plan and to integrate rapidly-emerging technologies cost effectively; the cost implications of the energy transition on ratepayers; and, the increased fiscal challenges arising from the COVID-19 pandemic.

The required energy transition will be complex, and warrants integrating planning across the entirety of Ontario's energy system: not just electricity, but also natural gas and the emerging hydrogen economy.

A Cycle of Planning Missteps

Recommendation ES-1: The energy planning framework should mitigate government risks by ensuring transparency and accountability in the processes and roles.

Over the last 25 years, Ontario's electricity sector has been in a constant state of transformation where policy responses and governance structures have failed to provide clarity and a stable investment climate for stakeholders. During this period, electricity resources have been procured that were misaligned with demand, and higher costs for ratepayers inevitably followed. These planning failures led to corrective policy interventions by respective governments in previous planning cycles that compounded the instability and resulted in additional cycles of suboptimal procurements.

Developing a framework for transparently planning Ontario's energy future with clearly defined stakeholder roles and accountabilities represents an opportunity for government to improve the efficacy of energy planning and yield better outcomes with less risk of planning failures and costly policy interventions.

The Reliability Crisis

Recommendation ES-2: Ontario needs a transparent, accountable and effective long-term energy planning framework to develop reliable and affordable energy infrastructure.

Unfortunately, a situational analysis shows that Ontario is in the midst of another unfolding planning failure.[15] The IESO has been forecasting a capacity gap in electricity supply for some time.[16] It plans on renewing and ramping up use of existing natural gas fired generation resources whose contracts are expiring. However, these resources alone are insufficient to replace the capacity from the retiring Pickering nuclear generating station.[17] Furthermore, increased use of these resources will result in

[14] OEA, 2021
[15] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[16] Brouillette, 2014
[17] IESO, 2020

increased exposure to the price volatility of the U.S. natural gas market, the costs of an increasing carbon price, higher carbon emissions, and reduced energy security. The latter will undermine Ontario's attempts to achieve its 2030 emissions targets.[18] In addition to this being the subject of prior PWU submissions,[19] some public groups are aware of this risk and have been actively expressing their opposition to the current plan and gaining support from municipal councils across Ontario.[20,21]

Currently, no credible plan has been advanced to address the requisite acquisition of new resources. Implied reliance on the ability to import from Quebec and the U.S. has been shown to be infeasible on the one hand and at significant risk due to U.S. climate policy objectives on the other. [22] Quebec cannot meet Ontario's growing winter heating load, instead currently relies on imports from Ontario in the winter. Both import options would lead to less energy security for Ontario. Yet the required procurement process for new resources will not be underway for many years, further delaying Ontario's ability to meet the forecast needs. Finally, the IESO has been clear that it has not factored in the impacts of electrification required to achieve Ontario's emissions targets as it has no policy guidance enabling it to do so.[23] Coupling the lack of supply solutions for the existing known capacity shortfall with the unfolding reality of new electricity demand from electrification of the economy points to a planning failure that will be hard to avoid without immediate policy action.

A 3-Part Solution

There are three elements to a comprehensive energy planning framework: Policy Priorities; Planning Roles; and Infrastructure Implementation. Each element requires a transparent, accountable process for the overall planning framework to be successful.

Policy Priorities:

> ***Recommendation ES-3:*** Government should provide clear, transparent, non-prescriptive Policy Priorities than can be planned for and are sufficiently measurable to support accountability.
>
> Ultimately government is responsible for making policy and is accountable for the outcomes. A clear set of Policy Priorities is a prerequisite for Ontario's future energy planning given the complexity of the province's ongoing energy transition and its associated risks. The Policy Priorities will establish what governs the planning process and the creation of measures of effectiveness which will ultimately drive how accountability is enabled and its outcomes.

[18] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[19] PWU, PWU Response to the Non-Emitting Resources Subcommittee's Draft Report, "Participation in Ontario's Future Electricity Markets", 2019; PWU, IESO Incremental Capacity Auction High Level Design Submission, 2019; PWU, PWU Submission on IESO Technical Planning Conference Materials, 2020; PWU, PWU Submission on Resource Adequacy Engagement, 2020; PWU, PWU Submission on Resource Adequacy Engagement, 2021.
[19] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[20] City of Toronto, 2021
[21] Ontario Clean Air Alliance, 2021
[22] Strategic Policy Economics, "Renewables and Ontario/Quebec Transmission System Interties: An Implications Assessment", 2016
[23] IESO, 2020

Recommendation ES-4: Policy Priorities should establish goals and objectives for such areas as: total cost to ratepayers; emission reductions; job creation; GDP; energy security; and other government policy objectives such as roles for indigenous peoples.

Energy Infrastructure investments can be leveraged to advance the economic prosperity of the province and achieve a range of policy objectives across government. Situational analysis shows that whole-of-government objectives should inform and shape both Policy Priorities and procurement criteria for the energy sector.

To maximize these benefits for Ontario's future prosperity, enabling new nuclear options in the supply mix conversation is an immediate imperative. Policy Priorities regarding how to best obtain the benefits offered by new nuclear should be included in the procurement criteria to encourage the same benefits from all options. The economics of supply mix choices are compelling with a nuclear solution creating upwards of $90B more in direct GDP than known alternatives.[24] Policy tools combined with creative business models can further reduce the cost of nuclear and attract private funds to mitigate government fiscal constraints.

Planning Roles:

Robust governance structures are needed to promote transparency and accountability in planning.

Recommendation ES-5: Using an IESO "Living Plan" approach, supported by the OEB's participation and annual reporting against the Government's Policy Priorities could require minimal change to existing roles, create negligible burden to planning timelines, and provide the accountability required to bolster the process.

There are several gaps in accountability in Ontario's current energy planning framework. These can be addressed by expanding the current practices of the IESO and the OEB. This would promote accountability and transparency, improve public trust in the process, and reduce government risk. The effectiveness of the planning process can be improved through appropriate roles for the IESO and the OEB in decision-making processes:

- Government's Policy Priorities for energy planning should be transparently communicated to the IESO and the OEB.

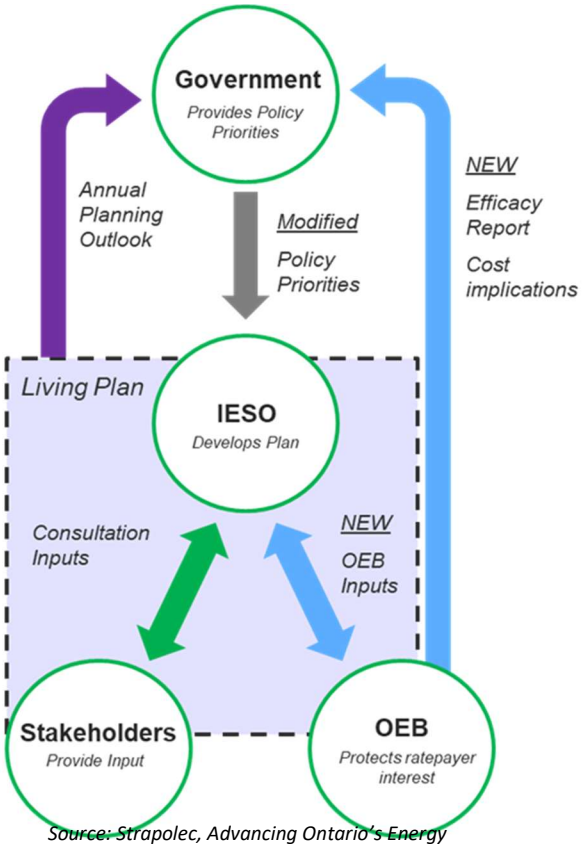
[24] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

- IESO can develop APOs that are explicitly responsive to the Policy Priorities, using its existing process as a 'Living Plan' approach to stakeholder engagement, including Indigenous Peoples.
- OEB can bring accountability to societally driven energy Policy Priorities through participation in the IESO's "Living Plan" and by providing an annual efficacy report. The OEB's mandate aligns with the assessment of societal impacts and already straddles the natural gas and electricity domains for rate decisions.

These minor changes to roles of the OEB, the IESO, and the Government could improve the effectiveness of the planning process while adding more transparency and oversight with minimal burden.

The *Policy Priority* and *Living Plan* processes may obviate the need for further LTEPs, or at least reduce its scope, as the APO could provide a more flexible, responsive and timely function during the pending energy transition and periods of rapid change.

Figure 2: Roles in an Updated Planning Framework



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

Infrastructure Implementation

Recommendation ES-6: Procurements for low emission baseload supply should start now.

Ultimately, energy planning results in the development and delivery of infrastructure. It is in this implementation of energy infrastructure that the outcomes of the planning framework are determined and where ultimate accountability is measured and falls to government. Unfortunately, when this form of accountability falls on government, it is well after the fact with little recourse. Elections are one, after the fact, form of holding government accountable, as are reports from Ontario's Financial Accountability Office and/or Auditor General. For the planning framework to be successful, Policy Priorities should transparently shape procurement criteria and hence frame the expected cost-benefit outcomes and provide earlier accountability in the decision-making process. Such complex procurement criteria require conventional RFP processes to convey them to bidders.

