

Date: February 27, 2024

From: James Scongack
Chair, IESO Strategic Advisory Committee

To: Bill Sheffield, Chair, IESO Board of Directors
Lesley Gallinger, President and CEO, IESO

Re: 2023 Challenge Statements & Summary of Feedback, Strategic Advisory Committee

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I would like to take this opportunity, on behalf of the IESO Strategic Advisory Committee (SAC), to share with you a summary of our work in 2023, along with perspectives and themes as the Board embarks on a number of critical areas in 2024.

I appreciate the engagement of the IESO Board and Executive Leadership Team in our public SAC meetings and a range of forums as we work to provide input and advice that is clear, practical and as integrated as possible. We look forward to continuing to evolve our work with an aim at informing IESO's priorities and that of the sector overall. As you know, the IESO SAC is cross-functional in its representation of the sector and the Province. However, in addition to bringing these various view points to the discussion, the SAC also has a role to play on a collective basis – providing strategic input that balances these factors to inform decision-making on the part of the IESO.

The important discussions about our sector at the SAC table surpass that of any of our individual considerations as a specific constituency and when our sector is successful, Ontario is successful. I would like to thank all SAC Members for their engagement throughout the year. Please find enclosed an overview of the SAC membership and the background from each SAC member (**Appendix A**)

Ontario's electricity system remains at a critical juncture. Throughout 2023, the Ministry of Energy's release of *Powering Ontario's Growth*, the Electrification and Energy Transition Panel's (EETP) Report and the implementation and advancement of many initiatives previously

launched began to crystalize a clear picture on the significantly increased and historic investments in clean generation, infrastructure renewal inclusive of innovation and modernization, while also balancing the need for system reliability/resiliency, economic pressures and working with Indigenous peoples, communities and stakeholders. Simply put, what Ontario is embarking on in the coming years is greater, with more complexities and factors, than the last major build-out of our electricity system between the 1970's-1980's.

The challenges facing Ontario are not dissimilar from other jurisdictions across the globe. However, what is unique about Ontario is we are starting from a place of strength from the perspective of reliability, a decarbonized supply mix, diversification of generation and a significant amount of opportunity for innovation and attracting of private-sector investment.

Building on our work in 2022, given the factors noted, the SAC undertook an initiative to align on a number of key areas to provide unified input on behalf of the sector to the IESO and its Board. While it is important to recognize that consensus is not practical or possible on every issue facing the sector, this exercise has demonstrated there is more alignment than disagreement in a number of key areas and that it is possible for SAC to come together as a sector to provide clearer input and advice to the IESO.

We undertook through our meetings in 2023 to focus on four areas, refreshing the important work from 2022 including:

1. The Urgency and Timing of New Resources
2. Maximizing Existing Resources
3. Resource Adequacy
4. Modernization and Efficiency

In each of these areas, a cross-functional working group was assigned to outline and/or update a challenge statement to clearly articulate the opportunity or risk to be addressed, a common set of facts and rationale, definition of the role of the IESO and other stakeholders and strategic considerations/advice. The outputs of these Challenge Statements were agreed upon by the respective working group, the SAC broadly and discussed openly in our various public meetings throughout 2023. In preparation for 2023, recognizing the shift to implementation and the role that Indigenous partners and Ontario play, a fifth focus area was added to our work referred to as Community Alignment. Enclosed is a summary from each of these areas (**Appendix B**).

While these summaries are intentionally succinct and clear, there are five broad themes I would like to flag for the IESO Board and Executive team as you consider these matters.

1. **Build on what we have.** The Province has a strong set of existing assets including generation, transmission, distribution and system management. Maximizing the use of these assets through innovation, focus, life extension and optimization can provide timely, cost effective and proven solutions. These assets have been 'de-risked' given that they've been sited and in operation and can form a reliable, predictable foundation for the system over the next 20+ years while significant build-out is underway.
2. **'No Regret Actions' Accelerated.** Given the dynamic environment with a wide range of supply/demand outcomes that Ontario's electricity system is operating in, future options are of very high value. The urgency around climate change and decarbonization as part of the overall energy picture is also expected to accelerate as technology advances. The IESO needs to create well defined mechanisms that are agile, robust and timely to enable option/siting development to de-risk and better define projects, and progress long term projects without final decisions being required. Additionally, such a mechanism will allow for public, municipal, community and Indigenous engagement in these processes. With this approach there is recognition that not all options will ultimately be used, but this is the most cost-effective approach in the current environment and on balance will provide value to ratepayers over the long-term;
3. **Investment challenge & opportunity.** The level of investment required in the sector under all demand scenarios is significant. As other jurisdictions renew their systems, they will be competing for what will be a limited pool of capital and there is a recognition that the public sector cannot meet the needs. As the sector moves forward we need to recognize we are in a competitive environment for capital and the jurisdictions that can provide the most certainty and clarity to investors early will be the most successful;
4. **Executability of program.** Similar to the levels of investment, under all demand scenarios, the execution of the build out program has significant opportunities and challenges in parallel as they will be drawing from similar building trades, manufacturing, supply chain and engineering resources. Advancing 'No Regret Actions' including early engineering and procurement activities will sharpen the focus on

execution through effective planning and preparation and ultimately reduce risk. On a sector-wide basis, establishing the aggregate needs will allow for a clearer picture for the sector and policy makers to begin to advance longer lead solutions to these challenges and in doing so leverage this historic opportunity;

5. **Active Engagement of Indigenous Peoples & Communities.** Community engagement by the sector and proponents, including at the municipal planning level, is essential for the necessary integration with cross-functional development plans as communities manage growth and a range of issues. While there is recognition on the need for early engagement and participation with Indigenous communities in development projects in their territory, an area of further work by the SAC and the sector is to better understand how to enable meaningful economic and broader participation that will allow the next generation of development to contribute to economic reconciliation.

