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[1]; 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.[2] The IESO has been forecasting a capacity gap in electricity supply for some time.[3] 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.[4] Furthermore, increased use of these resources will result in

[1] OEA, 2021
[2] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[3] Brouillette, 2014
[4] 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.[5] In addition to this being the subject of prior PWU submissions,[6] 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.[7,8]

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. [9] 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.[10] 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.

[5] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[6] 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.
[6] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[7] City of Toronto, 2021
[8] Ontario Clean Air Alliance, 2021
[9] Strategic Policy Economics, "Renewables and Ontario/Quebec Transmission System Interties: An Implications Assessment", 2016
[10] 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.[11] 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.

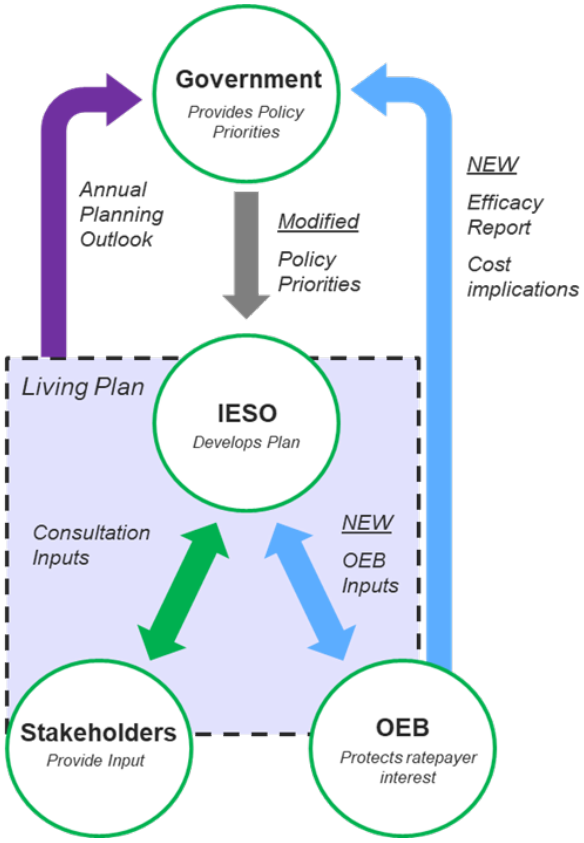
[11] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

- 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 1: 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.[12] 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 –

[12] 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

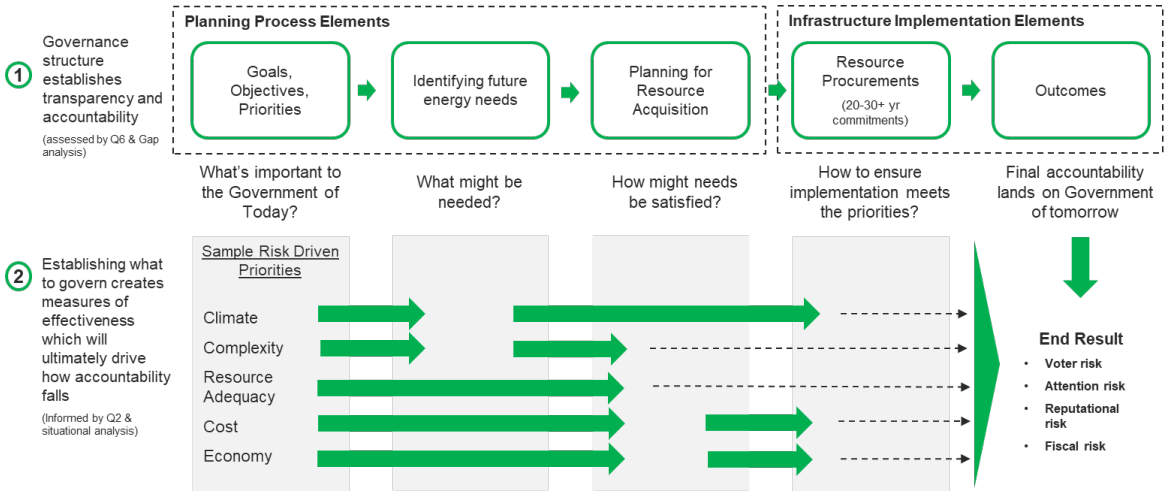
An effective energy planning environment involves the successful pairing of planning process and infrastructure implementation elements.

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 2: 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.

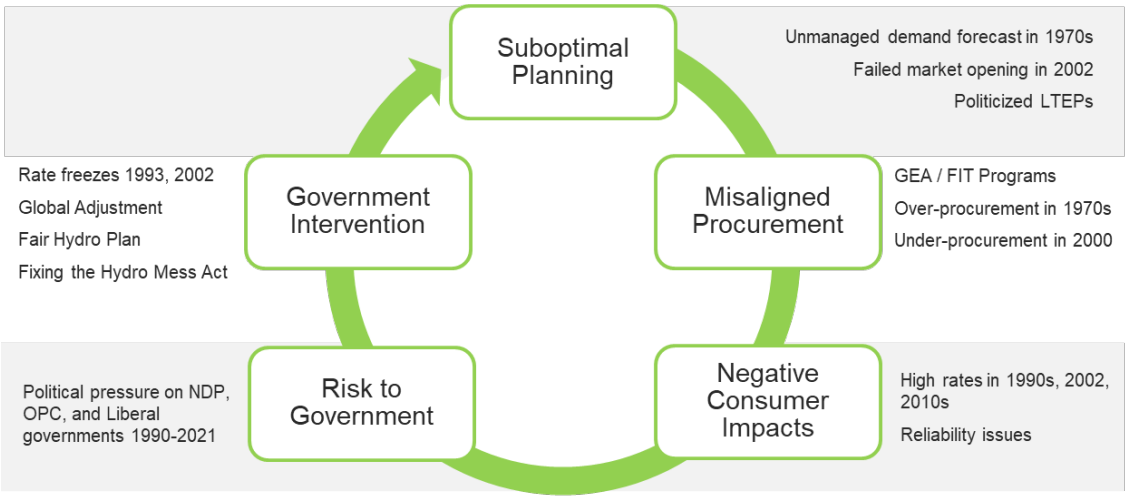
Developing the Governance Structure

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.[13]

Figure 3: 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" [14] Principles of *accountability, transparency,* and *agency independence* are key features of good governance.[15] 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.