Starting the procurement process now comes with little if any risk. A demand analysis shows that 2 GW to 5 GW of low emission baseload is already inherently needed in the IESO's existing forecast supply gap.[25] Low GHG-emitting baseload would displace the use of natural gas-fired generation for baseload, enabling it to provide the peak and reserve capacity it is most suited for. Building new, large-scale low-carbon baseload resources of any kind will take time to develop and commission –

[25] Strategic Policy Economics, DER in Ontario, 2018

the siting challenges that all options face. Nuclear may in fact the easiest given existing licensed sites.

The evidence clearly shows that Ontario faces a greater risk of under procurement. In addition to this capacity gap, Ontario's emissions will be affected by the continuing trends in electrification as consumers continue to seek low-carbon solutions. Achieving Ontario's existing 2030 emission target could increase the supply gap by 3 to 5 GW over what the IESO has currently forecast. Ontario needs substantial new, low-carbon electricity resources to avoid a supply shortfall.

Consultations and requests for expressions of interest could occur in 2021, with RFPs targeted for issuance in 2022, thereby advancing the availability of non-emitting supplies by 5 years.

Additional Recommendations

The PWU respectfully provides the following additional Policy Priority and Implementation recommendations.

Policy Priority Recommendations

Recommendation P1: Planners require a clear mandate to independently identify and explore emerging risks and their implications for Ontario's energy system and government established Policy Priorities.

Recommendation P2: Policy Priorities must recognize that climate action is driving an indisputable and significant need for electrification that must be included in Ontario's energy plan.

Recommendation P3: Policy Priorities should recognize the need for integrated planning across electricity, natural gas, hydrogen and biomass economies as emerging technology innovations could affect the need for capacity buildout.

Recommendation P4: Sustaining system reliability through the energy transition warrants planning now for the future.

- ***Recommendation P4-1:*** Long-term procurement planning should place a policy priority on acquiring non-emitting resources.
- ***Recommendation P4-2:*** Policy Priorities should consider that carbon pricing under the Emissions Performance Standard (EPS) be applied to natural gas-fired generation in a manner similar to the Federal Output-Based Pricing System (OBPS), including any future contractual arrangements with existing assets that arise from IESOs resource acquisition strategy.
- ***Recommendation P4-3:*** System planning should be based on a strategically-driven timeline to 2050 in order to minimize the system reliability risks of a capacity shortfall.

Recommendation P5: A new resource acquisition planning framework should prioritize a "low system cost" approach while concurrently addressing the evolving nature of demand, including regional needs.

- ***Recommendation P5-1:*** Planning for new resource acquisitions must consider the cost implications and benefits of integrated bulk, regional, and local solutions.

Recommendation P6: Optimizing the economic benefits of leveraging infrastructure investments should be included in Policy Priorities and applied to the IESO's procurement process.

- ***Recommendation P6-1:*** The energy planning framework should consider using infrastructure development tools for public-private partnerships to minimize and share costs and risks in new low carbon infrastructure like nuclear generation.

Implementation Recommendations

Recommendation I1 – Ontario should not be unnecessarily exposed to the risk of having inadequate electricity resources as it should not take the IESO four years to prepare a procurement process.

Recommendation I2 – Specifying Ontario's demand needs—baseload and intermediate—is the solution that allows the province to act both early and prudently to satisfy its future energy requirements.

Recommendation I3 – The IESO should create near-term dates to kick start the paradigm shift for procuring Ontario's energy needs by 2022.

Objectives of the MENDM Energy Planning Framework Consultations

On January 27, 2021, Ontario's Ministry of Energy, Northern Development and Mines (MENDM) opened a consultation to "refocus Ontario's long-term energy planning framework to increase the effectiveness, transparency and accountability of energy decision-making in Ontario," with the goal of promoting "transparency, accountability, and effectiveness of energy planning decision making," increasing investment certainty, and ensuring the interests of ratepayers are protected.

MENDM suggested that a new process could involve greater reliance on the IESO and the OEB, with their desired outcome being to "empower technical planners, such as the IESO, to plan the most reliable and cost-effective system." To that end, MENDM has posed the following nine questions to stakeholders:

1. *How can we promote transparency, accountability and effectiveness of energy planning and decision-making under a new planning framework?*
2. *What overarching goals and objectives should be recognized in a renewed planning framework?*
3. *What respective roles should each of the Government, IESO, and the OEB hold in energy decision-making and long-term planning?*
4. *What kinds of decisions should be made by technical planners at the IESO and the OEB as regulators?*
5. *What types of decisions should require government direction or approval?*
6. *Are there gaps in the IESO and the OEB's mandates and objectives that limit their ability to effectively lead long-term planning?*
7. *Should certain planning processes or decisions by the IESO, the OEB, or the government receive additional scrutiny, for example through legislative oversight or review by an expert committee?*
8. *How often and in what form should government provide policy guidance and direction to facilitate effective long-term energy planning?*
9. *How do we ensure effective and meaningful Indigenous participation in energy sector decision-making?*

These questions span the important aspects of successfully reforming the energy planning framework with the first question reflecting the all-encompassing objective of the reform. To fully address the objectives, a situational and a gap analysis were conducted to frame the recommendations in this submission. This context helps to illustrate a high-level planning framework. A summary of how these recommendations align with the above questions is provided in the appendix.

The Energy Planning Framework

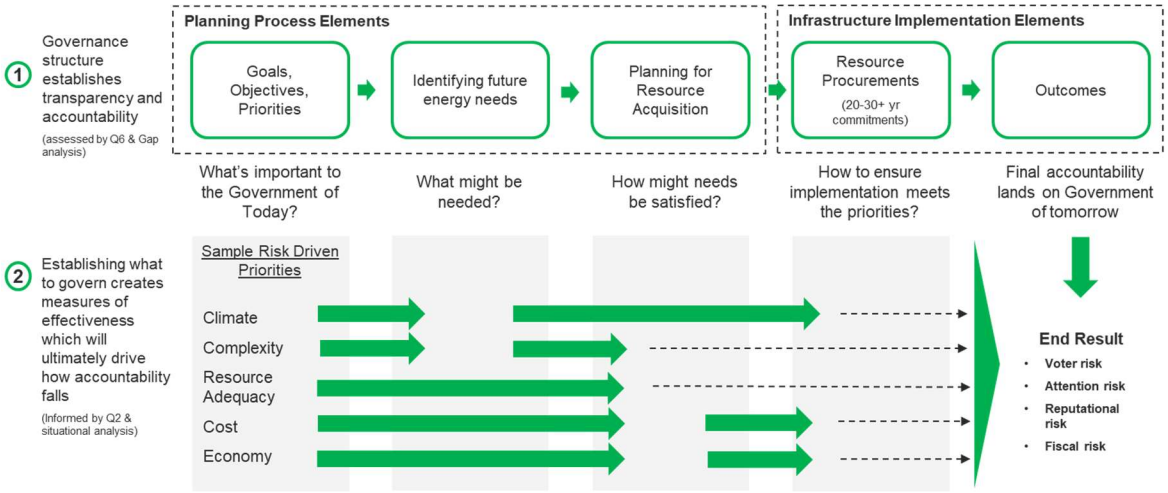
An effective energy planning environment involves the successful pairing of planning process and infrastructure implementation elements.

The *planning process* involves three highly integrated elements:

1) Setting goals, objectives and priorities – those that matter to the government of the day;
2) Identifying future energy needs – as established by informed forecasting of future conditions;
3) Planning for resource acquisition –to satisfy the needs for a reliable, sustainable, and affordable electricity system.

The *infrastructure implementation elements* include the procurement of resources, in accordance with the resource acquisition plan, which ultimately leads to the outcomes for which final accountability inevitably lands on government.

Figure 3: Three Elements for Framework Improvement



Source: Strapolec Analysis

Three elements influence the success of the framework's ability to deliver favourable outcomes:

1) *Developing the governance structure* that establishes transparency and accountability for the decisions made throughout the process;
2) *Setting the government's Policy Priorities* to clearly define what the planning process must achieve and ultimately the measures of success the government will be accountable for;
3) Ensuring the infrastructure implementation is in alignment with the Policy Priorities.

The recommendations in this submission are provided to help inform how the energy planning framework could be successfully reformed by improving the above three elements.