I look forward to the opportunity to present these outputs from our work to the IESO Board as we believe they represent a clear foundation that will aid in the advancement of policy, options, decisions and the long term direction of the IESO as the system operator of Ontario's electricity system.

Finally, I would like to recognize all of the SAC Members for their outstanding leadership, team work and engagement in this exercise. This package represents very unique alignment that is critical at this time. As we advance our work in 2024, we look forward to working with IESO Board and Executive Leadership Team to build on this work as we collectively view the year ahead as a critical one; by getting it right we will set the foundation for the next decade.

Regards,

James Scongack

Chair, IESO SAC

Appendix A: SAC Membership

Strategic Advisory Committee Membership



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Appendix B: Challenge Statements - SAC Working Groups

Theme 1: Urgency and Timing of New Resources
SAC Members: David Butters (lead), John Avdoulos, Paul Norris, Gurvinder Chopra

Challenge Statement:

- This is a critical time for Ontario's electricity sector. The 2022 Annual Planning Outlook ("APO") published in January '23 forecasts both **energy** and **peak demand** to grow steadily over the outlook period, with energy and winter peak demand slightly more than the 2021 APO Reference Scenario forecast.
- The IESO has recently concluded some procurement processes and others are currently underway.
- Recent Ministerial letters and announcements (e.g., *Powering Ontario's Growth; Ontario's Plan for a Clean Energy Future*) provide important future direction for energy planning that leverages Ontario's clean energy advantage, and supports economic growth and Ontario's net-zero objectives, affordably and reliably.
- However, there is still much more work to be done as demand for clean energy increases and Ontario works towards meeting the province's growing electricity needs.

Supportive Facts and Rationale:

- Reliability remains the paramount objective of the IESO.
- The most recent 2023 Annual Planning Outlook (APO), forecasts potentially unserved energy beginning in in 2028 increasing significantly through 2043:
 - **Capacity needs emerge** in 2026 and grow over the IESO's planning horizon, and **energy needs** also emerge in the mid-2020s, and grow sharply beginning in 2029
 - **Transmission system constraints** have also been identified for action or further study.
- On July 10, 2023 Ontario's Minister of Energy announced *Powering Ontario's Growth – Ontario's Plan for a Clean Energy Future*. The report represents the Government of Ontario's response to last year's Independent Electricity System Operator ("IESO") Pathways to Decarbonization ("P2D") report and subsequent EBR Posting, and commits to significant actions designed to ensure the province is prepared to sustainably manage anticipated growth in energy demand.
- To that end, the province is prioritizing a number of key areas, e.g.:
 - New Nuclear at Bruce and Darlington: Commencing pre-development work to site the first large-scale nuclear build the Bruce nuclear site in Kincardine, ON and moving ahead with three additional small modular reactors at the Darlington nuclear site;
 - Building New Transmission: New transmission lines to power the conversion from coal to Electric Arc Furnaces at Algoma Steel as well as growth in Northeastern

- Ontario, Ottawa/Eastern Ontario, Southwestern Ontario, and in the Greater Toronto Area;
- Long-Duration Storage Assessment Process: Ontario's first Long-Duration Storage Assessment to be carried out by the IESO to which the Ontario Pumped Storage Project in Meaford and Marmora Pumped Storage Project will be first to advance;
 - Hydroelectric Power: Optimizing the Ontario Power Generation ("OPG") existing hydroelectric fleet, along with other hydroelectric generation under contract, to increase clean generation capacity;
 - Recent postings on the EBR have requested commentary on several of the above.
- The Electrification and Energy Transition Panel report and the Ministry of Energy's energy pathways study will provide further direction later in 2023.

IESO Role:

- Maintaining reliability of the system.
- Providing timely and accurate information and data to support identification and timing of need.
- Consulting and developing timely, feasible and predictable competitive and other procurement mechanisms that can address multiple objectives of reliability, affordability and emission reduction policies.
- Complying with Ministerial Directives and developing and executing the solutions to meet future system needs-in a timely manner.

Role of Others:

- Incremental investment in existing and new assets requires a pool of owners, developers and investors with necessary expertise, capital, and appetite to participate in the Ontario market:
 - These potential participants need continued line of sight and information on the Ontario market and supply/demand picture to consider the features, benefits and risks of investing and operating in the Ontario market, and to be able to work with the IESO and government to develop feasible options that can move from concept to commercial operation.
- There needs to be clear cooperation between all levels of government, industry, community stakeholders and Indigenous peoples to meet our sustainability goals and make the most of an energy grid that sets Ontario apart and can be our clean energy advantage.
 - The federal government has been increasingly active in electricity issues through investment avenues (e.g. CIB, ITCs) and regulations (like the CER). Municipalities also play a role, particularly in permitting.
- LDCs, communities and other stakeholders need to engage in the discussion to ensure alignment of their priorities around electricity planning and operations to ensure consumer flexibility is considered.