[13] Strategic Policy Economics, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021; Informed by Warren, 2015; Vegh, 2017; Vegh, 2020.
[14] OECD, 2007
[15] 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.

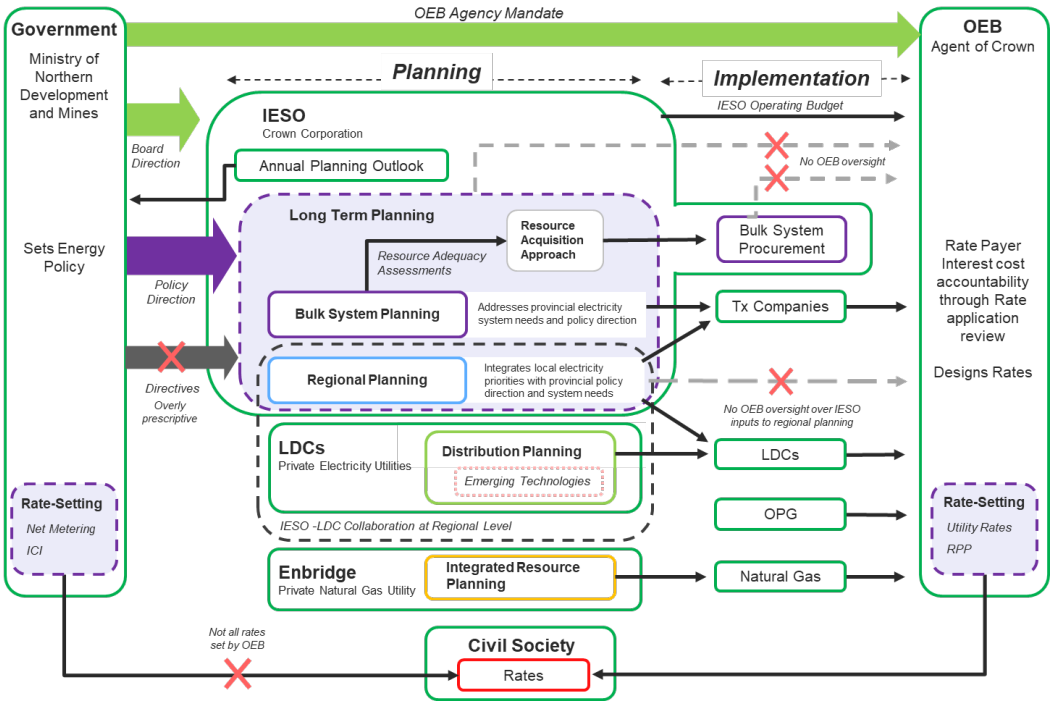
Accountability measures are required throughout the planning framework. Accountability means decisions are "owned" by the body making them.[16] In Ontario, the government is responsible for planning decisions, and is ultimately held accountable by voters during elections, and by Officers of Parliament 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 4: Ontario's Energy Planning Framework



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

[16] 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.[17]
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.[18]
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.[19] 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.[20]
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.[21]

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.

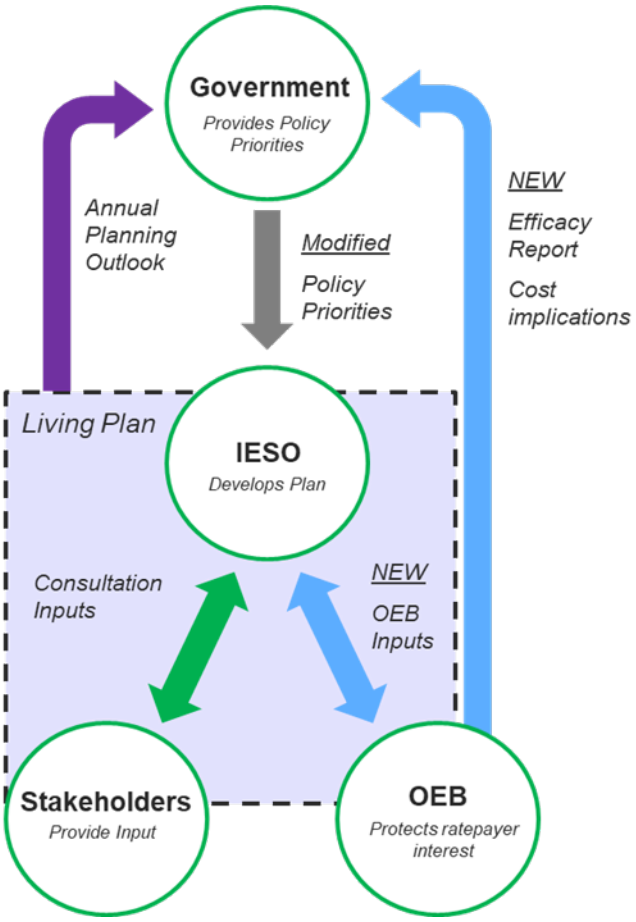
Recommendation ES-5: Using an IESO "Living Plan" approach, supported by the OEB's participation and annual reporting against the Government's Policy Priorities, could require minimal change to existing roles, create negligible burden to planning timelines, and provide the accountability required to bolster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

[17] Office of the Auditor General of Ontario, 2015
[18] Strategic Policy Economics, 2020
[19] Ministry of Energy, Northern Development and Mines, 2019; Ministry of Energy, Northern Development and Mines, 2020.
[20] Electricity Act, 1998, Part II.2, Subsection 25.29 (3)
[21] Vegh, 2017

a. **The Government, as an alternative to the prescriptive and politicized nature of the previous 2017 LTEP,**[22] [23] 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 5: 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.[24] 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.

[22] Vegh, 2020
[23] MENMD letter to stakeholders dated January 5th articulated a desire to eliminate political interference
[24] 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.[25] 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.

