

Date: December 5, 2022

From: James Scongack
Chair, IESO Stakeholder Advisory Committee

To: Joe Oliver, Chair, IESO Board
Lesley Gallinger, President and CEO, IESO

Re: 2022 Challenge Statements, Stakeholder Advisory Committee

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Ontario's electricity system is at a critical juncture. Over the last decade, the Province has benefited from a clean electricity system, aided by the phase-out of coal and an abundance of generation that has ensured strong system reliability. On the other hand, we now have a system that is challenged with the implications of this, including cost-pressures and a very dynamic view of the long term impacted by a step change in demand, various large scale supply considerations, diverse views and perspectives on decarbonization, and an external environment due to the Pandemic and other geopolitical factors that has been fluid.

Ontario, like many jurisdictions around the world, is trying to determine the most effective way to address these factors in a responsible way balancing the need for reliability and wide ranging economic considerations with a move towards greater decarbonization both within and beyond the electricity sector.

As you know, the IESO Stakeholder Advisory Committee (SAC) is cross-functional in its representation of these often competing factors. 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. Please find enclosed an overview of the SAC membership and the background from each SAC member (**Appendix A**).

In January of this year, given the factors noted, the SAC undertook an initiative to align on a number of key areas to provide some unified input on behalf of the sector. 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 the Committee to come together as a sector to provide clearer input and advice to the IESO.

We undertook through our meetings in 2022 to focus on four areas:

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 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. All of these outputs were agreed upon by the working group, the SAC broadly and discussed openly in our various public meetings throughout 2022. Enclosed is a summary from each of these four areas (**Appendix B**).

While these summaries are intentionally succinct and clear, there are four broad themes in terms of approach that we believe are important for the IESO to strongly consider in aggregate.

1. 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 and optimization can provide timely, cost effective and proven solutions;
2. Ontario faces unprecedented change in the decade ahead and the pace of execution within the sector and associated enabling measures needs to have a bias towards action within the short term (2023) before options for the IESO and decision-makers narrow;
3. In the dynamic environment Ontario's electricity system is operating in, future options are very high value. The IESO needs to create mechanisms that are agile, robust and timely to enable option development to de-risk projects, progress long term projects without final decisions being required with a recognition that not all options will ultimately be used, but this is the most cost effective approach in the current environment; and

4. The focus on the energy transition globally is resulting in an unprecedented investment in innovation integrating existing and new technologies. Ontario needs to be agile to incorporate these into our short and long term planning and this can be integrated with option development.

We request the opportunity to present these outputs from our work to the IESO Board and other stakeholders in early 2023 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 steward 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 move into 2023, we look forward to working with IESO Management and the Board 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



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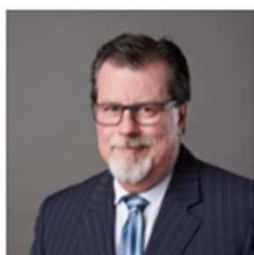
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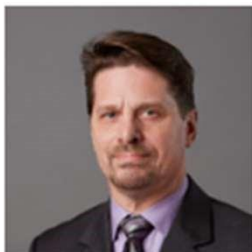
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Appendix B: Challenge Statements - SAC Working Groups

Theme 1: Urgency and Timing of New Resources
Date Presented: March 9, 2022
SAC Members: David Butters, Brandy Giannetta (Lead), Ed Gilbert, Jim Hogan, Bruno Jesus, Paul Norris

Challenge Statement:

- This is a critical time for Ontario's electricity sector. Ontario clearly requires significant amounts of supply (capacity and energy) – capacity needs exist now and will increase once the Pickering nuclear generation station retires before 2026, and energy needs emerge in the mid 2020s and increase through the late 2020s.
- This challenge requires a timely and appropriate solution for new resources to be in a position to help fill the gap and solve for the shortfall.

Supportive Facts and Rationale:

- Since IESO's 2016 Ontario Planning Outlook to IESO's 2021 Annual Planning Outlook, each subsequent IESO forecast results in larger supply shortfalls and therefore increasing supply needs.
 - Capacity needs emerge in 2025 and grow over the forecast horizon. Nuclear refurbishments and retirements, as well as expiring contracts, create medium-term capacity shortfalls.
 - Energy needs emerge in the mid-2020s, and grow sharply later in the decade reflecting post-pandemic and economic growth.
 - The drive to decarbonize using electricity adds further pressure.
- Ministerial Directive has signalled a path forward via a Long-term RFP competitive process to begin to procure new resources required to meet forecasted demand.
- Additionally, the Minister has requested the IESO to explore options and impacts of moving to a non-emitting grid all the while maintaining affordability and system reliability, as well as enabling new technologies.
- Reliability remains the paramount objective of the IESO
- These objectives create challenges in that they are not all perfectly aligned. This, coupled with the timing of need for new resources, makes the procurement design challenging.
- Investor confidence is not strong within Ontario's electricity sector and attracting new investment (or continued investment) in this market is at risk.