Strategic Considerations and Committee Advice:

- While the IESO has already begun to move toward solving this problem, timing remains very tight and there is some uncertainty about the capacity of the IESO to sustain the required initiatives,
- Stakeholders and policy makers recognize that in order to maximize resource optionality to meet Ontario's future electricity needs it is important not just that the procurement processes are successful, but equally important that the selected projects are able to be permitted, built, connected to the IESO administered Grid, and ready to supply reliable energy when needed. This will require the active participation of and support by key regulatory Ministries (e.g. MECP, MNRF).
- Provide ongoing support to the province to:
 - Access timely federal government investment (e.g. CIB, ITCs);
 - Ensure regulations such as the CER regulation do not impede an orderly energy transition;
 - Ensure appropriate federal and municipal improvements to permitting of large infrastructure.
- Continue further work to determine if low-carbon fuels, such as hydrogen and renewable natural gas, together with storage technologies can replace some of the flexibility of natural gas.
- Galvanize collaboration amongst stakeholders and Indigenous communities.
- Provide greater clarity on timing/plan new for hydro resources in Northern Ontario.
- Establish open, transparent and traceable process to measure progress and demonstrate results of decisions and actions taken along the way.
- Managing investor confidence must be acknowledged when developing mechanisms to meet needs, and in particular, the IESO should seek an increased understanding of the investment/finance community to ensure revenue expectations and risks are appropriately considered.
- Incorporate DERs to help meet the growing and urgent needs including through new arrangements with LDCs to access, expand, and utilize these technologies.
- Be pragmatic when prioritizing the development of solutions to meet urgent system needs, as different factors and opportunities may influence the mechanisms to meet longer term needs.
- Maintain awareness of international resource supply chains issues and resource security as areas of growing importance and consideration in meeting future system needs.

Challenge Statement:

- Ontario faces a significant near term, growing and enduring need for supply to meet increased demand that will continue with electrification of the broader economy. At the same time, contracts for several existing resources will expire within the next decade, in most cases, well prior to the end of the useful life of the assets
- What tools and mechanisms should the IESO use to cost effectively and reliably optimize the acquisition and continued operation of existing supply and demand side resources?

Supportive Facts and Rationale:

- Ontario taxpayers subsidize the rate impacts of existing resources to the tune \$6.5B in 2021, and \$7b IN 2022 - which highlights the need for prudent procurement.
- Ontario's installed electricity capacity is 38,216 MW, almost 19,000 of which is rate regulated (OPG) and a further 6,550 MW under long term contract (Bruce Nuclear). As such, resource re-acquisition mechanisms are focused on the remaining ~33% of existing assets
- 43% of the contracts for existing Ontario supply resources will expire over the next decade:
 - Expiring resources must be contracted effectively ensuring initial high-cost procurements are now utilized to bend the cost curve (downward) and the value of these assets are utilized for all Ontarians.
 - Options to "blend and extend" should be revisited for all expiring generating assets.
- The IESO's Annual Planning Outlook assumes the continued operation of existing assets over the horizon of the Outlook, yet asset owners may not have the investment confidence to make that same assumption which yields higher supplier risk premiums to address this uncertainty.
- The IESO's current or planned re-acquisition mechanisms or "toolkit" includes annual capacity and forward capacity auctions, mid term RFPs, same technology expansions and programs
- There is no IESO process for acquiring, dispatching or managing smaller existing, embedded non-market participant facilities, highlighting a revenue adequacy issue for small resources. Processes exist within LDCs but there is no real-time operational oversight by the IESO which makes it difficult for the IESO to rely on the contributions from these resources to manage the IESO administered Grid.
- No other jurisdictions are paying carbon tax to the significant extent within their electricity system. In other jurisdictions where generators are subject to cap & trade

carbon costs mitigating factors are available. It should be noted that there is no carbon tax in the US and several other jurisdictions that Ontario businesses compete with.

- Ontario Mining Association (OMA) and AMPCO analysis estimates 2022 carbon tax implications cost participants \$4/MWh and will be \$7/MWh in 2023 and \$20/MWh in 2030, and \$2 of carbon could cost \$500k in the market and will continue to grow as the electricity market grows

IESO Role:

- Understand each resource type and what is in scope for optimization.
 - Description; Example; Include opportunities for pairing technologies that optimize them (storage, hydrogen, etc.)
- Provide transparent opportunities for assets owners to communicate optimization from their perspective.
- Develop fit-for-purpose tools.
- Ensure ensuing contracts offer flexibility.
 - Engage generators with expiring contracts now – bend and extend, bend the cost curve downward
- Ontario grid provides reliable, affordable and sustainable power
- Tools and rules for aggregation and market participation across a broad spectrum including non-market participants.
- Running transparent, competitive, and timely procurement processes
- Ensure consistency with relevant emerging regulations (i.e. CER)

Role of Others:

- Generation, transmission, distribution and demand response resources communicate effectively what optimization looks like in their world
- Customers and other stakeholders communicate their need for reliable, low cost and sustainable power such that the IESO understands what are customer “tipping points”
- LDC’s have ability to support various resources operating within their jurisdiction while ensuring fiscal responsibility and appropriate charges across a broader range of participating resources.

