Stakeholder Feedback and IESO Response

2020 Annual Planning Outlook – January 26, 2021 webinar

Following the January 26, 2021 engagement webinar on the 2020 Annual Planning Outlook (APO), the Independent Electricity System Operator (IESO) received feedback from participants on the APO report, module, methodology and supplemental data.

The IESO received feedback from:

- Advanced Energy Management Alliance
- APPrO
- Capital Power
- Electricity Distributors Association
- Energy Storage Canada
- Induspec
- Market Intelligence & Data Analysis Corporation
- Northland Power
- Ontario Energy Association
- Ontario Power Generation
- Power Workers' Union
- TC Energy

This feedback has been posted in the 2020 Annual Planning Outlook section of the Planning and Forecasting Engagement Updates webpage.

Notes on Feedback Summary

The IESO appreciates the feedback received from stakeholders. The IESO has provided a summary below, which outlines specific feedback or questions for which an IESO response was required at this time.

2020 Annual Planning Outlook – Report:

Summary

Stakeholder submissions in general indicated that the APO report and supporting data modules are helpful, and that refinements made to the 2020 APO as compared to the 2019 APO increased the usefulness of the information. Some stakeholder submissions identified which report sections in particular are most helpful to them, and why. Stakeholders also noted information areas they would appreciate reading more about, or where further detail may have been helpful. Finally, stakeholder submissions highlighted considerations for the IESO in future outlooks, including key factors and potential uncertainties.

The sections below summarize the stakeholder feedback received on the APO report, and include the IESO's response to that feedback.

Feedback: Most helpful chapter/sections

As noted above, stakeholder submissions indicated the entirety of the report and supporting information is helpful. Chapters/sections identified as most helpful varied and generally related most closely to the particular stakeholder's type of participation in the market.

The demand forecast section was identified as most helpful by two stakeholders. From the LDC perspective, it was noted as helpful for planning future investments in infrastructure upgrades. The hourly demand forecasts were noted as being particularly helpful for stakeholders that are interested in making better use of low emission surplus electricity.

The capacity adequacy section was referenced in several stakeholder submissions, noted as helping to identify investment opportunities for energy storage resources. Three stakeholder submissions made specific reference to the addition of zonal adequacy information in the 2020 APO, indicating it is helpful in identifying locational opportunities in directing resources and investments. The IESO was encouraged to explore including even more granular information corresponding to zonal needs in future APOs.

The additional detail on transmission security included in the 2020 APO was also noted as helpful by several stakeholders, with further encouragement for even more granular information to be provided in future APOs, if possible.

IESO Response

Thank you for the feedback on sections of the report that were found most useful. Further to the new sections on transmission security and zonal adequacy included this year, the IESO will continue to evolve and develop relevant sections that were noted as helpful in future APOs.

Feedback: Areas stakeholders would like to read more about

Stakeholders highlighted a number of areas they would appreciate further information on in subsequent APOs. The following points detail the suggestions for further information:

1. the ability of front-of-the-meter and behind-the-meter DERs to meet adequacy and energy needs
2. economic evaluations and other factors used that lead to decisions
3. the impacts to supply and demand that will arise from the electrification of the transportation sector
4. integration of the results illustrating the system needs with and without existing resources identified in the capacity adequacy section
5. further analysis of the capability of energy storage to meet system needs
6. exploration of adaptation of existing supply resources to align with Ontario's future system need
7. defining additional value streams for existing assets and future assets
8. consideration for other entities that are interested in acquiring resources for their own energy need, e.g. municipal governments, either on their own or through municipally-owned utilities, are interested in executing net-zero emission targets and renewable generation from commercial & industrial customers are seeking environmental, social and corporate governance credentials for their business
9. greenhouse gas impacts
10. further detail on the options being considered to address upcoming anticipated capacity shortfalls
11. whether any inputs or outputs are impacted by the changes from Market Renewal (e.g. the implementation of Locational Marginal Pricing)
12. increased transparency relating the IESO's assumptions, analysis, data, and methodologies
13. any remaining data and information that is available to be shared publicly

IESO Response

1. To the extent that the distributed energy resources are visible to the IESO, the IESO includes front of the meter and behind the meter DER in its resource adequacy studies. Ontario has a significant and growing number of DERs connected to the system and they provide an opportunity to address future energy and capacity needs, reduce system costs, and enhance resilience.
2. The IESO will strive to demonstrate how decisions were made in the APO to provide better understanding of the factors leading to those decisions.
3. Electric vehicle electricity demand is an integral component of the overall APO long-term demand forecast and dependent adequacy assessments. Electric vehicle projections, by

nature, carry higher levels of uncertainty than other end-uses. Since the finalization of the demand forecast included in the 2020 APO, greater levels of interest in electrification, including electric vehicles, have emerged and such updated information will be considered in the 2021 APO and future APOs, which will likely result in higher levels of electric vehicle electricity demand.