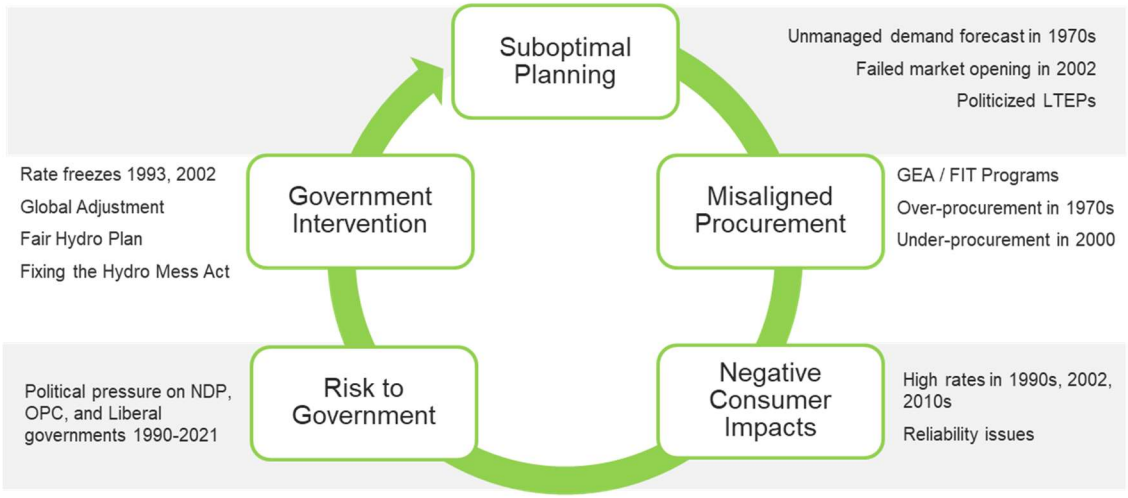
Developing the Governance Structure

The following recommendations are based on an historical analysis of some of Ontario's previous planning failures and a gap analysis of existing roles versus two principles of good governance: transparency and accountability.

Recommendation ES-1: The energy planning framework should mitigate government risks by ensuring transparency and accountability in the process and roles.

Energy planning has been a source of risk to government for the past 25 years, with a repeating cycle of suboptimal planning and associated undesirable outcomes ultimately presenting risks to government, who has ultimate accountability for energy planning. Suboptimal planning failures have ranged from under procurements to over procurements, which ultimately manifests as either high costs to rate payers, cost-shifting among rate classes, and growing financial support from taxpayers. The ensuing pressure on government presents as political risk, compelling government to intervene in planning. Such interventions inevitably bypass the formal planning process, prompting the cycle to repeat. This cycle of sub optimal energy planning has plagued governments of all stripes since the 1990s. Yet, these planning challenges and risks persist today with Ontario appearing to be on the path to repeating history by under procuring for Ontario's future.[26]

Figure 4: The Cycle of Suboptimal Planning



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

At the root of this cycle are problems of *governance.* Governance is defined by the OECD as "the process by which public institutions conduct public affairs and manage public resources" [27] Principles of *accountability, transparency,* and *agency independence* are key features of good governance.[28] These critical elements have been conspicuously absent in the recurring planning failures seen in Ontario to date. Gaps in transparency and accountability persist and Ontario's "independent planning agencies" are increasingly managed by directives.

[26] Strategic Policy Economics, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021; Informed by Warren, 2015; Vegh, 2017; Vegh, 2020.
[27] OECD, 2007
[28] Vegh, 2017

Breaking this cycle of intervention requires an energy planning framework that promotes these fundamental principles and delivers reliable, cost-effective outcomes for Ontario's energy consumers. Doing so will reduce future risks to government and minimize the need for government intervention.

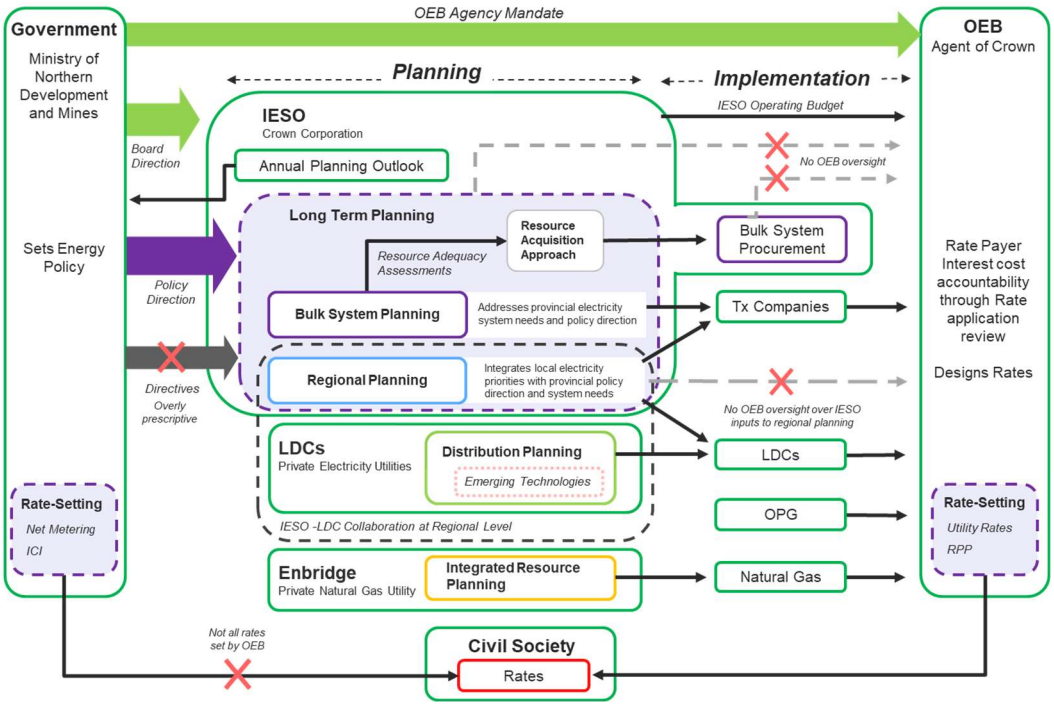
Accountability measures are required throughout the planning framework. Accountability means decisions are "owned" by the body making them.[29] In Ontario, the government is responsible for planning decisions, and is ultimately held accountable by voters during elections, and by Officers of Parliament like the Auditor General and the Financial Accountability Office. However, these mechanisms only hold the government accountable *after* decisions are made. To ensure plans are effective, Ontario needs accountability measures that apply *before* plans are finalized to avoid future outcomes from planning failures.

Recommendation ES-2: Ontario needs a transparent, accountable and effective long-term energy planning framework to develop reliable and affordable energy infrastructure.

In Ontario's current energy planning framework, the IESO directs regional and bulk system planning, while LDCs direct and implement distribution planning. The OEB provides accountability on behalf of ratepayers by reviewing utility rate applications and the IESO's operating expenses, and sets rates. Government provides the OEB with its mandate, but has also set rates.

For the IESO, Government provides direction as a member of the IESO's Board, policy direction for the IESO's planning activities, and other directives on miscellaneous particular matters, some of which are material to overall outcomes.

Figure 5: Ontario's Energy Planning Framework



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

[29] Vegh, 2017

Several accountability gaps exist in this framework:

a. **Government Directives to the IESO** are not always transparent and can be overly prescriptive, limiting the IESO's ability to utilize its independent expertise and provide effective planning.[30]
b. **The overall planning process** has no mechanism that links accountability to the interests of ratepayers and the financial viability of the sector. The IESO has no explicit requirement to address the cost-benefit tradeoffs of total system cost regarding how demand for electricity is met. The OEB provides an accountability measure, only "*after*" implementation plans are proposed by regulated entities. No such check occurs on the inputs to those plans, or the planning decisions made that have driven them. This creates economic/business uncertainty for utilities/generators that need stability and certainty in the regulatory environment to support their own planning exercises. The delayed review also impacts on the OEB mandate to balance ratepayer interests against the need to ensure the viability of the sector.
c. **Bulk system resource acquisitions** outside of the OEB regulated entities lack mechanisms linking decision accountability to ratepayer interests and investor risks. How the IESO balances its short-run (energy supply) risks against its long run (capacity availability) risks impacts on how investor and ratepayer risks are balanced.[31]
d. **Rate-setting** is performed by both the OEB and the government. Rates set by government, such as the ICI and Net Metering programs, currently have no accountability links to the OEB for assessing ratepayer interests. The ICI and net metering programs have both had unintended rate impacts to class B ratepayers. The associated challenges with these rates have been the subject of several MENDM consultations that have incurred substantive government attention.[32] The Electricity Act does not require the IESO to consider consumer impacts, including the possible transfer of risks between categories of ratepayers or between ratepayers and taxpayers.[33]
e. **After-the-fact accountability**: Existing accountability measures do not address outcomes until public awareness has grown, usually several years after the decisions are made.[34]

Ontario's reform of its energy planning framework should address these accountability gaps with measures that are applied *before* the fact, not afterwards. Such measures can provide an "early warning" to government about the risks that may arise during the energy planning process. The OEB may be well-placed to perform this role.