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

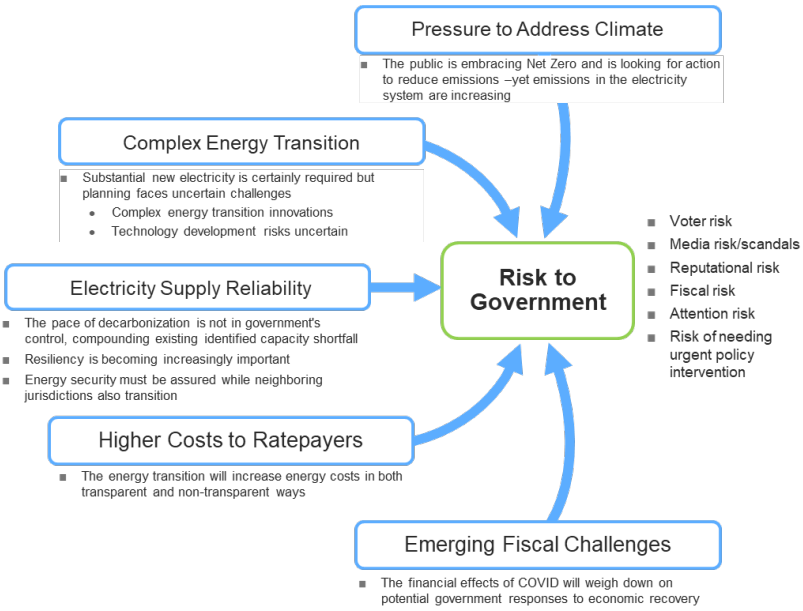
Recommendation P1: Planners require a clear mandate to independently identify and explore emerging risks and their implications for Ontario's energy system and government established Policy Priorities.

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 6: 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".[26] 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.[27] The PWU previously provided feedback recommending that the IESO include scenarios that address these demand uncertainties.[28] 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.

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

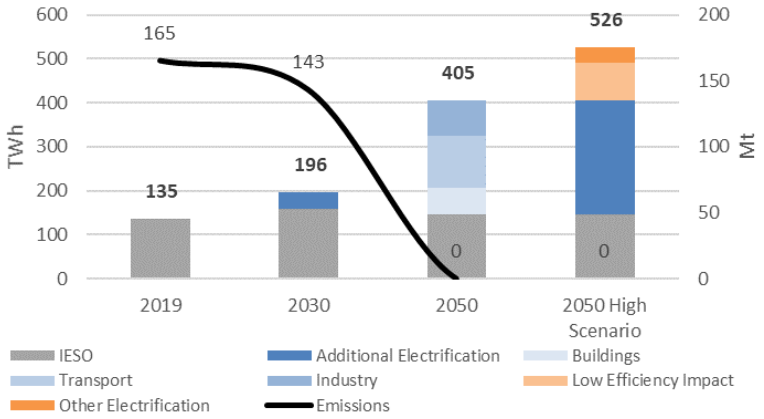
Recommendation P2: Policy Priorities must recognize that climate action is driving an indisputable and significant need for electrification that must be included in Ontario's energy plan.

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.[29]

Many options for reducing emissions across Canada are presently being explored including:[30] 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:[31]

- *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 7: 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.[32] 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).[33] 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.[34] By any measure, this emerging demand for electricity represents a significant challenge for planning Ontario's long-term energy future.

[29] OEA, 2021
[30] Canadian Institute for Climate Choices, 2021
[31] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[32] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[33] IESO, 2020
[34] 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:

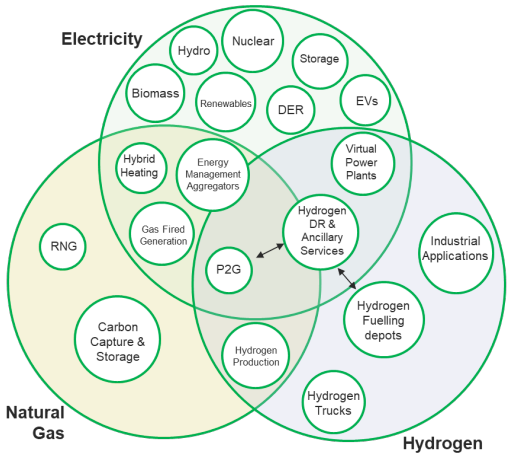
1) ***Electricity,*** the future emission-free energy source
2) ***Natural gas*** for heating and electricity generation
3) ***Hydrogen*** use by industry and heavy transport

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.

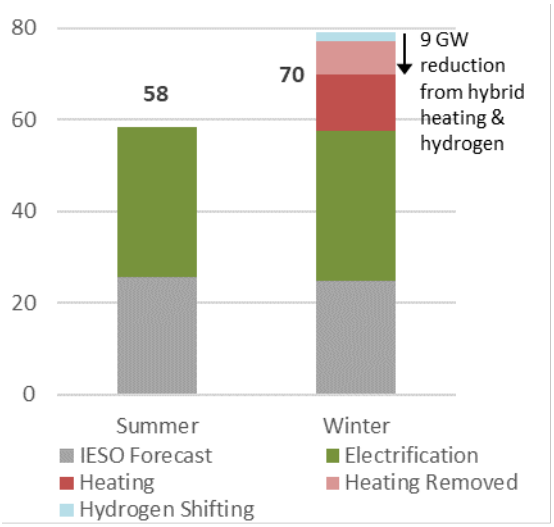
Some of these opportunities are already being explored. The IESO is currently running a pilot with the OEB's support that combines the functions of the natural gas system, hydrogen production and electricity system ancillary services.[35] The plethora of technologies will drive system efficiencies towards 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 8: Innovation Ideas for a New Energy System



Source: Strapolec Analysis

Figure 9: 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

[35] Enbridge Gas Inc., 2018

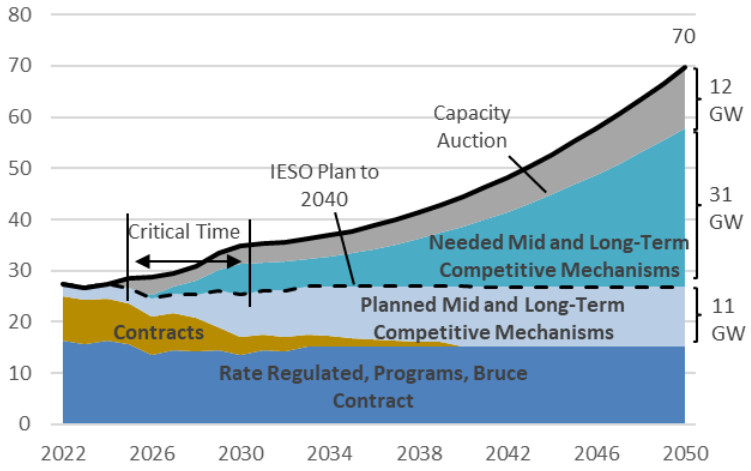
Recommendation P4: Sustaining system reliability through the energy transition warrants planning now for the future.