4. Section 6.2 of the APO presents a qualitative discussion of ways in which Ontario can meet its net electricity needs. Along with the option of continued availability of existing Ontario resources once their contracts expire, other options are also explored. Expansion of transmission, investment in increased zonal transfer capability, firm and non-firm imports, distributed energy resources, storage and energy-efficiency can also provide benefits. The IESO will consider providing a clear statement of needs in future APOs.
5. The IESO will continue to explore how storage can be used to meet system needs. In the 2020 APO, under ATR and Energy Storage Phase 1, a total of 34.8 MW are currently under contract with the IESO. Another 11.75 MW are contracted through Phase 2. However, these facilities have limited contribution to meeting reliability needs as they are pilot projects for testing purposes only or provide other services to the grid. Ontario currently has a 175-megawatt pumped hydro storage facility as part of the Sir Adam Beck complex. This facility is reflected in the adequacy and energy assessments under the hydroelectric resource category. The IESO will continue to work on identifying capability of energy storage to meet system needs.
6. The APO recognizes that many different technologies may play a role in meeting Ontario's future electricity needs, but its purpose is not to advocate for particular solutions. The IESO is committed to the use of technology-agnostic, competitive acquisition mechanisms to meet Ontario's future capacity needs. The Resource Adequacy engagement discussion will focus on identifying the tools available to help the IESO achieve resource adequacy.
7. Thank you for your comment. Some of the work the IESO has done to explore these issues can be found on the Innovation and Sector Evolution White Paper Series webpage.
8. The IESO appreciates this feedback and will explore ways to encourage broader participation among this segment of the stakeholder community. Power system planning reliability standards apply to the entire system, without allowance for specific consumer preferences to be considered. While this is an area of interest for IESO, the APO is intended to be an outlook of system requirements based on the most likely set of future system conditions and, therefore, it may not be appropriate to explore this or other fundamental shifts in system structure in the APO. Separate efforts are underway to study impacts to the system, including achieving net-zero emissions goals.
9. The IESO annually publishes a forecast of electricity sector GHG emissions in the APO. In the 2020 APO, this can be found in section 7.4; the underlying data are in the data tables.
10. The Annual Acquisition Report (AAR) will, to the extent possible, transparently outline the system needs and the mechanisms by how the needs will be met. Where non-competitive solutions are needed and known, the AAR will provide that information.

11. The IESO's current economic dispatch model for long-term power system planning dispatches resources from lowest to highest dispatch cost across the entire province's electricity system while respecting transfer constraints across zones. By implementing Locational Market Pricing (LMP), transmission constraints are required to be represented explicitly in energy modelling, which would affect energy dispatch among different generators. Also, as Ontario marginal cost is a key input to calculate cost to customer, implementing LMPs would affect the cost to customer calculations. The IESO is in the process of assessing the impact of implementing LMPs in modelling system inputs and outputs.
12. The IESO will consider ways to provide further information on our assumptions, analysis, data and methodologies in future APOs to the extent they can be shared publicly.
13. The IESO will consider ways to provide other data and information that is available to be shared publicly as the APO continues to evolve.