Strategic Considerations and Committee Advice:

- Consider the government’s use of ministerial directives to direct procurement/operational matters, and focus on establishing principles and the characteristics they expect to see optimized, such as cost, environmental, reliability, etc.
 - Existing electricity resources should be procured using mechanisms which balance the need for investment certainty and ratepayer value, regardless of the technology type or point of connection (grid-connected or behind the meter). However, also consider different clearing prices for emitting and non emitting resources.

- Carbon cost are being over-collected in the electricity system
- Carbon cost are not collected in any other market clearing price signal in North America
- Keep generators whole while ensuring carbon costs are being collected appropriately and induced carbon cost are not creating market distortion.
- The policy, regulatory and governance frameworks should be designed by the IESO and OEB to encourage distribution utilities to procure third-party electricity resources to meet local distribution needs while allowing these resources to value stack in order to reduce overall costs to the consumer.
- Aggregation of small loads, behind the meter and virtual loads should be allowed as in other jurisdictions
- Better coordination of gas and electricity energy resource
- Increased focus on reliability and resilience:
 - if electricity wants to increase its "market share" it needs to begin to increase its resilience and reliability to that of natural gas
- To enable the participation of distributed energy resources (DERs) as dispatchable resources, operating reserves, other ancillary services, capacity or energy resources, the IESO should allow for aggregation of DERs by expediting the development of the IESO's software and settlement tools as well as Market Rule changes that today preclude the utilization of cost effective and flexible DER resources. Currently this is available in other jurisdictions such as Alberta and New York.
- Enable a renewable energy certificate (REC) mechanism. In jurisdictions like Alberta and many US states, RECs can be registered as a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation. It provides value to the renewable generation resources, thereby reducing the cost to Ontario rate payers.
- MACC (marginal abatement cost curve) should be used to evaluate generation options against all other options (broad economic based) for sustainable Ontario

Theme 3:

Resource Adequacy

SAC Members:David Butters (lead), Malini Giridhar, Bala Gnanam, Kim Lauritsen

Challenge Statement:

- How to build a pathway to a net zero electricity grid in Ontario that guarantees sufficient supply at affordable rates to people and businesses every step of the way.

Supportive Facts and Rationale:

- While the reliability outlook has improved, Ontario will still be faced with significant reliability challenges going forward. Orderly and decisive action with a regular cadence is required to maintain adequate supply over the next decade.
 - Pickering retirement, nuclear refurbishments, coupled with significant MWs of contracted resources nearing the end of their contract terms toward the end of this decade are driving the near-term needs.
 - Recent procurements by the IESO means that by 2026, Ontario should have ~1200 MW of new capacity participating in the IESO's electricity market, and procurement activities are continuing through 2023 and into 2024 and beyond.
 - Population growth in Ontario and increasing electrification of its economy will also drive significant demand growth over the next two decades
 - A robust, sustainable and affordable Ontario electricity system requires ongoing investment, both to maintain existing assets, and to build new assets, as they are required. This is not a given, since developers face global opportunities for their time, capital and expertise.
- Over the longer-term, there is increasing pressure to plan for electricity emissions reductions
 - In its Pathways to Decarbonization report, the IESO identified the potential to eliminate emissions from Ontario's electricity system – but only after a transition that sees natural gas generation maintain reliability until nuclear refurbishments are complete and new non-emitting technologies such as storage mature.
 - To achieve decarbonization, we need to build out our non-emitting resource mix further, taking into account the time it takes to build all that new infrastructure, and allow new technologies to mature.
 - ESG requirements amongst investors, manufacturers and property owners are also putting pressure on the grid to achieve net zero and other sustainability outcomes.
 - The federal government has released a draft of its Clean Electricity Regulation (CER) to mandate a net zero by 2035 pan-Canadian electricity grid.
 - Federal funding such as that from CIB and ITCs will drive further system changes.

- Considerable debate has been taking place at a municipal level about the future of electricity supply.
- The Ontario Government recently released “Powering Ontario’s Growth”, which lays out important directions based in part on leveraging the existing resources of the grid today, while looking forward to additional technologies such as large scale new nuclear, SMRs, hydroelectricity and storage, lower carbon fuels, demand response and conservation as key opportunities.
- Additional considerations:
 - Reliability and affordability¹ will remain key issues for government and ratepayers
 - There is a consensus that both wise use of existing assets and the need for a pathway for prudent and affordable longer term electricity investment are required.
 - Innovations in energy storage, nuclear, and other supply areas are promising, but could be affected by supply chain challenges and long-lead times. Other potential non-emitting technologies (e.g. hydrogen, CCUS) are not yet readily available or commercially viable.
 - A number of new, critical electricity transmission projects will be required to support Ontario’s resource adequacy plans.
 - There is strong support for “Made-in-Ontario” solutions among politicians and residents of the province.
- **Bottom Line:** Reliability, Affordability and Sustainability will underpin policy decisions that shape the electricity grid of tomorrow.