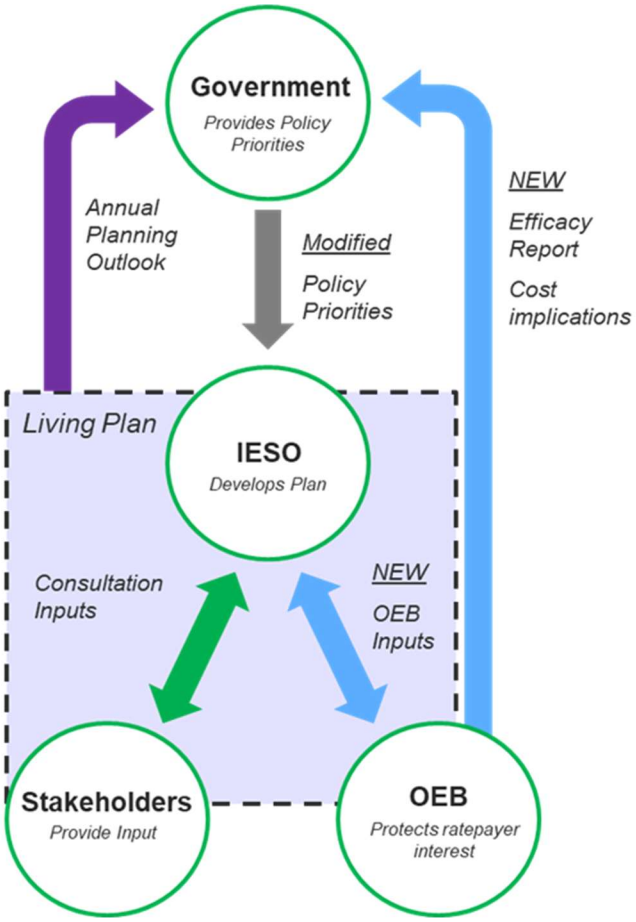
Recommendation ES-5: Using an IESO "Living Plan" approach, supported by the OEB's participation and annual reporting against the Government's Policy Priorities, could require minimal change to existing roles, create negligible burden to planning timelines, and provide the accountability required to bolster the process.

A revised energy planning framework can play to the strengths of the IESO and the OEB to create a more transparent, accountable, and effective planning framework. In this framework:

[30] Office of the Auditor General of Ontario, 2015
[31] Strategic Policy Economics, 2020
[32] Ministry of Energy, Northern Development and Mines, 2019; Ministry of Energy, Northern Development and Mines, 2020.
[33] Electricity Act, 1998, Part II.2, Subsection 25.29 (3)
[34] Vegh, 2017

a. **The Government, as an alternative to the prescriptive and politicized nature of the previous 2017 LTEP,**[35] [36] would set energy policy through a document that articulates the province's energy Policy Priorities. This single reference document would be publicly communicated to the IESO and the OEB to provide guidance on the execution of their respective mandates. The government would periodically update these Policy Priorities as required and/or in response to annual reports by the IESO and OEB regarding their progress towards achieving the government's objective of the Policy Priorities. Government decision-making authority would continue to apply to procurements that commit the province to expenditures above a set threshold. The Policy Priorities document would establish the measures of success, including final accountability.

Figure 6: Roles in an Updated Planning Framework



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

b. **The IESO** would receive Policy Priorities from the Government and undertake energy planning to meet the objectives set out therein. Their scope should include electricity and the implications to electricity of other energy resources, such as natural gas and hydrogen.

   The IESO's current stakeholder engagement process has been effective and successful in creating what is essentially a "Living Plan". Future IESO consultations on the planning process should include inputs from the OEB. The IESO would maintain its plan as necessary in response to stakeholder and/or OEB feedback. Its Annual Planning Outlooks would provide the government with its assessment of the current state of Ontario's energy plan and its alignment with the government's Policy Priorities.

c. **The OEB** currently acts on behalf of energy ratepayers for both electricity and natural gas.[37] The OEB could further represent civil society's interests with inputs to IESO's *living plan* consultations, where these interests relate to the Policy Priorities to which the OEB has been charged, and as these interests pertain to the implications of IESO's plan on electricity and natural gas rates.

[35] Vegh, 2020
[36] MENMD letter to stakeholders dated January 5th articulated a desire to eliminate political interference
[37] Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Sched. B

The OEB should be relied upon to set all rates in accordance with its assigned Policy Priorities including the rate programs currently administered by the government.

The OEB would provide annual reports to government on the efficacy of IESO's APO as it relates to the Policy Priorities assigned to the OEB and including the cost implications to ratepayers. These reports would be publicly available to provide an independent assessment of the expected outcomes of the IESO's activities to the government and the public.

With respect to the IESO's electricity planning mandate and its role to provide system expertise, the OEB's efficacy reports would remain focused on the *outcomes* of the IESO's planning activities as they relate to specific Policy Priorities that the OEB has been charged to review. This would not constitute *oversight* of the IESO's operations.

Trusted, transparent and effective processes expertly informed by the IESO and OEB could obviate the need for additional oversight/committees.

Setting Policy Priorities

The second question posed by the consultation concerns overarching goals and objectives that should be recognized in a renewed planning framework. These goals and objectives should define the substance of what the planning framework is governing.

Under Section 25.29 of the current Electricity Act, 1998, an LTEP may include goals and objectives respecting:

- The cost-effectiveness of energy supply and capacity, transmission and distribution;
- The reliability of energy supply and capacity, transmission, and distribution, including resiliency to the effects of climate change;
- The prioritization of measures related to the conservation of energy or the management of energy demand;
- The use of cleaner energy sources and innovative and emerging technologies;
- Air emissions from the energy sector, taking into account any projections respecting the emission of greenhouse gases developed with the assistance of the IESO;
- Consultation with Aboriginal Peoples and their participation in the energy sector, and the engagement of interested persons, groups, and communities in the energy sector;

The above list of goals and objectives are applicable to the government who currently owns the accountability for producing LTEPs. However, the Act places these items at the discretion of the minister. To advance the government's objectives to depoliticize the planning framework and rely on the expertise of the IESO and the OEB, these goals and objectives should be detailed by government as a set of Policy Priorities for long-term energy planning.

Recommendation ES-4: Policy Priorities should establish goals and objectives for such areas as: total cost to ratepayers; emission reductions; job creation; GDP; energy security; and other government policy objectives such as roles for indigenous peoples.

Ontario's energy transition and its focus on reducing emissions materially affects many of the desired objectives of the energy planning framework reform process. Energy Infrastructure investments can be leveraged to advance the economic prosperity of the province and achieve a range of policy objectives across government. Situational analysis shows that whole-of-government objectives should inform and shape both Policy Priorities and procurement criteria for the energy sector.

To maximize these benefits for Ontario's future prosperity, enabling new nuclear options in the supply mix conversation is an immediate imperative. Policy Priorities regarding how to best obtain the benefits offered by new nuclear should be included in the procurement criteria to encourage the same benefits from all options. The economics of supply mix choices are compelling with a nuclear solution creating upwards of $90B more in direct GDP than known alternatives.[38] Policy tools combined with creative business models can further reduce the cost of nuclear and attract private funds to mitigate government fiscal constraints. The following recommendations have been developed from an assessment of the planning risks in the energy sector and potential mitigation options that Policy Priorities may enable.

[38] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

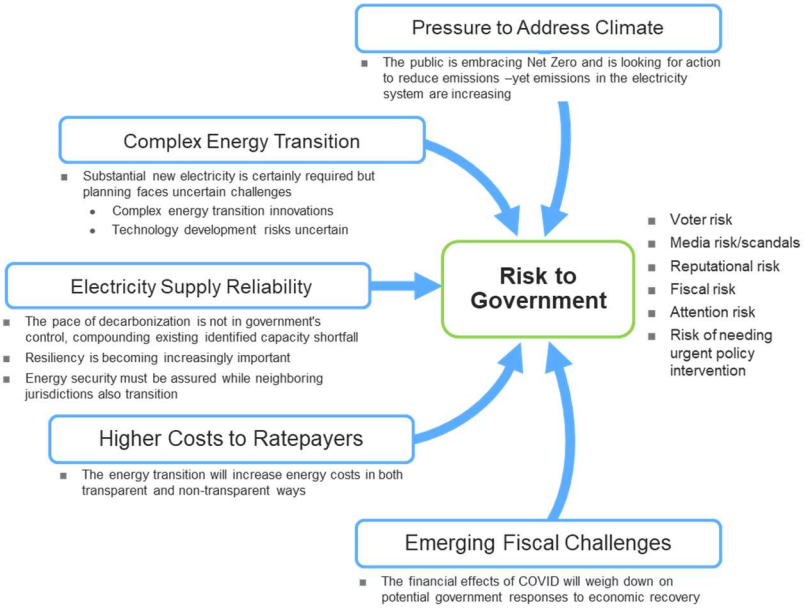
Recommendation P1: Planners require a clear mandate to independently identify and explore emerging risks and their implications for Ontario's energy system and government established Policy Priorities.

The challenge of managing the emerging risks facing Ontario's energy system is becoming increasingly complex. Experience has shown that delaying mitigating policy responses to critical issues can generate new risks and compound existing ones. These emerging risks include:

- Pressure to address climate change
- The complex energy transition
- Electricity supply reliability
- Higher costs to ratepayers
- Emerging fiscal constraints

Failure to address these planning imperatives fuels the cycle of suboptimal planning and the manifestation of government risks described earlier, such as voter risk, media and reputational risks, attention risks to address them, and fiscal risks arising from urgent interventions.