Feedback: Additional considerations for future outlooks

With respect to key factors, uncertainties and considerations for inclusion in future APOs, stakeholders provided the following recommendations:

1. the impact of carbon pricing
2. high and low forecast cases to reflect different climate policy scenarios and assumptions around demand growth
3. provision of a reference case similar to the approach in the 2019 APO so that stakeholders know which scenario the IESO will use
4. scenario development accounting for potential fuel supply constraints
5. risks to fleet availability arising from changes in the operational profiles of resources being relied upon following nuclear retirements and during nuclear refurbishments
6. risks affecting assumed nuclear return-to-service dates and identify mitigation options should refurbishment schedules extend beyond currently scheduled return-to-service dates
7. clarity on assumptions regarding gas availability with special attention to commodity risk, logistics, and system operability constraints during demand events (including analysis on how the IESO's assessments align or diverge from recommendations set out by NERC)
8. hourly forecasts for imports, exports, each type of generation, and total clean energy surplus to domestic needs
9. the hourly breakdown of the energy conservation efficiency for Figure 1 from the APO in terms of air conditioners, LED parking lighting, etc.
10. the impact of CDM on the demand forecast and the role that LDCs can play to help meet those assumptions
11. further analysis of the assumption that existing generation continues to operate for the entire planning period

12. further analysis of the costs associated with extending the operating lives of these existing assets vs. new builds
13. comparison and discussion on the differences between the current demand forecast and supply outlook with those from the prior year's APO

IESO Response

1. Since the finalization of the demand forecast included in the 2020 APO, greater levels of interest in electrification, including electric vehicles, have emerged and such updated information will be considered in the 2021 APO and future APOs, which will likely result in higher levels of electric vehicle electricity demand. Increases to the federal carbon price beyond 2022 will be factored into the APO once it is known how this change will be implemented in Ontario's carbon pricing framework. Should these details not be available at the time the next APO is published, the IESO will consider treating carbon pricing as a sensitivity.
2. The IESO 2020 APO included two scenarios as a result of the unusual level of uncertainty as a result of the COVID-19 pandemic, representing a shallow recession, rapid recovery 'higher' demand scenario and a deep recession, slow recovery 'lower' demand scenario. Going forward, it is expected the 2021 APO will present a single most credible 'reference' scenario based on the best available information and data at the time.

   Since the finalization of the demand forecast included in the 2020 APO, greater levels of interest in electrification, including electric vehicles, have emerged and such updated information will be considered in the 2021 APO and future APOs, which will likely result in higher levels of electric vehicle electricity demand. It is expected the 2021 APO and future APOs will also consider the potential impacts of climate change on its demand forecast and supply assessments.
3. See response to question 2, above.
4. The APO reliability assessment includes the impact of generator outages, performance, and energy limitations across the fleet. More information can be found in the Resource Adequacy and Energy Assessment Methodology document accompanying the APO.
5. Forecasts illustrates that our natural gas fleet acts as a swing resource during nuclear refurbishment period, as well as providing insurance should refurbishment schedules extend beyond scheduled return to service dates. Nuclear refurbishment project risks are reflected in the planning reserve. More information can be found in section 4.13 of the Resource Adequacy and Energy Assessment Methodology document, as well as section 2.2 of the Supply, Adequacy and Energy Outlook Module.
6. See response to question 5, above.
7. For thermal resources, availability and performance is measured with Equivalent Forced Outage Rate on Demand (EFORd). For more information, please refer to section 3.3 of the Resource Adequacy and Energy Assessment Methodology document.
8. The IESO will consider providing additional granularity behind the outlook in future APOs.

9. Hourly CDM data, including by end-use, is not available.
10. The IESO continues to meet regularly with the EDA's Conservation Council to discuss ways that LDCs could help promote and support the objectives of the new 2021-2024 CDM Framework. The IESO recognizes the unique relationship that LDCs have with their customers and wants to leverage it to ensure the success of the framework. As part of the discussions, the IESO has reminded LDCs that the IESO has been directed to conduct competitive procurements to support a new local initiatives program stream that targets regions with identified local needs, as per the regional planning process. The IESO is currently working with LDCs that operate within the targeted regions identified in the first half of the framework to discuss the role they can play in working with the IESO on this initiative.

    The IESO participates in the regional planning process with the transmitters and LDCs of all 21 planning regions. As part of this 2021 APO, the IESO will be looking to reconcile regional and provincial demand forecasts, and gain alignment where possible. This can potentially identify where and when LDCs and CDM can help meet the needs of the province.
11. Questions such as these will be explored during the IESO's ongoing Resource Adequacy engagement. As new information acquisition targets and strategies becomes available, it will be incorporated into forecasts presented in future editions of the APO.
12. Further to the response to question 11, the IESO will consider conducting this analysis when adequate data and resources needed to do so are available.
13. The IESO will consider the inclusion of a comparison and discussion of the current year's APO and the previous year's.