IESO Role:

- The IESO’s role is to operate the electricity system with a primary objective of maintaining reliability.
 - Planning should drive key decision-making, particularly on needs assessments to support procurement pathways through the IESO or the OEB. Competitive procurements should be pursued where possible, but it is also understood that the OEB and regulatory oversight on a cost-of-service basis can serve as a useful surrogate to competitive tension (particularly on certain long lead and large-scale capital projects, e.g., nuclear power, very large hydro storage).
- The IESO must be transparent on how the electricity system will continue to support reliability. It should take into account detailed socio-economic analysis and input on demand growth, electrification and energy transition, informed by input from the Ministry of Economic Development, Job Creation and Growth, the Ministry of Northern Development,

¹According to recent research on impressions of the Energy Transition: “4-in-10 generally feel good about the energy transition, but skepticism is growing.” (Politics of the Energy Transition; Innovative Research, September 2023)

the Ministry of Natural Resources and Forestry, and the Ministry of Mines. This work should be included as part of the analysis forming the APO.

- The IESO should take a Conservation First approach, and work with LDCs as part of an updated 2021-2024 CDM Framework to optimize CDM programming and planning.
- The IESO should work aggressively to enable DERs and NWA's to participate in the IESO-Administered Market.
- The IESO should provide clear and plain language information to municipalities and Indigenous communities on electricity planning.

Role of Others:

- The IESO should work with the Electricity and Energy Transformation Panel ("EETP") once it reports on its findings as well as the Ministry of Energy's "Cost-Effective Energy Pathways Study" and other relevant ministries to better understand:
 - The drivers of electricity demand tomorrow and in the years ahead, and
 - The sustainability or emissions profile of that electricity supply needed to support economic development imperatives in key sectors and amongst the general population.
- Active and ongoing engagement with municipalities, Indigenous communities, business groups and other stakeholders will be critical to help inform decision-making.

Strategic Considerations and Committee Advice:

- The initiative to roll the APO and AAR into one annual update document should be continued.
- IESO should work with the Ministry of Energy and other key organizations in the energy ecosystem, including the natural gas industry to transform the APO/AAR into a coordinated provincial energy plan. This Plan will provide Ontario's the basis for coordinating provincial and federal net zero objectives.
- Decarbonizing Ontario's economy requires an "all hands on deck" and "all resources" approach:
 - Take a "safe bets" approach: proven technologies + Ontario's sustainable/reliable electric system + a reliable/resilient and affordable natural gas distribution infrastructure, provides a pathway to a reliable, sustainable and affordable 2030 outcome;
 - Electrifying technologies across various sectors, particularly transportation, manufacturing and industry, could mean real progress in reducing overall provincial greenhouse gas emissions.);
 - Given the scale of Ontario's gas peak demand (90,000 MW) and the resilience of the gas system, electrification of building heat could benefit from a hybrid heating approach. Leveraging heat pumps and furnaces for heat to minimize duplication of infrastructure to deliver peak heating requirements and increased

emissions from using gas fired generation in lieu of the direct use of gas, when needed.

- Post 2030 decarbonization will call for a massive deployment of capital-intensive infrastructure – soon.

Challenge Statement:

- Attending to the climate emergency with urgent action is part of the mandate of many organizations both in the sector, and in other industries that rely on the energy sector. Building grid resiliency in the face of climate change is of the utmost importance.
- As a sector, we must turn our minds to building grid resiliency in partnership with Indigenous communities. Working together through this energy transition is critical.
- For over a century, there has been mostly one-way flow of electricity, with stable demand curves. The sector has long operated based on the principle that the future will be overwhelmingly like the past.²
- As a sector, we are on the precipice of massive change. It is not just that people are using more energy efficient air conditioners and switching out their gas stoves for electric, but transformational change is occurring in the economy. Electricity will serve fundamentally new roles in our lives - as a fuel source, as a marketplace, as an enabler of more connected cities.³
- While we have the certainty of fundamental change, we are also uncertain about the pace and particulars of that change. We need to plan from the center out: from certainty to uncertainty. The choices made today have long-term implications. Those trade-offs are more important than they have ever been.
- As a sector we must not lose sight of the importance of helping those who need it most. Those who may be grappling with the pressing affordability consequences that can flow from taking the necessary action in support of grid modernization and electrification.
- Public policy, customer expectations and technological advancements are converging around three key themes which impact the ways electricity is produced, delivered and used:
 - **Increased demand** – we know that demand for electricity could double by 2050⁴. We know more electricity is required to meet that demand but we also must remain flexible to scale as needed based on market conditions which continue to change.
 - **Grid modernization** – we need to lay the foundation of this future state through a series of upfront modernization-focused investments in the grid and in our operations. These investments are not nice to haves. They are need to haves. Grid modernization lays the foundation for meeting rising customer expectations for reliability, resiliency and efficiency.⁵

² 2022 OEA Energy Conference TH Speaking Notes

³ 2022 OEA Energy Conference TH Speaking Notes

⁴ [Powering Ontario's Growth](#)

⁵ Comments from Northwinds Panel – Unlocking and Leveraging Potential with Distribution Systems

- **DERs** – are recognized as having an important role in managing and enabling the energy transition.
- **The challenge then, is this:** to modernize a historically linear system so it is agile and adaptable to inevitable change, while continuing to deliver on familiar customer and system imperatives.

