



Leonard Kula
Vice President, Planning, Acquisition and Operations, and Chief Operating Officer
Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, ON M5H 1T1

June 17, 2021

Dear Leonard,

This submission responds to the Independent Electricity System Operator (IESO) May 28, 2021 presentation, *Resource Adequacy Engagement*¹, and more generally on maintaining renewable generation and energy storage facilities post expiry of contracts.

Power Advisory has coordinated this submission on behalf of a consortium of renewable generators, energy storage providers, and the Canadian Renewable Energy Association (the "Consortium"²).

The Consortium continues to support the Resource Adequacy Framework (the "Framework"), and looks forward to working with IESO, market participants (MPs), and other stakeholders towards defining the details within the Framework through open and transparent engagements.

Specific Comments on the May 28, 2021 Presentation

The Consortium commends IESO on the Resource Adequacy Information Guide (the "Guide"). The Guide is very helpful in delineating components within the Framework itself and implementation of the Framework through the Annual Acquisition Reports (AARs) and use of specific procurement mechanisms (e.g., Capacity Auctions (CAs), Request for Proposals (RFPs), etc.), including procurement mechanism-specific documents (e.g., Market Rules regarding CAs, RFPs, contracts, etc.).

Listed below are comments regarding points made in the presentation relating to the Guide.

- Commitment Details – for Mid-Term procurements, IESO should be flexible by allowing for commitments greater than three or four years, if warranted (e.g., cost effective, etc.)

¹ See <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Resource-Adequacy-Engagement>

² The members of the Consortium are: Canadian Renewable Energy Association; Axium Infrastructure; BluEarth Renewables; Boralex; Capstone Infrastructure; Cordelio Power; EDF Renewables; EDP Renewables; Enbridge; ENGIE; Evolgen (by Brookfield Renewable); H2O Power; Kruger Energy; Liberty Power; Longyuan; NextEra Energy Canada; Pattern Energy; Suncor; and wpd Canada.

- Products and Services – for Mid-Term and Long-Term procurements, IESO should be more flexible in procuring multiple unbundled or bundled electricity products (e.g., energy, capacity, ancillary services, etc.), if warranted (e.g., cost effective, etc.), and clearly justify any specific supply requirements (e.g., capability to produce continuous energy for multiple hours, etc.)
- Transition/Bridging Mechanisms – the Consortium is pleased that IESO has acknowledged considerations for resources with expiring contracts, which relate to the above point regarding maintaining flexibility to procure multiple electricity products in the Mid-Term (and not just unbundled capacity), if warranted (e.g., cost effective, etc.), also the Consortium suggests that AARs should explicitly address how resources with expiring contracts will be factored into meeting power system needs and their participation within associated procurement mechanisms – especially considering the significant quantities of resources with expiring contracts in the future (see Appendix A)
- Target-Setting Methodology – IESO should ensure that global and local (e.g., zone, sub-zone) supply targets will be clearly and justifiably specified within AARs
- Programs – the Consortium is pleased to see the inclusion of Programs within the Framework, and suggests IESO be explicit in providing distribution-connected generators (e.g., solar, hydroelectric, etc.) as example candidates for future Programs, as these resources are not typically registered MPs within the IESO-Administered Markets (IAM) and cannot directly contract or sell electricity at contract prices or regulated rates to applicable Local Distribution Companies (LDCs), Programs should be explicitly accounted for within AARs (i.e., quantities of supply, contribution to meeting power system needs, etc.)

Listed below are comments regarding other points made in the presentation relating to AARs and Unforced Capacity (UCAP).