Figure 7: Risks Converging on Government



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

The Electricity Act requires the IESO to submit a technical report to the Minister of Energy that addresses the adequacy and reliability of Ontario's electricity resources including "any other matters the Minister may specify".[39] The IESO's latest APO does not provide any contingencies for emission reductions in its plan as they have not been given a mandate to do so.[40] The PWU previously provided feedback recommending that the IESO include scenarios that address these demand uncertainties.[41] Unless specified by the Minister, the IESO is not required to address climate uncertainties, the implications of the energy transition on resource adequacy for supply reliability, or even the costs and benefits of how electricity demand will be met. No authority is currently providing information that would inform the public about the implications of the energy transition, as would an electricity forecast showing the results of electrification. Such objectives should be addressed by the government's Policy Priorities to be considered by the IESO.

[39] Electricity Act, 1998, Part II.2, Subsection 25.29 (3)
[40] IESO, 2020
[41] PWU, Submission on IESO APO January Engagement Session, 2021; PWU, 20-Year Planning Outlook Stakeholder Engagement Meeting 2 Feedback, 2019

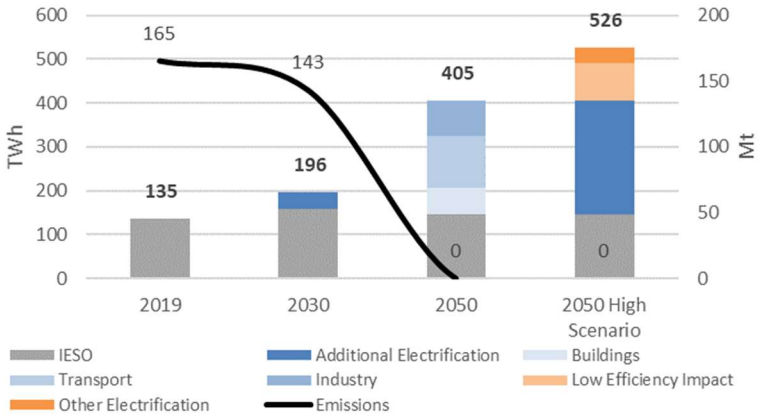
Recommendation P2: Policy Priorities must recognize that climate action is driving an indisputable and significant need for electrification that must be included in Ontario's energy plan.

As previously noted, the public's calls to address climate change are growing louder, including the need to reduce the province's emissions, an objective that all senior executives of Ontario's energy infrastructure are now endorsing.[42]

Many options for reducing emissions across Canada are presently being explored including:[43] fuel switching (primarily electrification and hydrogen); efficiency improvements; carbon capture; and, direct air capture. The potential efficacy of these options varies by region across Canada. For example, in Ontario the largest emission reductions in the province's primary emitting sectors are likely to be achieved via efficiency gains and electrification. These two options could eliminate 65% of Ontario's emissions:[44]

- *Buildings* - Heat pumps and electric water heating for both residential and commercial buildings
- *Transportation* - EVs for passenger vehicles and EVs and hydrogen options for freight
- *Industry* – Electric heating for light industry process heat and technology switching for heavy industry (e.g., hydrogen)

Figure 8: Emission Reduction and Electrification Pathway to 2050
(TWh, Mt)



Source: Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

Note: 2019 data used in place of 2020 to remove impact of COVID-19 pandemic on emissions and electricity demand

Implementing these electrification options would increase Ontario's electricity 2050 demand by a minimum of 270 TWh over today.[45] This demand estimate results from direct electrification (e.g. EVs, heat pumps) and indirect demand for hydrogen electrolysis. This is three times as much electricity as the province consumes today and double the demand forecast by the IESO for 2040 (after awarding greater efficiency benefits than planned).[46] The upper bound could exceed 20% more. These new demand levels should be important criteria for planning Ontario's long-term energy system.

The other immediate concern is a potential 15% increase in electricity demand in 2030 that will be required to meet Ontario's 2030 emission targets.[47] By any measure, this emerging demand for electricity represents a significant challenge for planning Ontario's long-term energy future.

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[42] OEA, 2021
[43] Canadian Institute for Climate Choices, 2021
[44] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[45] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[46] IESO, 2020
[47] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

Recommendation P3: Policy Priorities should recognize the need for integrated planning across electricity, natural gas, hydrogen and biomass economies as emerging technology innovations could affect the need for capacity buildout.

Planning for the energy transition involves the interplay of three key sectors:

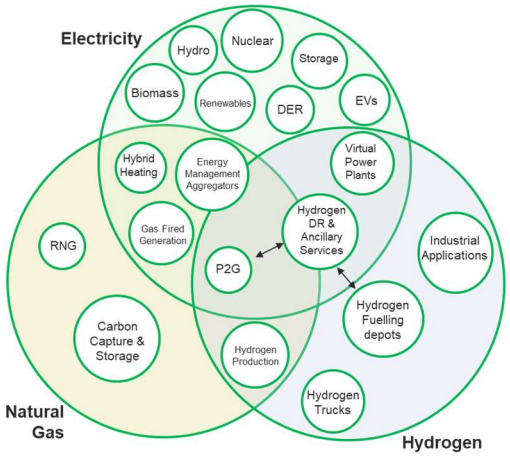
1) ***Electricity,*** the future emission-free energy source
2) ***Natural gas*** for heating and electricity generation
3) ***Hydrogen*** use by industry and heavy transport

Conventional planning strategies to optimize the use of existing assets, such as hydro, nuclear, biomass and the natural gas distribution systems, may be disrupted by the need to integrate new hydrogen and other emerging technologies, such as:

- ***Hybrid heating*** devices that are dual-fueled by both natural gas and electricity can reduce peak electricity system needs.
- ***Energy management systems*** that can optimize home heating, EV charging, and water heating.
- ***Community storage*** can be located near demand loads and smooth variable demand, potentially reducing grid infrastructure costs by enabling greater use of baseload supply. ***EVs*** can provide mobile storage and act as ***virtual power plants***.
- ***Hydrogen electrolyzers*** provide a cost-effective source of demand response and ancillary services that could be regionally distributed across the province near load centers (e.g. LDCs) where the benefits are most needed.

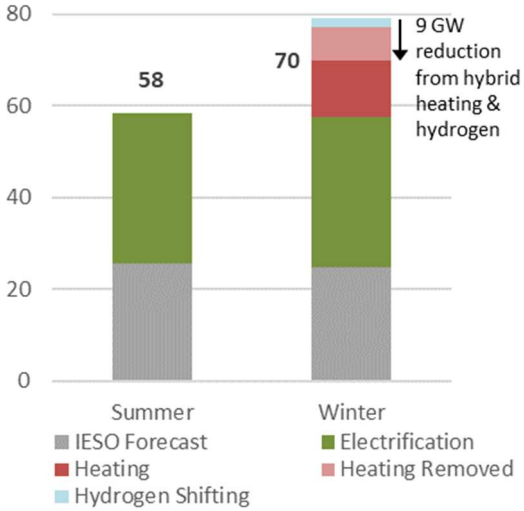
Some of these opportunities are already being explored. The IESO is currently running a pilot with the OEB's support that combines the functions of the natural gas system, hydrogen production and electricity system ancillary services.[48] The plethora of technologies will drive system efficiencies towards a greater need for larger baseload generation. Ontario has the opportunity to build upon its foundation of low-emitting nuclear and hydro baseload generation and integrate emerging technologies.

Figure 9: Innovation Ideas for a New Energy System



Source: Strapolec Analysis

Figure 10: Seasonal Capacity Drivers
(GW by Season, 2050, Pre vs. Post Optimization)



Remaining 2 GW reduction in peak comes from reduction in required reserve capacity and smart demand side management

Source: Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021; IESO, 2020

[48] Enbridge Gas Inc., 2018

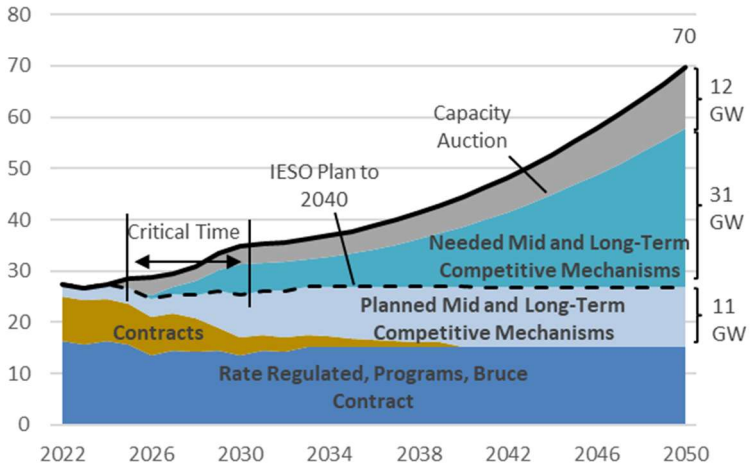
Recommendation P4: Sustaining system reliability through the energy transition warrants planning now for the future.