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.[36] The IESO's currently planned mid-term competitive mechanisms are RFPs for 3-year contracts to renew expiring resource contracts.[37] 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.[38]

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

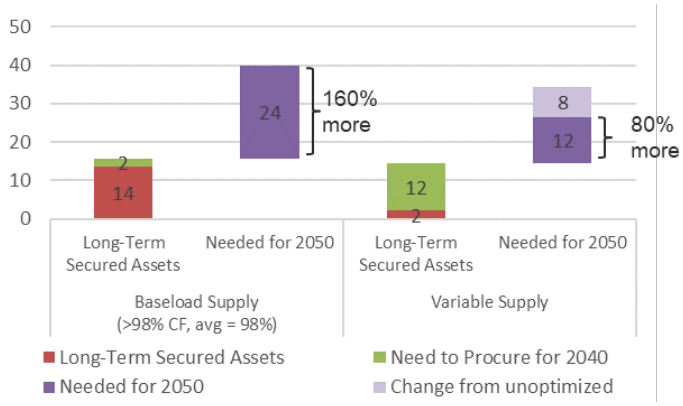
Adding to this challenge is the 2050 forecast need for 70 GW, of which 40 GW is new capacity including 24 GW of new low-emission baseload.[39]

Figure 11: Ontario Procurement Needs with Electrification
(MW by Year)



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

Figure 10: 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.

[36] IESO, 2020
[37] IESO, Resource Adequacy Engagement, March 22, 2021
[38] IESO, 2020
[39] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

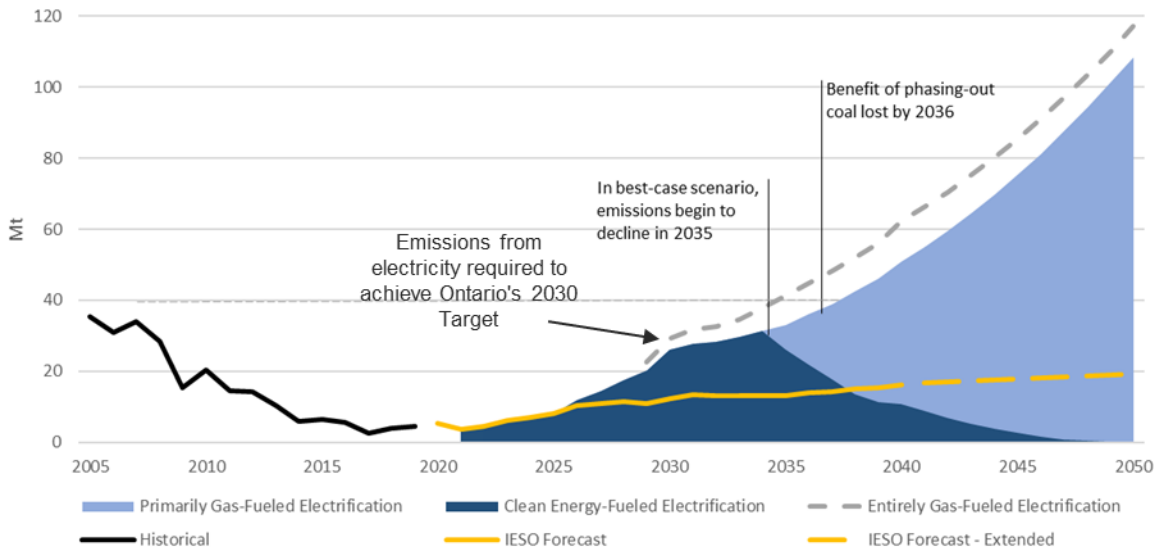
Recommendation P4-1: Long term procurement planning should place a policy priority on acquiring non-emitting resources.

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.[40] 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.[41] 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.[42]

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.[43] 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 12: Emissions Implications of Electrification Under Emitting and Clean Supply Options
(Mt)



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

[40] IESO, 2020
[41] Ontario Clean Air Alliance, 2021
[42] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[43] 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.

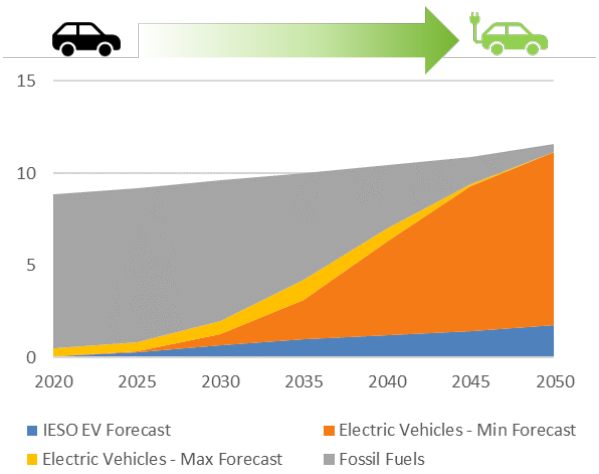
Developing the large-scale energy infrastructure required to almost triple Ontario's generation capacity by 2050 and supply the future 70 GW will be a mammoth undertaking. Bulk sources for low-emitting firm generation of this scale along with transmission take many years to develop. All options: wind, 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.[44] The provinces of Quebec and BC are both more aggressive with equivalent targets set for 2035.[45]

Many passenger vehicle manufacturers have committed to cease fossil-based vehicle production by 2040.[46] For example, General Motors, has committed to do so by 2035.[47] EV forecasts to 2035 indicate EV penetration will far exceed the levels assumed in IESO's latest APO.[48]

Figure 13: 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. [49]

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.