2020 Annual Planning Outlook - Modules, Methodology, and Supplemental Data:

Feedback: Reasonableness of assumptions, inputs and methodology

Most stakeholder submissions indicated that the assumptions, inputs, and methodology used by the IESO are reasonable. However, several stakeholder submissions included further commentary on the reasonableness, and suggestions to improve.

Stakeholders provided feedback on the scenarios used in the 2020 APO, with one stakeholder suggesting it would be more helpful to establish a reference case and then model sensitivities to that, rather than limiting the scenarios to fast and slow-recovery possibilities. With respect to alternate scenarios to model, one stakeholder suggested more scenarios should be considered in recognition of growing electrification and electric vehicle loads and changing intra-day and seasonal load shapes. Further stakeholder feedback pointed at carbon pricing and the desire for the IESO to incorporate a most likely scenario for planning purposes. It was further suggested the IESO forecast an additional scenario with respect to addressing dramatically higher emissions than in scenarios 1 and 2.

One stakeholder suggested that scenario 2 should have had a lower growth rate for loads other than EV deployment, mass transit electrification and greenhouses compared to scenario 1, and that the

scenario 2 growth rate should have been set equal to zero (flat demand) for all loads except EV deployment, mass transit electrification and greenhouses.

One stakeholder recommended the IESO provide details on how the IESO calculates hydro peak contribution to help understand the changes and causes for these changes in grid-connected demand shape, especially the shift of the peak hours and summer-peak season.

Feedback received from one stakeholder included a number of clarifying points and questions:

1. Figure 9 and 10
    a. How often does the IESO refresh the methodology or update values it uses to assess effective capacity?
    b. Does the IESO use one single value for effective capacity resources based on fuel, or does it apply different values based on location?
2. Figure 17 – Reserve Margin
    a. Can the IESO confirm what variables go into defining the reserve margin? Is Load Forecast Uncertainty (LFU) a factor in reserve margin?
3. Figure 20 & 21
    a. What changes for the HQ Imports to go from 2.2 TWh in 2022 and 2023 to 0 TWh for the remainder of the planning period?
4. Figure 24 & 25
    a. It appears to show that the IESO is forecasting that they will be a net importer (15.6 TWh of imports vs. 12 TWh of exports) as early as 2023 in Scenario 1. Can the IESO please confirm what is driving this assumption?
    b. As for Scenario 2, it appears as though Ontario remains a net exporter for the duration of the planning period. More specifically can the IESO break down the assumptions it is making for the import/export on the Michigan, New York and Quebec interfaces? Given Ontario's Output-Based Pricing System for emissions, do the IESO's assumptions incorporate the marginal emissions rates from external jurisdictions?
5. Figure 33
    a. If the IESO is forecasting anywhere between 1,204-1,917 MW short of capacity in 2025 (provided existing off-contract resources can be retained), can the IESO indicate what other options it is considering to ensure that it can satisfy this requirement?
    b. Considering the Resource Adequacy procurement solutions will not be designed to procure for new installations, what options are available to the IESO to procure for this capacity? Specifically, can the IESO identify what fuel/resource types (wind, solar, demand response, imports, storage, etc.) it is banking on to be available to meet this need?

6. The format of how some of the information is presented has led to confusion

    a. the report indicates there is a capacity need for FETT in 2026 when Pickering shuts down. Section 6.2.2.1 indicates the interface capability can be increased by up to 2,000 MW through a Hydro One upgrade. Figure 35 on page 60 appears to indicate this upgrade along with reacquired receiving subsystem supply (Lennox?) will satisfy the need until 2036. Yet section 4.1.1 FETT indicates a need for 1,600 MW of capacity in 2026 with reacquired resources (Lennox?). The reader would benefit from a single concise statement of the need as opposed to two potentially conflicting statements.

IESO Response

The IESO 2020 APO included two scenarios as a result of the unusual level of uncertainty as a result of the COVID-19 pandemic, representing a shallow recession, rapid recovery 'higher' demand scenario and a deep recession, slow recovery 'lower' demand scenario. Going forward, it is expected the IESO 2021 APO will present only a single most credible 'reference' scenario based on the best available information and data at the time.