Supportive Facts and Rationale:

The path to decarbonization has begun, but how and when it is achieved remains uncertain

- Decarbonization will shift electricity demand from a stable steady state seen in recent decades to a dynamic and uncertain future of (potentially exponential) growth. Bulk system demand forecasts in successive IESO Annual Planning Outlooks have increasingly tended towards a higher demand scenario identified in the 2022 Ontario Planning Outlook.^{6 7}
- What remains uncertain is by how much, when, and in what ways demand will increase, and correspondingly by how much, when, what types, and in what ways supply will ramp up to meet that demand, as there many inputs to demand (and supply) both global and local, which will affect the pace of change.⁸
- Working Group Recommendation: while there are multiple potential paths to net zero, a good plan now is better than a perfect plan later. To this end, Ontario is working to identify plausible forecasts and decarbonization plans for electricity demand and electricity supply⁹ and this work is critical to enable stable market conditions that drive investment and business growth in Ontario.

Customers and technology are driving change to how the electricity system operates

⁶ IESO, *Annual Planning Outlook*, December 2022.

⁷ Decarbonization will increase electricity demand at an unprecedented rate and will require significant investments and rapid upgrades in the electricity system infrastructure. (Pathways to Decarbonization, IESO Dec 2022, Page – 4)

⁸ Demand depends on changing consumer preferences that are subject to a broad set of global drivers: technological innovation (e.g., EVs, heat pumps, industrial innovation), government policy (e.g. fiscal policy, inflation), global supply chain constraints (e.g., materials, commodities and equipment), global pandemics (e.g. COVID-19) and global energy prices. Demand for electricity also depends on energy policy choices here at home: supply-side factors such as bulk system capacity, demand-side tools (e.g., CDM, ICI and DERs), as well as rate design (e.g., low overnight RPP rate, GA rate design, net metering).

⁹ The IESO undertook a Pathways to Decarbonization Study, that explores the potential pathways for reaching a reliable, affordable, decarbonized electricity system in Ontario. The Ontario Government has launched an Electrification and Energy Transition Panel to provide advice on potential demand curves and coordinating long term planning.

- There is emerging public consensus on the need to decarbonize the economy.¹⁰ Customers are increasingly turning to technologies, such as EVs and demand-side resources such as storage and solar panels, to reduce their environmental footprint.¹¹ However, customers also require visibility and assistance in accessing and deploying these opportunities.
- There remains some short-to- medium-term supply chain, cost and policy challenges leading to timing and proliferation uncertainty for some technologies which can be used by utilities to address emerging local, regional and provincial needs using customer and non-utility solutions in place of, or to supplement, traditional approaches. Through technological advancement and decarbonization initiatives, DERs will become more prevalent as sources of supply and demand management tools. Tools that can assist the utility in managing the bidirectional grid to better deliver outcomes for customers, including managed energy costs, improved reliability and power quality, and reduced environmental footprint.
- *Working Group Recommendation: sector must undertake "complete picture" analysis and customer engagement on the costs and values of decarbonization activities and alternatives (including pace).* Those engagements should be robust and look beyond the bulk system, a particular technology, and even electricity alone, to take an all-in approach that enables meaningful analysis and engagement in the discussion about choices and trade-offs, including customer preferences and price tolerances.

The electricity system must incorporate more technology to optimize its operations and enable change that customers expect

- The electricity grid has provided one-way flow of electricity for over 100 years. Actions taken to build and operate the electricity grid more efficiently to meet relatively consistent customer expectations over that period have been consistent with that century-old paradigm.
- The availability of new technologies and changing customer expectations plus decarbonization means that the grid must now evolve to incorporate more capabilities: e.g. automation, enhanced observability and control, two-way flow of (more) electricity, and increased electronic transactional and information-sharing processes with customers.
- As DERs proliferate over time, there are increasing expectations for utilities to play a greater role connecting and integrating supply and demand side resources into new, varied, and concurrent opportunities.¹²

¹⁰ Canadian Net-Zero Emissions Accountability Act, which became law on June 29, 2021, enshrines in legislation Canada's commitment to achieve net-zero emissions by 2050. The Ontario Government has committed to decarbonizing the economy and is making investments to enable electrification. The City of Toronto has an established net zero by 2040 plan.

¹¹ Electric Autonomy Canada reports that electric vehicles (battery electric, plug-in hybrid, hybrid electric and fuel cell vehicles) sales surged to nearly 11% of the total market share in Canada in Aug 2023, highest proportion ever. See: <https://electricautonomy.ca/2023/08/25/zev-market-share-canada-q2/>. Additionally, battery electric vehicles registrations saw an increase of 46.3% in Q2 August 2023

¹² For example, utilities need to invest in short-term forecasting, planning, and dispatching capabilities that together will allow for the active, real-time management of DER value as it relates to highly dynamic and complex system needs.