[44] NRCan, 2021
[45] Jarratt, 2020
[46] Daimler , n.d.; Hyundai, n.d.; White, 2021
[47] Wayland, 2021
[48] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[49] 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.

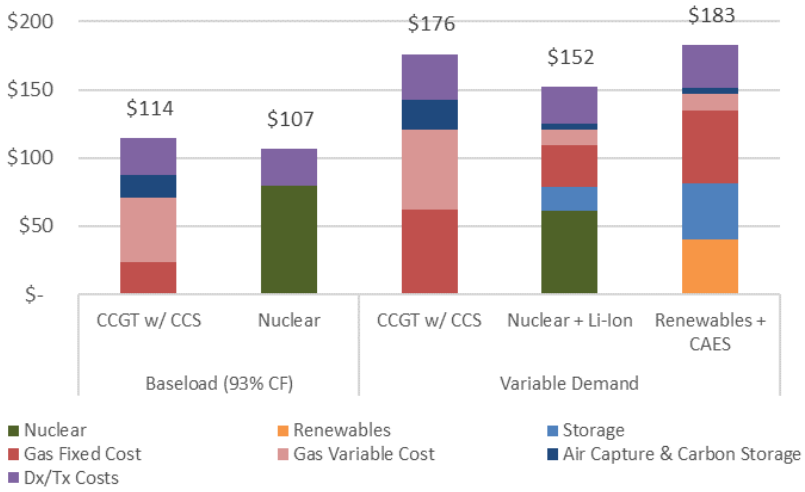
Reforming Ontario's energy planning framework presents two opportunities: procuring low-cost, lower risk solutions that meet Ontario's baseload and variable supply; and, more emission reductions.

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 14: 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.

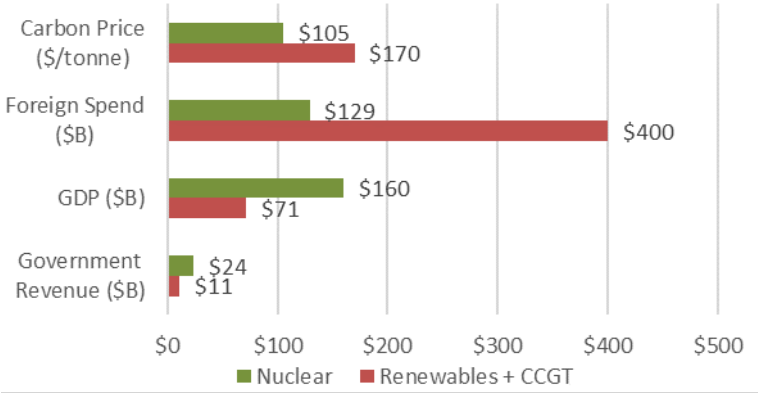
Recommendation P6: Optimizing the economic benefits of infrastructure investments should be included in Policy Priorities and applied to IESO's procurement process.

Significant societal benefits result from investments in large energy infrastructure projects. Ontario's nuclear industry and refurbishment program provide good examples.[50] 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 15: 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.[51] Nuclear-based solutions may generate upwards of $90B more direct GDP than alternatives.[52] 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.*

[50] Bruce Power, 2020
[51] 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.
[52] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021

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 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.

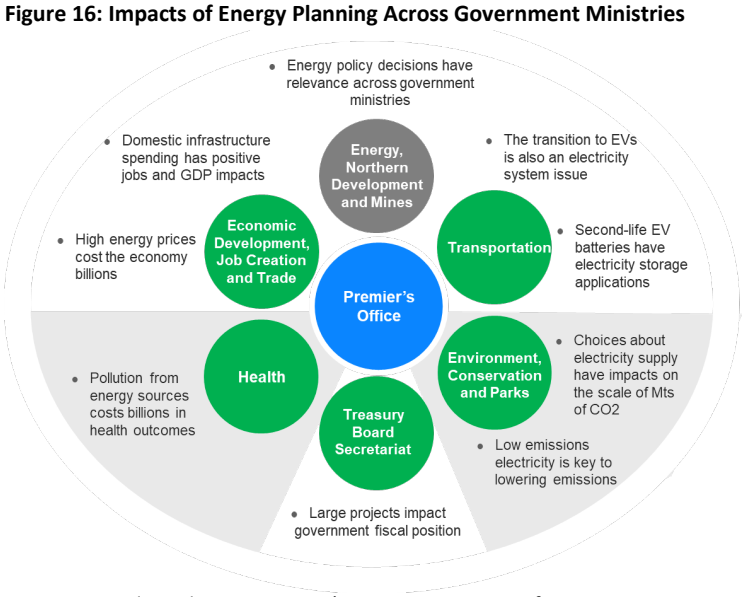
Mitigating these collective risks can reduce the cost of infrastructure projects. The Canadian Infrastructure Bank, Green Bonds, long-term energy planning, and regulated returns can all help enable of affordable, reliable, and sustainable solutions.[53] By optimizing the risk profile of projects, the 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.[54] 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.[55]

Figure 16: 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.

[53] Strategic Policy Economics, Advancing Ontario's Energy Transition: Leveraging Policy Tools, 2021
[54] Strategic Policy Economics, Advancing Ontario's Energy Transition: Reforming Energy Planning, 2021
[55] 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 17: 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%.[56] 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.[57] 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[58]. 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.[59]
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.[60]
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.[61] 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

[56] IESO, 2020
[57] Ontario, Achieving Balance: Ontario's Long Term Energy Plan, 2013; Ontario, Delivering Fairness and Choice: Ontario's Long Term Energy Plan 2017, 2017.
[58] 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
[59] Strategic Policy Economics, Advancing Ontario's Energy Transition: Electrification Pathways, 2021
[60] Ontario Clean Air Alliance, 2021
[61] Bloch et. al., 2019

constraints, especially during extreme cold weather events.[62,63] As an example, Ontario ran out of natural gas during the last Polar Vortex.[64] The recent extreme weather event in Texas saw gas prices rise in Ontario.[65]

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.[66] 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.[67]

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.[68]

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.[69] 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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[62] 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)
[63] In PJM, natural gas prices reached over $100/MMBTU in January 2014, while average wholesale electricity prices reached over $600/MWh. (Glazer, 2014)
[64] Go Energy, 2018
[65] Intelligence, 2021
[66] IESO, Verbal Communication during Enabling Resources April Engagement Session, 2021
[67] Strategic Policy Economics, 2020
[68] IESO, 2020
[69] 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

Appendix 1 - References

Bloch, C., Newcomb, J., Shiledar, S., & Tyson, M. (2019). *Breakthrough Batteries.* RMI.