IESO Role:

- Providing timely and accurate information and data to support identification and timing of need
- Consulting and developing timely and feasible competitive procurement mechanisms that can address multiple objectives of reliability, affordability and emission reduction policies.
- Maintaining reliability of the system and complying with Ministerial Directives
- 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 sufficient 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.
 - Investors can continue to communicate what constitutes a strong market signal and what is required to gain confidence in this market.
 - Suppliers need to communicate feasible options in hope the IESO is able to adopt processes and design mechanisms that will attract investment
- The Government of Ontario should ensure policy clarity (e.g. Long Term Planning), in particular environmental and socioeconomic goals, to help inform the direction of the sector and establish investor confidence, including by providing timely Ministerial Direction when/where required
- Demand side; communities; other stakeholders need to engage in the discussion to ensure alignment with their priorities around electricity needs, planning and operations to take consumer flexibility into account

Strategic Considerations and Committee Advice:

- The IESO has already begun to move toward solving this problem and has also been Directed by the Minister in this way – timing is getting very tight.
- Planning mechanisms should recognize that some technologies have longer lead times, and to maximize resource optionality to meet those needs, the identification of needs should occur earlier
- IESO should consider greater understanding of demand side trends to ensure it can identify needs in a timely manner

- IESO has technical expertise in the operation of the system and should have ability to take timely actions to meet urgent system needs.
- The IESO needs to be able to recognize and factor in stakeholder feedback to ensure a successful procurement process that meets the multiple objectives of reliability/affordability/emission reduction policies.
- 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 other expectations and risks are appropriately considered
- Incorporate the role of DERs to help meet the growing and urgent needs
- 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
- The impacts of international resource supply chains and resource security are areas of growing importance and should be considered in meeting future system needs

Theme 2: Maximize Existing Resources

Date Presented: July 6, 2022

SAC Members: Malini Giridhar (Lead), Paul Grod, Frank Kallonen, Paul Norris, Mark Passi

Challenge Statement:

- Ontario faces a significant near term, growing and enduring supply gap 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, 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
- 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
- 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 process for reacquiring smaller existing, embedded non-market participant facilities, highlighting a revenue adequacy issue for small resources

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 that aim to meet environmental, policy and societal goals
- Ontario grid provides reliable, affordable and clean power

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 clean power such that the IESO understands what are customer “tipping points”

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.
- 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.

Theme 3: Resource Adequacy
Date Presented: September 28, 2022
SAC Members: David Butters (lead) Brandy Giannetta, Malini Giridhar, Tonja Leach

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:

- Ontario will soon be faced with significant reliability challenges. There is much to do in short order to maintain adequate supply over the next decade.
 - Pickering retirement and customer demand growth is driving the near-term needs.
 - Significant MWs of contracted resources are nearing the end of their contract terms toward the end of this decade.
 - Population growth and increasing electrification of the economy is driving significant demand growth over the next two decades
 - A robust 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 emissions reductions
 - ESG requirements amongst investors, manufacturers and property owners are also putting pressure on the grid to achieve net zero and other sustainability outcomes
 - The IESO is currently undertaking the Pathways to Decarbonization study in response to the Minister of Energy's request;
 - The federal government is developing a Clean Electricity Standard and regulations to enable a net zero by 2035 pan-Canadian electricity grid
 - Considerable debate has been taking place at a municipal level about the future of electricity supply
 - The Ontario Government has not yet provided its policy directions and views
- Equally important:

- 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 no-emitting technologies (e.g. hydrogen, CCUS) are not readily available or commercially viable.
- 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, 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 NWAs to participate in the IESO-Administered Market.
- The IESO should provide clear and plain language information to municipalities and Indigenous communities on electricity planning.

¹ See, for example, RBC’s recent paper: *The Price of Power: How to cut Canada’s Net Zero electricity bill* <https://thoughtleadership.rbc.com/the-price-of-power-how-to-cut-canadas-net-zero-electricity-bill/>

Role of Others:

- The IESO should work with the Ministry of Economic Development, Job Creation and Growth, the Ministry of Northern Development, the Ministry of Natural Resources and Forestry, and the Ministry of Mines, to help 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.
- Municipalities, Indigenous communities, business groups and other stakeholders should be consulted to help inform decision-making.

Strategic Considerations and Committee Advice:

- The APO and AAR should be collapsed into one annual update document.
- Following the release of the Pathways to Decarbonization, the IESO should work with the Ministry of Energy to transform the APO/AAR into an Integrated Resources Plan. This Plan will provide Ontario's plan to meet its own and federal net zero by 2035 requirements.
- 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;
 - Transportation electrification can drive significant abatement with modest impact on incremental demand for electric energy (if done right);
 - Post 2030 decarbonization will call for a massive deployment of capital-intensive infrastructure – soon.