A situational analysis shows that Ontario is in the midst of an unfolding planning failure. The IESO has identified the need to acquire 15 GW of generation resources to sustain the reliability of Ontario's system.[49] The IESO's currently planned mid-term competitive mechanisms are RFPs for 3-year contracts to renew expiring resource contracts.[50] However, in spite of the availability of the dual-fuelled Lennox station and the refurbishment of Ontario's low-emission nuclear fleet, the province's natural gas-fired generation fleet will be insufficient to replace the capacity of the retiring Pickering station and meet the IESO's projected capacity demand. The supply gap after these options are exercised approaches 3 GW in the late 2020s, increasing to 4 GW by 2040.[51]

Yet, no credible means to address this shortfall has been advanced. The procurement of new resources is required.

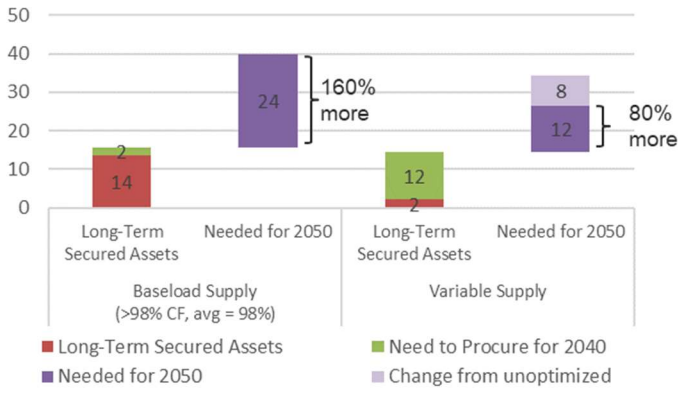
Adding to this challenge is the 2050 forecast need for 70 GW, of which 40 GW is new capacity including 24 GW of new low-emission baseload.[52]

Figure 12: Ontario Procurement Needs with Electrification
(GW by Year)



Source: IESO, 2020; Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

Figure 11: Incremental New Supply Required by Demand Type
(GW, IESO 2040 vs. 2050)



Source: IESO, 2020; Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

Renewing existing or securing new natural gas-fired generation presents significant risks for Ontario: fuel price volatility; carbon pricing; and increased emissions. The latter will complicate Ontario's ability to achieve its 2030 emissions targets. The bottom line, the current approach to procuring electricity resources does not consider the ramifications of decarbonizing Ontario's economy.

[49] IESO, 2020
[50] IESO, Resource Adequacy Engagement, March 22, 2021
[51] IESO, 2020
[52] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

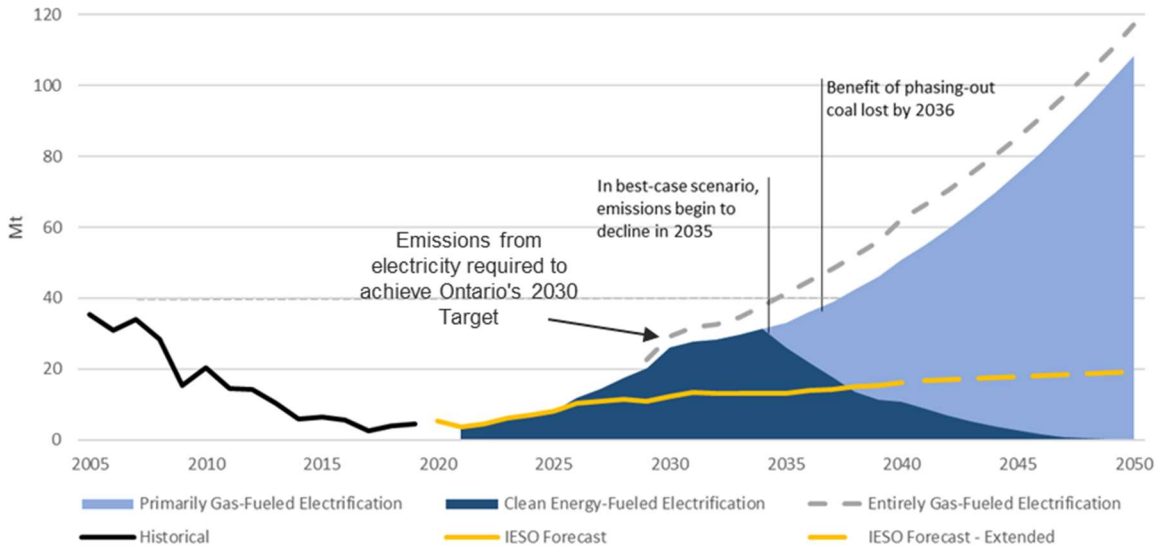
Recommendation P4-1: Long term procurement planning should place a policy priority on acquiring non-emitting resources.

The absence of a low-emission replacement for the retiring Pickering station is a major factor contributing to the IESO's forecast 500% increase in Ontario's electricity system emissions.[53] Some public groups are aware of this risk and have been actively expressing their opposition to the current plan and gaining support from municipal councils across Ontario.[54] Investments in today's electricity infrastructure will be required to create a low-emitting grid. With the anticipated new demand from electrification of the economy and absent the availability of new non-emitting generation, emissions from the electricity sector could far exceed those seen in 2005 prior to the phase out of coal, putting Ontario at risk of losing its status as a clean energy region.[55]

Recommendation P4-2: Policy Priorities should consider that carbon pricing under the EPS be applied to natural gas-fired generation in a manner similar to the OBPS, including any future contractual arrangements with existing assets that arise from IESOs resource acquisition strategy.

The EPS effectively places no carbon price on most of the output from Ontario's natural gas fleet.[56] A carbon price on natural gas-fired generation emissions will send an economic signal to investors that incents low-emitting resource options. It would also incent natural gas generators to consider investing in carbon capture or direct air capture. The terms should also be applied to any imported energy.

Figure 13: Emissions Implications of Electrification Under Emitting and Clean Supply Options
(Mt)



Source: Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021; IESO, 2020

[53] IESO, 2020
[54] Ontario Clean Air Alliance, 2021
[55] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[56] Strategic Policy Economics, Advancing Ontario's Energy Transition: Leveraging Policy Tools, 2021. Note: Emissions up to 420 tonnes per GWh are exempt from the carbon price under the EPS. The carbon price is paid on any incremental emissions above that threshold. This threshold effectively excludes most natural gas generation in Ontario.

Recommendation P4-3: System planning should be based on a strategically-driven timeline to 2050 in order to minimize the system reliability risks of a capacity shortfall.

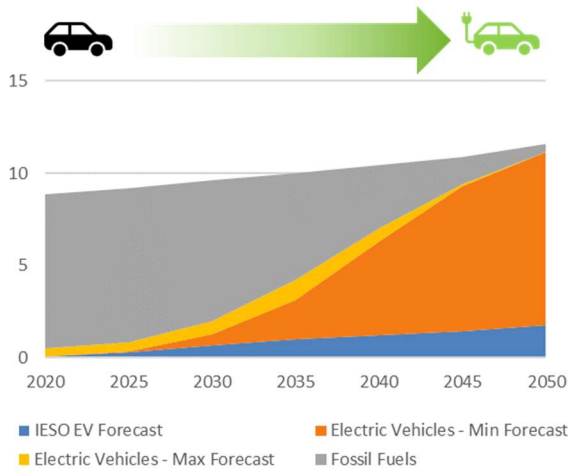
Developing the large-scale energy infrastructure required to almost triple Ontario's generation capacity by 2050 and supply the future 70 GW will be a mammoth undertaking. Bulk sources for low-emitting firm generation of this scale along with transmission take many years to develop. All options: wind, hydro, natural gas with carbon capture and storage, as well as nuclear will face siting challenges including public opposition and NiMBYism of one form or another. Even if procurements were to start today, the likelihood of the needed generation being available before 2035 is unfavorable. This will result in a transition period of high emissions from Ontario's electricity sector, putting at risk the reductions achieved closing the province's coal stations.

It is becoming increasingly important that Ontario consider the timing for new generation required to address electrification and develop a transparent and accountable approach for securing the requisite low emitting supplies. In addition, the near-term rise in demand will materialize from the electrification decisions made by the public and businesses e.g., EVs, Hydrogen, and building heating. The associated increase in near-term demand for carbon-free electricity represents a near-term system reliability risk.

Consumers are increasingly choosing EVs and auto manufacturers are responding with more models. The government of Canada has set a target of 100% EV passenger vehicle sales by 2040.[57] The provinces of Quebec and BC are both more aggressive with equivalent targets set for 2035.[58]

Many passenger vehicle manufacturers have committed to cease fossil-based vehicle production by 2040.[59] For example, General Motors, has committed to do so by 2035.[60] EV forecasts to 2035 indicate EV penetration will far exceed the levels assumed in IESO's latest APO.[61]

Figure 14: Passenger Vehicle Stock Forecast
(Million Vehicles)



Demand from electrification could well exceed current planning assumptions by up to 33 TWh before 2030 putting Ontario at risk of being unable to meet 2030 emissions targets of 143 Mt. [62]

This near-term risk means critical planning decisions should be made as soon as possible regarding Ontario's long-term supply requirements for 2030. These decisions will also have long-term consequences for Ontario's future emissions profile. Looking to 2050, 30 years does not allow much time for re-imagining and undertaking to almost triple the capacity of Ontario's electricity system.