Brouillette, M. (2014). *Rethinking Ontario's Long-Term Energy Plan.* CCRE.

Brouillette, M. (2019). *Renewables-based Distributed Energy Resources in Ontario: A Three-Part Series of Unfortunate Truths.* CCRE.

Bruce Power. (2020). *Ontario Energy Report.*

Canadian Institute for Climate Choices. (2021). *Canada's Net Zero Future: Finding our way in the global transition.*

City of Toronto. (2021, March 11). Special Meeting City Council.

Daimler . (n.d.). Retrieved from Ambition 2039: Our path to CO_2-neutrality,=: https://www.daimler.com/sustainability/climate/ambition-2039-our-path-to-co2-neutrality.html

Electricity Act, 1998, S.O. 1998, c. 15, Sched. A. (1998).

Enbridge Gas Inc. (2020, November 18). *Enbridge Gas announces a $5.2M Hydrogen Blending Pilot Project to further explore greening of the natural gas grid*. Retrieved from Cision: https://www.newswire.ca/news-releases/enbridge-gas-announces-a-5-2m-hydrogen-blending-pilot-project-to-further-explore-greening-of-the-natural-gas-grid-849137548.html#:~:text=18%2C%202020%20%2FCNW%2F%20%2D,existing%20natural%20gas%20network%20serving

Glazer, C. (2014). *Operational Events and Market Impacts January 2014 Cold Weather.* PJM.

GoEnergy. (2018, January 12). *How cold weather extremes affect Ontario energy markets*. Retrieved from GoEnergy: https://goenergy.ca/cold-weather-extremes-affect-ontario-energy-markets/

Hyundai. (n.d.). *Hyundai Motor to further extend lead in zero-emission mobility*. Retrieved from https://www.hyundai.news/uk/brand/hyundai-motor-to-further-extend-lead-in-zero-emission-mobility/

IESO. (2019). *Incremental Capacity Auction - High Level Design.*

IESO. (2020). *Annual Planning Outlook.*

IESO. (2021, March 22). Resource Adequacy Engagement .

Intelligence, N. G. (2021). *NGI's Dawn Daily Natural Gas Price Snapshot.*

ISO Newswire. (2014, April 4). *Oil inventory was key in maintaining power system reliability through colder-than-normal weather during winter 2013/2014*. Retrieved from https://isonewswire.com/2014/04/04/oil-inventory-was-key-in-maintaining-power-system-reliability-through-colder-than-normal-weather-during-winter-2013-2014/

Jaratt, E. (2020, November 16). *Quebec to ban sale of new gas vehicles by 2035*. Retrieved from Electric Autonomy Canada: https://electricautonomy.ca/2020/11/16/quebec-ban-new-gas-vehicles-2035/

Ministry of Energy, Northern Development and Mines. (2019, April 1). *Consultation on industrial electricity prices*. Retrieved from Ontario: https://www.ontario.ca/page/consultation-industrial-electricity-prices

Ministry of Energy, Northern Development and Mines. (2021, January 5). Letter to stakeholders.

Ministry of Energy, Northern Deveopment and Mines. (2020, October 8). *Changes to Ontario's Net Metering Regulation to Support Community-Based Energy Systems*. Retrieved from Ontario: https://ero.ontario.ca/notice/019-2531

NRCan. (2021, March 24). *Zero Emission Vehicle Infrastructure Program*. Retrieved from Government of Canada: https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/zero-emission-vehicle-infrastructure-program/21876

OEA. (2021, April 7). OEA Symposium on MENDM Energy Planning Reform.

OECD. (2007). Governace. *OECD Glossary of Statistical Terms*.

Office of the Auditor General of Ontario. (2015). *2015 Annual Report.*

Ontario. (2013). *Achieving Balance: Ontario's Long Term Energy Plan.*

Ontario. (2017). *Delivering Fairness and Choice: Ontario's Long Term Energy Plan 2017.*

Ontario Clean Air Alliance. (2021, March 11). *Mayor Tory & Toronto City Council call for phase-out of Ontario's gas plants*. Retrieved from Ontario Clean Air Alliance: https://www.cleanairalliance.org/mayor-tory-toronto-city-council-call-for-phase-out-of-ontarios-gas-plants/

Ontario Clean Air Alliance. (2021). *Mayor Tory & Toronto City Council call for phase-out of Ontario's gas plants.*

Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Sched. B. (1998).

PWU. (2019, May 13). 20-Year Planning Outlook Stakeholder Engagement Meeting 2 Feedback.

PWU. (2019, May 17). IESO Incremental Capacity Auction High Level Design Submission.

PWU. (2019, March 18). PWU Response to the Non-Emitting Resources Subcommittee's Draft Report, "Participation in Ontario's Future Electricity Markets".

PWU. (2020, March 11). PWU Submission on IESO Technical Planning Conference Materials.

PWU. (2020, October 20). PWU Submission on Resource Adequacy Engagement.

PWU. (2021, February 22). PWU Submission on the IESO's January 2021 Annual Planning Outlook Engagement.

PWU. (2021, February 22). PWU Submission on the IESO's January 2021 Resource Adequacy Engagement.

PWU. (2021, April 14). PWU Submission to the IESO's March 2021 Resource Adequacy Engagement.