The IESO will consider providing additional insight as to how hydro peak capacity is determined in future planning outlooks.

1. Figure 9 and 10

    a. IESO updates effective capacity values on an annual basis.

    b. The effective capacity depends on the fuel type. For thermal resources, the effective capacity is calculated separately for each resource based on their historical performance, outage information, and seasonally adjusted capacity as submitted by market participants. For renewable resources, the effective capacity is calculated based on the performance of that resource at its location.

2. Figure 17 – Reserve Margin

    a. Reserve margin is an output of IESO's capacity adequacy assessments and load forecast uncertainty is an input; for more information please refer to chapter 4 of the Resource Adequacy and Energy Assessment Methodology document.

3. Figure 20 & 21

    a. The Ontario-Quebec Electricity Trade Agreement (ETA) ends in 2023.

4. Figure 24 & 25

    a. The refurbishment of various nuclear units decreases the nuclear production in 2023. As a result, electricity market imports increase and exports decrease.

    b. The IESO simulates load, generation, transmission for the whole Eastern Interconnection. The imports and exports transactions between Ontario and neighbouring jurisdictions are based on system constraints and market fundamentals. The information for neighbouring jurisdictions is based on publicly available information.

For neighbouring jurisdictions, the Cap and Trade program is assumed for selected resources in Nova Scotia, the federal backstop is assumed for selected resources in New Brunswick, and the Regional Greenhouse Gas Initiative (RGGI) is assumed for selected resources in United States.

5. Figure 33

    a. In anticipation of future capacity shortfalls, the IESO will work with stakeholders through its Resource Adequacy engagement to enable a framework of competitive mechanisms to meet Ontario's resource adequacy needs in the short-, medium- and long-term. For the latest updates, please refer to our Resource Adequacy Engagement webpage

    b. The APO recognizes that many different technologies may play a role in meeting Ontario's future electricity needs, but its purpose is not to advocate for particular solutions. The IESO is committed to the use of technology-agnostic, competitive acquisition mechanisms to meet Ontario's future capacity needs. The ongoing Resource Adequacy engagement discussion will focus on identifying the tools available to help the IESO achieve resource adequacy.

6. Confusion of information

    a. The intent of sections 4 and 6 are different. Chapter 4 explores system needs arising from the requirement to meet transmission planning standards while Chapter 6 explores means to meeting future needs. The FETT upgrade is considered as the preferred option to meeting the FETT transfer capability need. Thus, in Chapter 4 the system need is shown to be in 2026, and in Chapter 6 the FETT upgrade provides a means to resolving the near-term need, pushing the need date from 2026 to 2036.

Feedback: Information stakeholders would like to see more of

For consideration in future APOs and the supporting information provided, stakeholder submissions indicated more information on the following would be helpful:

1. more data and assumptions on electrification, specifically looking into EVs and the electrification of the transportation sector and how this will impact the electricity system
2. information regarding new or extension of contracts
3. the dispatch model along with assumptions and inputs into the model so that stakeholders can understand how the IESO is reaching its conclusions
4. the effective winter and summer capacity for each resource type (natural gas combined cycle, solar, wind etc.) for each Ontario zone
5. details on how the IESO defines the period that is being solved for by effective capacity
6. more information, and transparency, to facilitate the decision making process for stakeholders (prioritization, resources, investment)
7. solutions the IESO is considering in meeting its supply gap, even if low probability

8. data on Ontario's emissions profile
9. inclusion of total system cost in forecasting and planning decisions