[57] NRCan, 2021
[58] Jarratt, 2020
[59] Daimler , n.d.; Hyundai, n.d.; White, 2021
[60] Wayland, 2021
[61] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[62] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

Recommendation P5: A new resource acquisition planning framework should prioritize a "low system cost" approach while concurrently addressing the evolving nature of demand, including regional needs.

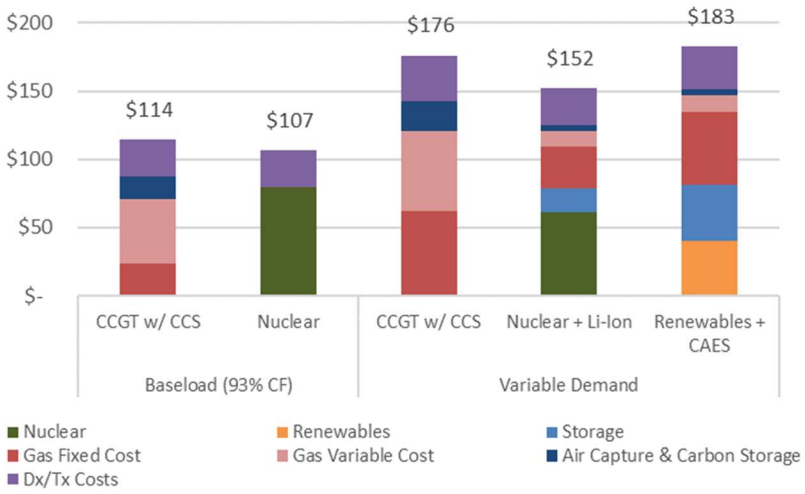
Reforming Ontario's energy planning framework presents two opportunities: procuring low-cost, lower risk solutions that meet Ontario's baseload and variable supply; and, more emission reductions.

Baseload demand requires firm, reliable, non-emitting supply that is available and affordable 24x7.

- Ontario's base electricity demand is currently met by its dependable, cost-competitive nuclear fleet and hydroelectric assets. Other low-emitting technologies are emerging e.g., SMRs, natural gas generation with carbon capture and storage to backstop renewables.
- Variable demand requires flexible supply that minimizes the cost of the associated lower usage of the capacity.
- Flexible supply has typically been natural gas fired generation, which if equipped with carbon capture, could remain a viable option. However, variable demand can also be met by hybrid solutions, such as integrating the operation of local energy storage technologies with bulk system nuclear, renewables, and transmission assets.

While nuclear is available to cost-effectively provide non-emitting baseload supply, the fossil fuel-based options require access to storage for captured carbon.

Figure 15: Cost of Options to Supply Baseload and Variable Demand
($/MWh CAD, 2050)



Source: Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

Recommendation P5-1: Planning for new resource acquisitions must consider the cost implications and benefits of integrated bulk, regional, and local solutions

Planning Ontario's low-cost, low-carbon energy system for the future will require integrating bulk, regional and local solutions in a manner that enhances energy security, reliability, and total system costs. This will facilitate the development of cost-effective hybrid solutions that best meet specific energy demands. New energy management innovations—IT and AI—are another enabler but also come with costs to the province's overall electricity system. Distributed assets combined with bulk baseload can reduce the unit energy cost of the Dx and Tx infrastructure.

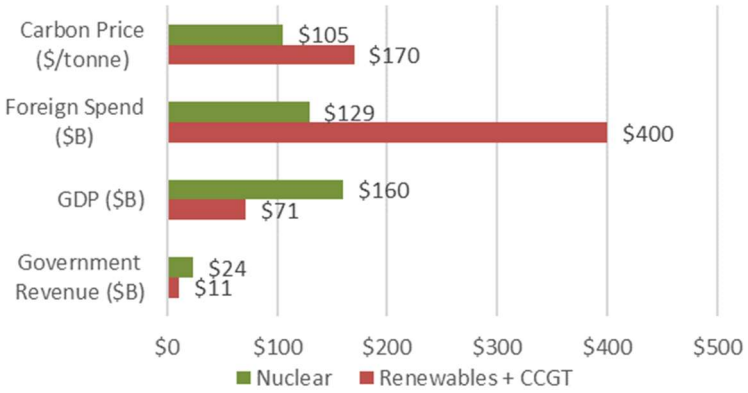
Recommendation P6: Optimizing the economic benefits of infrastructure investments should be included in Policy Priorities and applied to IESO's procurement process.

Significant societal benefits result from investments in large energy infrastructure projects. Ontario's nuclear industry and refurbishment program provide good examples.[63] Ontario's Policy Priorities should reflect the importance of such expenditures and the resulting societal benefits

Additionally, these kinds of investments should form part of a "made-in-Ontario" resource acquisition planning strategy. Policy Priorities would include:

- *Accelerate decarbonization:* Low-cost electricity minimizes the required carbon price to accelerate climate action.
- *Secure domestic energy supply:* Assures regional energy security, security against extreme events & retains spend in Ontario.
- *Enhance economic growth:* Infrastructure spend creates direct GDP, jobs, and tax revenues for government.
- *Strengthen Industrial policy:* Nurtures business opportunity by attracting investment and creating jobs in globally-competitive firms exporting in emerging sectors, such as EV manufacturing, hydrogen technologies, and nuclear.
- *Enhance Innovation:* Nurtures domestic science, technology, & innovation in strategic technologies.

Figure 16: Economic Impacts of Infrastructure Choices
($/Tonne vs. $B)



Note: Values normalized to an equivalent electricity cost basis of $114/MWh

Source: Strapolec, Advancing Ontario's Energy Transition: Electrification Pathways, 2021 Note: Values normalized to an equivalent electricity cost basis of $114/MWh

The numerous analyses detailing the environmental and economic benefits of Ontario's nuclear technologies suggests the new nuclear option should be explored sooner than later.[64] Nuclear-based solutions may generate upwards of $90B more direct GDP than alternatives.[65] Policy Priorities regarding how to best leverage these existing, domestic, low-carbon energy assets should be captured in the IESO's procurement criteria. Benefits of such policies are further explored in Appendix 3 that has been previously supplied to the MENDM.

Recommendation P6-1: *The energy planning framework should consider using infrastructure development tools for public-private partnerships to minimize and share costs and risks in new low carbon infrastructure like nuclear generation.*

The essence of a public private partnership is the management and sharing of risk. Leveraging innovations in governance, finance, and regulation can enable creative business models to mitigate risks

[63] Bruce Power, 2020
[64] Strategic Policy Economics, 2015; Strategic Policy Economics, Renewables and Ontario/Quebec Interties, 2016; Strategic Policy Economics, Ontario's Emissions and the Long-Term Energy Plan, 2016; Strategic Policy Economics, 2018.
[65] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

to both government and the private sector on large infrastructure projects, like nuclear new builds. Societal benefits may warrant public investment or cost sharing between rate payers and taxpayers.

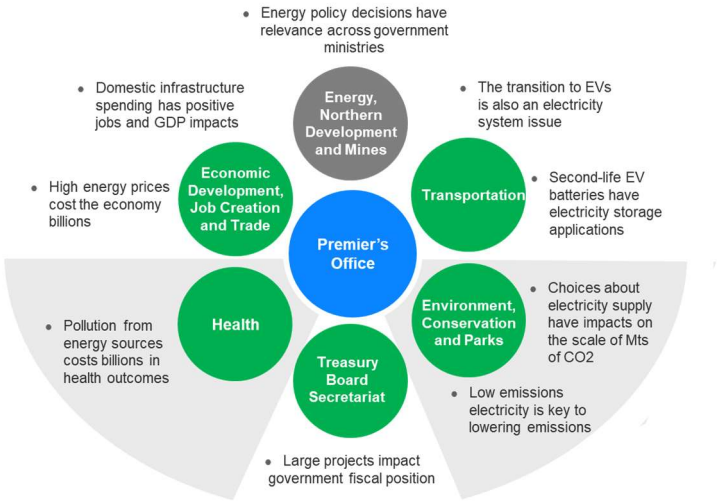
Mitigating these collective risks can reduce the cost of infrastructure projects. The Canadian Infrastructure Bank, Green Bonds, long-term energy planning, and regulated returns can all help enable of affordable, reliable, and sustainable solutions.[66] By optimizing the risk profile of projects, the private sector may help accelerate decarbonization and help reduce the fiscal burden on government. New nuclear build, given its significant capacity to avoid greenhouse gas emissions should be considered by government as a form of "clean/green" energy and be included in investment taxonomies that provide preferential funding mechanisms e.g. green bonds.

Recommendation ES-3: Government should provide clear, transparent, non-prescriptive Policy Priorities than can be planned for and are sufficiently measurable to support accountability

In addition to the MENDM's specific interest in advancing long term energy planning and the spending implications for new infrastructure on the government's fiscal position, many other ministries also have vested interests in the pace, journey and outcomes of Ontario's energy transition.[67] Moving forward, the Policy Priorities for long-term energy planning should form a cohesive reflection of the policies of the affected government ministries.