Strategic Policy Economics. (2015). *Impact of Extending Pickering Nuclear Generating Station Operations to 2024.*

Strategic Policy Economics. (2016). *Ontario's Emissions and the Long-Term Energy Plan: Phase 1: Understanding the Challenge.*

Strategic Policy Economics. (2016). *Renewables and Ontario/Quebec Transmission Interties.*

Strategic Policy Economics. (2018). *Distributed Energy Resources in Ontario: A Cost and Implications Assessment.*

Strategic Policy Economics. (2020). *Electricity Markets in Ontario: An Examination of Mismatched Conditions and Options for Future Competitive Processes.*

Strategic Policy Economics. (2021). *Advancing Ontario's Energy Transition: Leveraging Policy Tools.*

Strategic Policy Economics. (2021). *Advancing Ontario's Energy Transition: Reforming Energy Planning.*

Strategic Policy Economics. (2021). *Advancing Ontario's Energy Transition: Electrification Pathways for Ontario.*

Vegh, G. (2016). *Learning from Mistakes: Improving Governance in the Ontario Energy Sector.* C.D. Howe Institute.

Vegh, G. (2017). *Report on Energy Governance in Ontario to the Ontario Energy Association and the Association of Power Producers of Ontario.* McCarthy Tetrault. OEA and APPrO.

Vegh, G. (2020). *Electricity Procurements in Ontario: Time for a New Approach.* Ontario 360.

Warren, R. B. (2015). *The Governance of Energy Agencies: A Case Study of the Ontario Energy Board.* CCRE.

Wayland, M. (2021, January 28). *General Motors plans to exclusively offer electric vehicles by 2035*. Retrieved from https://www.cnbc.com/2021/01/28/general-motors-plans-to-exclusively-offer-electric-vehicles-by-2035.html

White, A. (2021, February 20). *Here Are All the Promises Automakers Have Made about Electric Cars*. Retrieved from https://www.caranddriver.com/news/g35562831/ev-plans-automakers-timeline/

Appendix 2 - List of Recommendations

Governance recommendations

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

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

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.

Policy priority recommendations

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.

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 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.
- ***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.

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

Implementation Recommendations

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

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.

Appendix 3 - Summary of Responses to Posed Questions

1. *"How can we promote transparency, accountability and effectiveness of energy planning and decision-making under a new planning framework?"*

   A *living plan* approach will promote transparency, accountability, and effectiveness through the provision of Policy Priorities of government, stakeholder engagement, and IESO and OEB annual reporting. OEB inputs to this process will promote accountability of planning to ratepayer interests, and reports to government of planning efficacy will increase transparency and increase the likelihood of effective and evidence-based planning in the broader interests of Ontarians.

2. *"What overarching goals and objectives should be recognized in a renewed planning framework?"*
   Assuring adherence to the principles of transparency, accountability and agency independence should be at the core of the new framework in order for it to be effective. The new planning framework must recognize and seek to mitigate the numerous novel risks facing the energy system and ultimately government: the pressure to address climate change; the complex energy transition; electricity supply reliability challenges including energy security; higher costs to ratepayers; and the emerging fiscal challenges post-COVID-19. These goals should be captured by whole of government Policy Priorities for energy planning and may include others.

3. *What respective roles should each of the Government, IESO, and the OEB hold in energy decision-making and long-term planning?*
   Government should set broad Policy Priorities for planning. IESO should create a *living plan* to meet these priorities in consultation with stakeholders, including the OEB. The OEB should provide inputs to the planning process, and report on the efficacy of IESO's proposed plans in light of the Policy Priorities as well as on the implications of those plans on ratepayers, taxpayers, and sector viability.

4. *"What kinds of decisions should be made by technical planners at the IESO and the OEB as regulators?*
   The IESO should lay out the process and criteria for defining and procuring adequate supply. OEB to not have decision-making powers over planning but should be accountable for advising on the compliance of the IESO's plans with regards to the relevant Policy Priorities.

5. *"What types of decisions should require government direction or approval?"*
   Government must set the Policy Priorities that will define the parameters and objectives for planning that the IESO and OEB can then use to guide their respective mandated activities. The approval signing authority for procurements that commit the province to expenditures above a set threshold best resides with the government.

6. *"Are there gaps in the IESO and the OEB's mandates and objectives that limit their ability to effectively lead long-term planning?"*

   The use of non-transparent or overly prescriptive Government Directives, limit the IESO's ability to utilize its independent expertise and provide effective planning.

   The overall planning process has no mechanism that links accountability to the interests of ratepayers and the financial viability of the sector. The OEB provides an accountability measure, only "after" implementation plans are proposed by regulated entities. 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.

Bulk system resource acquisitions outside of the OEB regulated entities lack mechanisms linking decision accountability to ratepayer interests and investor risks.

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 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.

After-the-fact accountability: Existing accountability measures do not address outcomes until public awareness has grown, usually several years after the decisions are made.

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?"*
   The planning process is well suited to be formulated under a *living plan* model. Participation of the OEB and publicly released annual reports by both the IESO and the OEB should remove the need for any legislative oversight or review by expert committees. With overall performance benchmarks determined by suitably expressed Policy Priorities, existing governance frameworks should suffice.

8. *"How often and in what form should government provide policy guidance and direction to facilitate effective long-term energy planning?"*
   The government should provide policy guidance to IESO in terms of broad, measurable Policy Priorities informed by discussions with all areas of government, and encompassing the public good objectives of energy planning. This is best done early in the term of a new government to provide as stable an environment for planners and investors as possible. Updates can follow whenever the outcomes of the annual OEB and IESO reports warrant the government to consider revisions of is Policy Priorities. With the publicly formalized expression of Policy Priorities in a document such as "The Long-Term Energy Planning Policy Priorities", there may be no need for a separate government authored LTEP beyond ongoing approvals of the APO.

9. *"How do we ensure effective and meaningful Indigenous participation in energy sector decision-making?"*
   Objectives regarding indigenous engagement should be included in the government's Policy Priorities and affirmatively enabling their participation in the *living plan*.

Appendix 4 - Detailed Background on Broad Policy Priorities and Business Models

The following is extracted with minor updates from previous submission to the MENDM.

When looking to the long term, any actions that are taken in the electricity sector should look to maximize the benefit to Ontario of the resulting energy infrastructure initiatives. Options should seek to enable opportunities that leverage creative funding solutions and Federal funding support, thereby minimizing the outlay from the province or rate payers. Recommended areas for consideration include optimizing the economic outcomes from plans to meet Ontario's energy needs; and, seeking leverage of federal program funding where synergistic policy objectives may exist.