IESO Response

1. Electric vehicle electricity demand is an integral component of the overall APO long-term demand forecast and dependent adequacy assessments. Electric vehicle projections, by nature, carry higher levels of uncertainty than other end-uses. Since the finalization of the demand forecast included in the IESO 2020 APO, greater levels of interest in electrification, including electric vehicles, have emerged and such updated information will be considered in the IESO 2021 APO and future APOs, which will likely result in higher levels of electric vehicle electricity demand.
2. The IESO is committed to the use of competitive acquisition mechanisms to meet Ontario's future capacity needs. In anticipation of future capacity shortfalls, the IESO will work with stakeholders through its Resource Adequacy engagement to enable a framework of competitive mechanisms to meet Ontario's resource adequacy needs in the short, medium and long term. Information on new or extension of contracts will be shared publicly when available.
3. For information on the inputs and assumptions behind the dispatch model, please refer to the Resource Adequacy and Energy Assessment Methodology document. Other inputs, including fuel costs, can be found as part of the supplemental data.
4. The effective capacity depends on the fuel type. For thermal resources, the effective capacity is calculated separately for each resource based on their historical performance, outage information and seasonally adjusted capacity as submitted by market participants. For renewable resources, the effective capacity is calculated based on the performance of that resource at its location. Information on the methodology can be found in section 4 of the Resource Adequacy and Energy Assessment Methodology document, and global capacity contribution factors can be found in section 1 of the Supply, Adequacy and Energy Outlook Module.
5. The IESO uses a five-year rolling average to derive each facility's EFORd which is one of the inputs into calculating the effective capacity of thermal units. For more information, please refer to section 3.3 of the Resource Adequacy and Energy Assessment Methodology document.
6. The IESO will continue to evolve and consider ways to provide more information to facilitate informed decision making for stakeholders.
7. The APO is intended to provide an outlook of system needs and is not intended to be developed as a firm plan to recommend solutions to meet the needs. The APO identifies needs that can inform plans and actions for solutions. The Annual Acquisition Report will identify the mechanisms by how the needs identified in the APO will be met.
8. The IESO annually publishes a forecast of electricity sector GHG emissions in the APO. In the 2020 APO, this can be found in section 7.4; the underlying data are in the data tables.

9. The IESO's commitment to enhanced use of market-based acquisition mechanisms to meet system requirements will mean less certainty in forecasting future costs because the competitive market will have a greater role in determining what those costs will be. The IESO is considering ways to address this uncertainty for possible inclusion in future APOs or as products that accompany future APOs.

General Comments/Feedback:

Feedback

Stakeholder submissions included a number of general points for the IESO's consideration.

One stakeholder commented on the need to consider the effect of supply and resource adequacy in neighbouring markets, particularly where adequacy may affect the IESO's assumptions regarding non-firm imports. With respect to outage management practices, it was recommended the IESO consider whether historical data present suitable analogous operating conditions to effectively predict whether outage management practices are a sufficient tool for managing tighter reserve margins, particularly if future supply/demand conditions are expected to place greater demands on assets.

One stakeholder suggested better alignment on assumptions and methodologies is required between the Reliability Outlook and the APO, and that it would be beneficial if the IESO would provide a schedule of when the alignment may occur. Further, it was suggested both outlooks clearly state the amount of non-firm imports used in the forecast and when to apply this amount for outage and procurement planning.

Further information was requested on the APO target capacities and how they feed into the Annual Acquisition Report and whether the amounts in each report will properly align.

It was also requested the IESO to provide historical and forecast Ontario electricity system costs, including the publishing of non-commodity cost information as was previously provided in the Long Term Energy Plan.

IESO Response

The methodology for how the IESO determines the amount of non-firm imports to be included in resource adequacy assessment can be found under the Reliability Standards Review stakeholder engagement page.

The IESO will continue to work towards better aligning assumptions and methodologies across the Reliability Outlook and Annual Planning Outlook, while recognizing that each report serves a different purpose which may call for some difference in assumptions and approach.

The IESO will continue to communicate reliability needs, and seek ways to translate these into procurement targets for the Annual Acquisition Report. The target capacities will be continually reassessed based on updated system information. The capacity auction will be the mechanism to acquire target capacities to meet short-term needs and to balance longer term emerging needs. The interaction between the annual capacity auction and other mid/long-term mechanisms will be discussed within the Resource Adequacy engagement.

Similar to above, the IESO's commitment to enhanced use of market-based acquisition mechanisms to meet system requirements will mean less certainty in forecasting future costs because the competitive market will have a greater role in determining what those costs will be. The IESO is considering ways to address this uncertainty for possible inclusion in future APOs or as products that accompany future APOs.

Please note that the information and responses provided by the IESO herein are for information and discussion purposes only and are not binding on the IESO. This document does not constitute, nor should it be construed to constitute, legal advice or a guarantee, representation or warranty on behalf of the IESO. In the event that there is any conflict or inconsistency between this document and the Market Rules, Market Manuals or any IESO contract, including any amendments thereto, the terms in the Market Rules, Market Manuals or contract, as applicable, govern.