Through Policy Priorities, government can transparently set the agenda for Ontario's energy policy and lay the groundwork for effective and accountable energy planning and implementation.[68]

Figure 17: Impacts of Energy Planning Across Government Ministries



Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

Examples of high-level Policy Priorities relevant to energy planning span several critical areas including: pressure to address climate change, emerging fiscal constraints; and a reliable, sustainable and affordable, low-carbon energy system that provides long-term, domestic-based energy security.

To be effective within a reformed energy planning framework, the Policy Priorities should be:

- Clear enough for the IESO to incorporate in its planning.

[66] Strategic Policy Economics, Advancing Ontario's Energy Transition: Leveraging Policy Tools, 2021
[67] Strategic Policy Economics, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021
[68] Strategic Policy Economics, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

- General and non-prescriptive enough for the IESO and the OEB to independently determine the best solutions.
- Measurable enough to facilitate performance tracking.
- Prioritized relative to their importance to each other to help guide planning/procurement decisions.

Figure 18: Sample Policy Priorities

Pressure to Address Climate
Emissions intensity of energy system
Pace of decarbonization
Economics of emissions
Emerging Fiscal Constraints
Domestic content & jobs
Direct GDP benefit
Government Financing
Electricity Supply Reliability
Energy Security
Reliability, NERC, IESO, and technical requirements
Complex Energy Transition
Integration of fossil, electricity, and hydrogen solutions

Lower Cost to Ratepayers
Minimize system cost
Rate stability / volatility
Competition in procurements
Rate competitiveness / fairness
Cost of extraneous policies
Principles
Agency Independence
Transparency & Disclosure
Accountability
Technology Agnosticism
Indigenous Consultation

Source: Strapolec, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021

Infrastructure Implementation

Recommendation ES-6: Procurements for low emission baseload should start now.

Ontario's capacity gap significantly broadens in 2028 – only 7 years from now. Waiting until 2025 for the IESO to complete its procurement framework design could leave Ontario without cost-effective, viable energy solutions. The IESO is aware that Ontario's forecast peak summer capacity needs exceed available existing capacity by 4,200 MW in 2040, or 10%.[69] The electrification of Ontario's economy will only exacerbate the need for building new capacity in the province.

As described earlier, Ontario now faces the risk of a supply shortfall before 2030.The pending supply gap was noted in Ontario's 2013 Long-Term Energy Plan (LTEP), almost a decade ago and in subsequent LTEPs without procurement action being taken.[70] More recently, the need to develop a competitive mechanism that can procure long-term, low-cost, non-emitting resources has been continually communicated to the IESO through the various engagements related to system planning and developing procurement mechanisms[71]. However, the need for new low emissions resources has not been advanced into the resource acquisition plans. a delayed procurement process will result in:

1. ***Procurement of gas-fired generation*** because only new gas-fired generation can be built on such short timelines at the scale required meet Ontario's needs – assuming the site selection processes encounters no opposition.[72]
2. ***Long-term commitments to higher greenhouse gas (GHG) emissions*** **out to 2050,** because the economic life of new gas-fired generation plants is 20 years+. The emission consequences— Ontario's ability to meet its emission targets is compromised--were also discussed earlier. The province's "clean energy jurisdiction" status will also be compromised as well as the reductions achieved by Ontario's decarbonization initiatives – from EVs to hydrogen. Given these negative impacts on the province's climate objectives, public opposition to new gas plant siting is inevitable.[73]
3. ***A higher cost solution —*** current forecasts predict that neither new nor existing gas plants will be Ontario's cost-effective solution by the end of the decade.[74] Given the expected increases in carbon pricing, the new natural-gas fired generation will become uneconomic sooner.
4. ***Reduced energy security for Ontario –*** As natural gas consumption in the U.S. increases due to their coal plants being shut down, system planners around the Great Lakes region (including Ontario's IESO) have identified this increasing reliance on natural gas as a reliability risk given existing pipeline

[69] IESO, 2020
[70] Ontario, Achieving Balance: Ontario's Long Term Energy Plan, 2013; Ontario, Delivering Fairness and Choice: Ontario's Long Term Energy Plan 2017, 2017.
[71] PWU, PWU Response to the Non-Emitting Resources Subcommittee's Draft Report, "Participation in Ontario's Future Electricity Markets", 2019; PWU, IESO Incremental Capacity Auction High Level Design Submission, 2019; PWU, 20-Year Planning Outlook Stakeholder Engagement Meeting 2 Feedback,2019; PWU, PWU Submission on IESO Technical Planning Conference Materials, 2020; PWU, PWU Submission on Resource Adequacy Engagement 2020; PWU, PWU Submission on the IESO's January 2021 Annual Planning Outlook Engagement, 2021
[72] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[73] Ontario Clean Air Alliance, 2021
[74] Bloch et. al., 2019

constraints, especially during extreme cold weather events.[75,76] As an example, Ontario ran out of natural gas during the last Polar Vortex.[77] The recent extreme weather event in Texas saw gas prices rise in Ontario.[78]

Recommendation I1 - Ontario should not be unnecessarily exposed to the risk of having inadequate electricity resources as it should not take the IESO four years to prepare a procurement process.

The IESO currently has a four-year plan to develop their long-term competitive procurement mechanisms. The approach appears to be driven by a process overcomplicated by a singular focus on electricity markets solutions and associated resource constraints within the IESO.[79] Analyses show that capacity market solutions are not economically and environmentally suitable for meeting Ontario's emerging needs. A traditional RFP process is more appropriate.[80]

Recommendation I2 - Specifying Ontario's demand needs—baseload and intermediate—is the solution that allows the province to act both early and prudently to satisfy its future energy requirements.

The IESO's forecasts clearly demonstrate that Ontario will need to renew or replace 50% of its required capacity to meet future demands, even without considering the impacts of decarbonization.[81]

A procurement process that is focused on the specific needs of the province can be more quickly developed than one focused on "unbundling" the assets for individual procurement. The IESO's future procurement approach should encourage bundled solutions through technology agnostic specifications of the demand that needs to be met. Resource requirement parameters could include: the flexibility to respond to daytime fluctuations ramping; location; transmission implications; etc.

Analyses show that future low-emitting electricity system solutions will be provided by a range of technologies such as renewables, storage, nuclear, and natural gas.[82] Selecting "technology" winners from emerging resources presents significant uncertainties and risks. A more cost-effective and lower-risk approach would encourage proponents to bid a mix of gas, biomass, renewables, storage, nuclear, small hydro, DERs, and aggregations as complex integrated hybrid solutions. This approach could also encourage a mix of existing and new resources in a hybrid solution.

Developing a competitive procurement mechanism that enables cost-effective, integrated hybrid solutions is consistent with Ontario's desire to attract investors in innovation and meet its economic and environmental objectives.

Recommendation I3 - The IESO should create near-term dates to kick start the paradigm shift for procuring Ontario's energy needs by 2022.

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[75] New England saw average natural gas and electricity prices in January 2014 go up by over 5 times than in the preceding months. (ISO Newswire, 2014)
[76] In PJM, natural gas prices reached over $100/MMBTU in January 2014, while average wholesale electricity prices reached over $600/MWh. (Glazer, 2014)
[77] Go Energy, 2018
[78] Intelligence, 2021
[79] IESO, Verbal Communication during Enabling Resources April Engagement Session, 2021
[80] Strategic Policy Economics, 2020
[81] IESO, 2020
[82] Brouillette, 2019

The IESO should begin now to develop an RFP procurement approach that will provide long-term, cost-effective solutions to meet Ontario's emerging electricity needs. This year's IESO consultation process should explore how Ontario's demand needs could be met by bundled solutions, facilitated by information that is mostly available from the IESO's Planning Outlooks.

Targets should be established to define a selected set of needs for soliciting expressions of interest by the middle of 2021, followed by a formal procurement launch in early 2022. Initially, optimization of this process could be advanced by focusing on the clearly identified needs – for both baseload (to start replacing lost Pickering capacity as early as possible) and variable supply solutions.

This approach could advance the IESO's plans by 5 years and by extension, the availability of low-carbon energy supplies to support Ontario's 2030 emission targets and the economic benefits from the infrastructure investments.

Closing

There is evident urgency to resolving Ontario's energy planning framework. The contracting/RFP process should begin much earlier than the IESO's planned 2025 process design completion date.

The PWU has a successful track record of working with others in collaborative partnerships. We look forward to continuing to work with the MENDM and other energy stakeholders to strengthen and modernize Ontario's electricity system. The PWU is committed to the following principles: Create opportunities for sustainable, high-pay, high-skill jobs; ensure reliable, affordable, environmentally responsible electricity; build economic growth for Ontario's communities; and, promote intelligent reform of Ontario's energy policy.

We believe these recommendations are consistent with, and supportive of Ontario's objectives to supply low-cost and reliable electricity for all Ontarians. The PWU looks forward to discussing these comments in greater detail with the MENDM and participating in the ongoing stakeholder engagements.

Appendices

1. References
2. List of Recommendations
3. Summary of Responses to Posed Questions
4. Detailed Background on Broad Policy Priorities and Business Models

Appendices available on request