1) Optimize the implementation benefits when preparing to meet Ontario's longer-term future electricity demand

   Current investment decisions in Ontario's electricity sector are driven by the cost of purchasing the required resource with a focus on the cheapest option. While this is an important criterion, it presents a significant risk for Ontario's long-term energy cost and security and its climate objectives. Several factors critical to mitigating this risk are not currently being considered by the IESO. For example, the IESO's Market Renewal Program is currently focused on procuring natural gas generation to meet Ontario's electricity needs at the expense of important jobs in the province and tax revenues.

   Expenditures in Ontario's electricity infrastructure have significant impacts on all sectors of the economy and should not be undertaken without considering the driving economic factors such as domestic content, job creation, energy security and the environmental well-being of citizens.

   i) Domestic Content should be a Critical Element of any Provincial Electricity Plan

      According to an independent report by the Conference Board of Canada, Ontario Power Generation's $12.8 billion refurbishment of four reactors at the Darlington Nuclear Generating Station and subsequent 30 more years of operation are expected to generate a total of $89.9 billion in economic benefits to Ontario. Ninety-six percent of the project costs will be spent in Ontario and the project will rely heavily on Ontario-based contractors. This investment will also create 14,200 jobs per year and boost personal income by an average of $1.6 B annually.

      By comparison, studies have shown that natural gas-fired generation sends significant dollars out of Ontario and the jobs with it. About seventy percent of the natural gas Ontario consumes for electricity generation is currently supplied from shale reserves in the United States. This significant outflow of dollars, amounting to billions of dollars per year, would be better spent on investments in domestic electricity projects that keep the benefits in Ontario and help speed up the province's recovery from the Covid-19 pandemic.

   ii) Low-carbon, Energy Security is a competitive advantage for Ontario's Economic Future

      Significant finds of shale in the United States have lowered the cost of natural gas which in turn has driven up demand. As a result, more of this fossil fuel is being consumed by homes, electricity generators and industries in the U.S. The U.S. also has become a net exporter of this commodity

to other parts of the world besides Canada. The upsurge in U.S. consumption has resulted in delivery constraints due to pipeline infrastructure limitations in some parts of the country e.g. northeast region.

Natural gas consumption in the U.S. is forecast to continue to increase as their coal plants are shut down and these generators switch to this lower carbon emitting fossil fuel. 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 constraints, especially during extreme cold weather events. As an example, Ontario ran out of natural gas during the last Polar Vortex.

Natural gas is a commodity that Ontario competes for in a North American market with multiple jurisdictions in the U.S where consumption has been increasing significantly. This presents two risks: availability and price volatility. The recent extreme weather event in Texas saw gas prices rise on Ontario. In an extreme, widespread weather event Ontario's electricity sector could expect to see its natural gas supply curtailed. Furthermore, the State of Michigan is currently considering closing the pipeline that provide Ontario and Quebec with its oil for refining gasoline.

The price volatility of natural gas is a risk Ontario's IESO has been tracking over the past two decades.

iii) More natural gas generation means more carbon emissions

The IESOs emissions forecast shows that 30% of the emission savings Ontario has achieved from shuttering the coal plants will be lost when the Pickering Nuclear Generating Station is retired, and its capacity is replaced by natural gas. The 6 Mt increase in emissions by 2025 will make it significantly more challenging for the province to meet its Made-in-Ontario 2030 climate targets.

This makes re-evaluating the ongoing investments in new natural gas-fired generation infrastructure even more relevant. As previously noted, imports of U.S. shale gas send economic wealth out of the province and negatively impact Ontario's energy security, trade balance, jobs and emission levels. For these reasons, Ontario should transparently assess the costs and benefits of building new gas-fired generation and delivery infrastructure.

2) Work with the federal government to re-direct resources to energy infrastructure projects that improve Ontario's economic competitiveness.

New nuclear and biomass are two opportunities that could provide substantial economic and environmental benefits to Ontario, including thousands of new jobs, more low-carbon electricity and greater energy security.

a) Build new nuclear

There is a clear need for Ontario to secure 2000 MW of new baseload supply which could be met by a new nuclear facility when the current gas generation contracts expire in 2029. Ontario Power Generation has a CNSC approved site at Darlington that can accommodate a new nuclear investment with minimal site preparation delays.

The PWU recognizes the funding constraints that governments are facing and the views of ratepayers regarding any further rate increases. The PWU has advocated for the development of

new and creative business models to support future investments in nuclear energy. Some new models suggest that a new CANDU plant at OPG's Darlington site could be delivered with private funding thereby reducing risk to government and ratepayers. As the Conference Board of Canada's assessment of the Darlington refurbishment program has shown, this retains domestic content and secures low-cost, low carbon electricity for the long-term. Analyses also show that it is a cost-effective and reliable way to reduce emissions compared to other options. It would also build international confidence in Canada's nuclear technologies in support of export opportunities to other countries. Building new nuclear can also be accomplished in time to meet Ontario's electricity needs when the existing contracts for gas generation expire and without negatively impacting the refurbishment programs at the Darlington and Bruce Nuclear Stations.

Several studies of Ontario's future supply mix options point to a nuclear enabled solution as the low-cost option that will provide Ontario with electricity rates that will represent a competitive advantage for the province in the Great Lakes region. With expanded use of natural gas for baseload, Ontario will be more expensive.

b) Ontario's Biomass Resources in Northwestern Ontario.

Several independent analyses confirm the availability of significant supplies of renewable, carbon-neutral biomass—wastes from forestry harvesting and processing—are available in Northwestern Ontario. The 200 MW Atikokan Generating Station is fueled by these processed wastes in the form of wood pellets that are manufactured nearby. The plant provides dispatchable power to the grid and is potentially capable of supplying heat for residential and commercial consumers. These would include food production, e.g. greenhouses, and wood pellet production for local use and for export.

Investments that expand existing biomass supply infrastructure in the region would enhance energy security in the area and effectively eliminate the need to import natural gas generated electricity from Southern Ontario. Most importantly these kinds of investments would secure existing and create new employment and business opportunities for local, Indigenous and Metis communities.