- The grid must be there for customers when they need to “plug in”, which will require investment in grid, systems, people, and partnerships ahead of when the demand materializes.
- *Working Group Recommendation: align planning, coordination, and incentives.* Modernization will require an evolution to grid operational processes and plans (e.g., bulk procurement, energy markets, regional planning, etc.) to better incorporate the needs of customers (individually and in aggregate), as some elements of modernization present challenges to conventional market and regulatory incentives, such as funding electrification-driven investment or in its treatment of DER-backed non-wires alternatives.¹³

IESO Role:

- Issue bulk system demand and supply forecasts that incorporate consumer trends on electrification and are consistent with an Ontario plan for decarbonization (in coordination with the Province and Electrification and Energy Transition Panel).
- Maintain bulk system reliability through the transition to decarbonization.
- Operate and evolve efficient energy markets, including as part of Market Renewal. Develop coordination protocols in collaboration with utilities to better integrate DERs into energy markets, leveraging groups like the Transmission-Distribution Coordination Working Group and pilot projects testing models aggregating DERs. Design DER-oriented market rules such that they remain agnostic to the role of utilities in order to enable different paths of grid modernization (e.g., DSOs).
- Evolve procurement mechanisms to better integrate value-stack opportunities presented by DERs connected to the distribution system; partner with utilities (remaining agnostic on their role) to leverage local information and incorporate local distribution considerations in procurement design.

OEB Role:

- Maintain a baseline of regulatory stability and strong consumer protections during the transition to net zero, evolving regulatory mechanisms in a targeted fashion to address specific and identified barriers or emerging needs (e.g. reconciling timing between investment in the grid and when demand materializes).
- Maintain an outcomes orientation in its approach to regulation, having regard for changes in the relative importance of those outcomes (and potential introduction of incremental outcomes) and the potential need for a wider lens for benefit-cost analysis (e.g. beyond the meter) during a period of intense change.
- Monitor, review and relevant policies promptly in response to emerging trends: e.g. following the Framework for Energy Innovation Working Group output, develop a non-wires alternative framework.

¹³ Some utilities are already implementing DER-backed Non-Wires Alternatives (e.g., Toronto Hydro Local DR) as an engineering tool, however evolutions to frameworks and incentive regimes are needed to more broadly enable these approaches.

Local Distribution Companies' Role:

- Develop, review and revise grid expansion plans that best anticipate customers' incremental electrification requirements, with a base of investments that support the widest range of credible demand scenarios.
- Modernize distribution systems to incorporate the operational benefits of technology, and prepare for decarbonization and demand-side tools such as DER-backed non-wires alternative opportunities.

Work collaboratively with the OEB, the IESO, each other, and third parties on emerging issues, such as the integration of behind-the-meter DERs

Definition of Community:

Communities encompass both Indigenous and non-Indigenous entities, such as their governing bodies, utility providers, those involved in development, technology and service providers, and potentially other stakeholders specific to the local context or investment opportunity. These communities are situated within a defined geographical area that is smaller in scale than a province or territory and governed by an organized authority, which may consist of regions, cities, townships, hamlets, reserves, or settlement areas, among others.

Challenge Statement:

- Communities have a critical role to play in enabling the growth of Ontario's electricity sector by building buy-in and raising awareness for sustained implementation of new electricity resources, by reducing the need for electricity capacity through energy efficiency measures and implementing thermal networks, by coordinating parties from various sectors, and by establishing Community Energy and Emissions Plans that set local and regional priorities which inform electricity resource planning.
- Local governments and Indigenous communities are vital partners as a resource to the electricity system when establishing the conditions needed for the communications, planning and expansion of the grid to meet tomorrow's energy demands.

Supportive Facts and Rationale:

- Communities in Ontario are responsible for over 65% of energy use and 60% of Ontario's greenhouse gas emissions.¹⁴
- Local governments (Indigenous and municipal) control urban planning. This includes land use, transportation, building location and design, landfill, water and wastewater systems, industry location and integration; all of which require energy and produce emissions.
- Local governments are the **level of government closest to individual Canadians** giving them the greatest ability to influence human behaviour, ensure local interests are being met, and build the necessary and lasting support for aligned climate and energy policy and implementation.
- Local governments have the ability to significantly influence energy supply and demand locally, regionally, and provincially through Community Energy and Emissions Planning. A Community Energy and Emissions Plan (CEEP) is a tool that defines community priorities around energy with a view to improving efficiency, reducing greenhouse gas emissions, and

¹⁴ NRCan energy end-use database and include residential, commercial, and a portion of personal transportation, 'light' industrial, and freight that occurs in communities but not between communities.

driving economic development. Local governments have a role to play in advocating for the collective interests of local participants and partners.

- The Ministry of Energy presently does not assess the official plans of Ontario's municipalities, despite these plans having direct implications for energy matters, notably electricity consumption. To ensure coherence, the mandate by the Ministry of Energy should align with the growth plans of municipalities, which are guided by the Provincial Policy Statement setting land use planning rules in Ontario.
- Collaborating with Indigenous landowners and initiatives is vital for achieving sustainable energy goals, fostering equitable partnerships, and for a unified energy transition approach.
- There is a common issue across many Ontario communities whereby there is a lack of understanding or alignment between the local governing body and the local electricity distribution company (LDC) despite many LDCs being wholly owned subsidiaries of their local government – greater engagement is needed for parties to come together and understand needs and align priorities
- Most communities are dealing with multiple, complex and urgent issues and are not able to dedicate the resources required to understand the evolution of the electricity system and how it will impact their objectives in the future.
- There is a risk of electricity system expansion increasing the rural-urban divide due to the fact that many renewable sources exist or are more easily accessible in rural communities, and that transmission infrastructure will need to be further built out in rural areas and on unceded Indigenous lands.
- There is lack of available, reliable and resilient electricity service to some rural, remote and Indigenous communities that will exacerbate these inequities and also increase the rural-urban divide if not addressed.
- There are local projects underway that help support electrification, but knowledge gained through those project implementations are not being captured and shared for the benefit of similar projects in other regions.