Theme 4: Modernization and Efficiency
Date Presented: September 28, 2022
SAC Members: Nicolas Bosse, Bala Gnanam, Amanda Klein (lead), Annette Verschuren, Agnieszka Wloch

Challenge Statement:

- Today, electricity is already an essential service that customers - homes, businesses, hospitals, and other institutions – rely on to power their daily needs.
- Customer expectations, technological advancements, and public/energy policy are converging around three key drivers of change in the ways electricity is produced, delivered, and used:
 - **Decarbonization:** demand for electricity will increase (potentially exponentially), and more electricity must be produced to meet that demand;
 - **Grid Modernization:** more technology must be incorporated into the electricity system to improve the efficiency and operability of the grid and respond to changing customer needs and expectations; and
 - **Demand-Side Tools:** the same factors which drive decarbonization and modernization mean that demand side tools, including distributed energy resources (“DER”), will increasingly become part of the electricity system.
- The electricity system/grid must adapt to address these drivers of change. However, the pace of each of these drivers of change remains dynamic, and above all, highly uncertain.
- The familiar imperatives of serving customers and providing safe, reliable, and clean electricity at a fair price will persist.
- **The challenge then, is this:** the electricity system/grid must modernize and adapt to address potentially significant and uncertain drivers of change in a way that continues 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 2016 Ontario Planning Outlook.²

² IESO, *Ontario Planning Outlook*, September 2016 – “Scenario C”. IESO, *Annual Planning Outlook*, December 2021.

- 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.³ Sector decoupling between technology, such as transportation and buildings, and prominent fuel type, namely petroleum and natural gas, can unfold independently, contributing to the uncertainty that faces system planners and operators.
- *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 supply⁴ 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

- There is emerging public consensus on the need to decarbonize the economy.⁵ Customers are increasingly turning to technologies, such as EVs and demand-side resources such as storage and solar panels, to reduce their environmental footprint.⁶ However, customers also require visibility and assistance in accessing and deploying these opportunities.
- While there remain short-to-medium-term supply chain, cost and policy challenges for some demand-side technologies that make uncertain the precise timing and extent of their proliferation,⁷ technological advancement, decarbonization imperatives will tend to make DERs more prevalent as a demand-side tool to manage customer energy costs, reliability, power quality and environmental footprint.
- While it is likely that safety, reliability (including grid resiliency), service and price, outcomes customers expect the electricity system to deliver may evolve during the energy transition and the relative importance of those outcomes may become increasingly heterogeneous among customer classes, customer segments, industries and individually.
- *Working Group Recommendation: sector must undertake "complete picture" analysis and stakeholder/customer engagement on the costs and values of decarbonization activities and alternatives (including pace).* Those engagements should be robust and look beyond the

³ 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).

⁴ The IESO is currently undertaking a Pathways to Decarbonization Study, which will explore the potential pathways for reaching a reliable, affordable, decarbonized electricity system in Ontario. And The Ontario Government has launched an Electrification and Energy Transition Panel to provide advice on potential demand curves and coordinating long term planning.

⁵ Building on the international consensus arrived at through successive Conferences of the Parties (most recently COP26 in Glasgow), federal, provincial and municipal governments in Canada are investigating and adopting climate change mitigation targets and actions consistent with deep levels of decarbonization of the economy, including some striving to achieve Net Zero by as early as 2040.

⁶ Electric Autonomy Canada reports that electric vehicles (battery electric, plug-in hybrid, hybrid electric and fuel cell vehicles) made up 11.8% of all vehicle registrations in Canada in 2021, up from 7.6% the year prior. See: <https://electricautonomy.ca/2022/02/15/ihs-markit-zev-adoption-canada-2021/>.

⁷ See for example: <https://www.utilitydive.com/news/energy-storage-soars-despite-international-supply-chain-lithium-challenges/625865/>

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. Engagement with municipalities and Indigenous communities to support the transition underway in the electricity sector is critical. Sector efforts on engagement must be coordinated, and not competitive or disconnected.

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: eg. 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.⁸
- 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 system operational processes and plans (e.g., bulk procurement, energy markets, regional planning, local utility planning, etc.) to better incorporate the needs of customers (individually and in aggregate). Some elements of modernization present challenges to conventional market and regulatory incentives, such as funding energy transition-driven investments, and treatment of DER-backed non-wires alternatives.⁹

IESO Role:

- Respond to future uncertainty by developing tools to undertake modernization planning and procurement that include multiple potential options (depending on how the future materializes).
- 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).

⁸ 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.

⁹ 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.

- 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 specific regulatory mechanisms in a targeted fashion to address specific and identified barriers or emerging needs (e.g. improving incentives for NWA/DERs, reconciling timing between investment and when demand materializes, enabling scenario planning by utilities to address an uncertain future, etc.).
- 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 (eg. beyond the meter and upstream) and cost performance during a period of intense change.
- Monitor, review and relevant policies promptly in response to emerging trends: eg. following the Framework for Energy Innovation Working Group output, develop a non-wires alternative framework.

Local Distribution Companies' Role:

- Develop, review and revise grid expansion plans that best anticipate customers' incremental electrification requirements (develop scenario plans), with a base of investments that support the widest range of credible demand scenarios (e.g. safe bet and least regret investments).
- 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 into bulk system opportunities.
- Engage directly and proactively with customers to support their own individual paths through the energy transition, including actions motivated by climate change mitigation and adaptation.