IESO Role:

No regret actions for the IESO that are aligned with the Pathways to Decarbonization study include:

- There is a need for better understanding and dialogue between LDCs and local governments. The IESO should play a role in enabling this outcome by being available upon request to come to a municipality and present on provincial topics as part of LDC-led engagement initiatives.
- The IESO should continuously provide supporting materials and assist LDCs in communicating what is transpiring with the electricity grid, the challenges of expansion and what will be needed of them (specific to their region) for Ontario to be able to meet its energy and climate objectives. The IESO should request that communities respond to a call for information on what their communities would and would not support, allowing for flexibility in their responses.

- The IESO should establish a dedicated resource for rural and Indigenous communities on how to capitalize on the opportunities for local economic development and prosperity as a result of grid expansion.
- The IESO should become a champion and knowledge hub for local projects that support electrification so that they can more easily be replicated in other communities.

An additional action that the IESO should consider is:

- The IESO should collaborate with the Ministry of Energy to review municipal official plans (OPs) from an energy needs perspective, ensuring alignment between Ontario's energy plan and approved community growth plans. Municipal OPs are integral to the Municipal Comprehensive Reviews, which derive from growth allocations provided by upper-tier authorities or the Province. These reviews guide phased build-outs necessary to achieve OP development objectives, in coordination with Municipal Infrastructure Planning for water, wastewater, and roads, all incorporated into the Municipal Long-Term Capital Budget. It is imperative that LDCs are aware and engaged with this comprehensive process to support sustainable community growth and energy demands.

Role of Others:

- LDCs and the governing bodies of the communities that they serve need to convene regularly with the specific objective of better understanding the functions and activities of one another as plans are implemented and continually updated.
- The Ministry of Municipal Affairs and Housing and the Ministry of Energy need to coordinate, share and understand the energy implications of Municipal Official Plans within the current timeframe and approval process. Additionally, while it is out of jurisdiction for the Provincial government to review the plans of Indigenous communities, doing so should be encouraged to further inform the Provincial Energy Plan.
- The Ministry of Municipal Affairs needs to expand the framework of Master Service Plans to include services delivered to communities by external service providers (i.e. energy & communications).
- Local governments, in collaboration with their LDCs, need to lead engagement with local businesses and constituents to build awareness of the challenges and opportunities of electricity system expansion and to gather important information for the LDC's on what solutions the community would and would not support. The IESO should strive to reconcile local inputs with overarching system needs.
- The Ontario Energy Board has a role to play in understanding communities, what their plans are with respect to energy end-use and where energy usage is going to increase as a result.
- With support from the Provincial government, communities implementing local projects that support electrification (e.g. EV charging infrastructure, building energy retrofit, thermal grids, etc.) need to document methodology, best practices and lessons learned throughout the process for efficient replicability.

- Communities need assistance from the Provincial government in attracting private sector capital investments and de-risking new financial tools or methodologies for the scale-up of local projects.
- With multiple, complex and urgent issues to address, communities need support to build local capacity to implement local energy projects and meaningfully engage with energy planning and forecasting mechanisms.
- Entities such as the Ministry of Energy, IESO, local LDCs and local communities need to be leveraging various organizations, such as the Association of Municipalities of Ontario (AMO), Rural Ontario Municipal Association (ROMA), etc. who can play an important role bridging information sharing.

Strategic Considerations and Committee Advice:

Coordination and Communication: Encourage and support cross-sectoral – municipal, Indigenous, industry, energy service provider and provincial – understanding, collaboration and coordination to foster a culture of innovation and learning, and to accelerate the implementation and replicability of projects.

Planning Alignment: Integrate CEEPs into the provincial energy planning process and expand Master Servicing Plans to include services delivered to communities by external service providers. Doing so will help ensure that the energy objectives and priorities of communities align with the broader provincial goals and enable a more cohesive and coordinated approach to electricity resource planning, capital forecasting and development.

Awareness and Education: Strengthen educational and knowledge-sharing campaigns and activities framed around the competing priorities of reliability, affordability and environment. Raise awareness of what is transpiring with the electricity grid, the challenges of expansion, and what will be needed of communities, and build mechanisms and capacity for community engagement. Of critical importance is an understanding by local political leadership on the constraints of the electricity system that may impact the ability to achieve local goals and projects.

Knowledge Sharing & Engagement: Establish a knowledge-sharing and engagement platform where communities can share experiences, best practices, and lessons learned from local energy projects and provide input into Provincial energy planning such as the IESO's Annual Planning Outlook process. This platform can serve as a valuable resource for communities looking to implement similar initiatives and for energy planning purposes.