- The Consortium commends IESO on plans to release AARs, and looks forward to the first AAR scheduled to be released by the end of June 2021
- Relating to points above regarding unbundled capacity, the Consortium recommends that AARs should not solely focus on Ontario's future capacity needs (e.g., UCAP planned to be procured through identified mechanisms), and should broadly specify all of Ontario's future electricity product needs (e.g., energy, capacity, ancillary services, etc.)
- The Consortium commends IESO on plans to specify projections for capacity to be procured within CAs over future five-year periods within AARs – this will provide the market with needed transparency regarding future capacity needs over the Short-Term and Mid-Term

- The Consortium accepts IESO's plans to procure UCAP within CAs, as CAs will be the main procurement mechanism to meet Short-Term (i.e., seasonal) capacity needs
- Regarding methodologies to calculate UCAP for renewable generators and energy storage, the Consortium recommends that IESO apply the most to-date methodologies that best take into account supply capabilities of these resources along with the evolving resource mix within power systems towards more inverter-based and fast-moving resources with unique fuel management requirements, and not simply take historical average production data during specific periods in time – see Appendix B regarding how U.S. Independent System Operators (ISOs)/Regional Transmission Organizations (RTOs) are moving towards newer methodologies to calculate UCAP, and why many of the practiced methodologies to calculate UCAP are not optimal

Questions Posed by IESO within May 28, 2021 Presentation and Answers

Is there any important Resource Adequacy-related information not already considered in this guide? (p. 20/p. 68)

See above points made regarding the Guide

Will the initial qualified capacity proposals presented result in a UCAP value that is consistent with the qualified capacity design principles for the resource types considered? If not, what changes would you suggest? Please offer alternatives. (p. 65/p. 69)

As specified above and in Appendix B, Effective Load Carrying Capability (ELCC) should be used within the calculation of UCAP for wind and solar (i.e., variable) generators (VGs), hydroelectric generators, and energy storage

Are the sources of data suggested as inputs into each UCAP formula appropriate? If not, please explain why and suggest alternatives. (p. 65/p. 69)

See answer above and Appendix B

Are there any incorrect assumptions the IESO has included that may not be appropriate? (p. 65/p. 69)

Regarding planned use of UCAP within CAs, no. However, as stated above and discussed in the subsequent section of this submission, the Consortium recommends that IESO not solely procure UCAP to meet Mid-Term supply needs, so as to maintain flexibility to procure multiple electricity products, if warranted (e.g., cost effective, etc.)

Is there anything the IESO may not have considered that may contribute to the development of an accurate UCAP methodology? (p. 65/p. 70)

See responses above and Appendix B

Are bi-weekly meetings appropriate? What should the format be? How should attendance be managed? (p. 70)

Bi-weekly meetings are appropriate allowing for stakeholder interaction and discussion

General Comments Regarding Maintaining Renewable Generation and Energy Storage Facilities Post Expiry of Contracts

As stated in previous Consortium submissions regarding the Framework³, more clarity is needed regarding procurement mechanisms that will be afforded to renewable generators and energy storage providers towards maintenance and potential re-powering, uprates, expansion, etc. of their operating facilities presently under contracts with IESO. Decisions to maintain operations – as is, or expanded, or cease operations – need to be made years in advance of expiry of contracts and could require significant capital investment.

Building from points made in the above section regarding maintaining procurement and contracting flexibility towards achieving good outcomes, IESO must be open-minded when designing procurement mechanisms and contracts to meet Mid-Term and Long-Term supply needs to ensure continued operations of low-cost renewable generators are maintained, and not result in needless decommissioning of these facilities post expiry of contracts. If this were to occur, IESO will then need to procure more costly sources of energy supply to meet future power system needs.

The Consortium notes that during previous IESO Resource Adequacy stakeholder engagement meetings, IESO has not confirmed but have posed the possibility of procuring UCAP within the forthcoming RFP to meet Mid-Term supply needs. As stated above, the Consortium recommends that IESO not solely procure UCAP or unbundled capacity within procurement mechanisms to meet Mid-Term and/or Long-Term supply needs, so to enable flexibility to procure multiple electricity products, if warranted (e.g., cost effective, etc.), in the future.

There are many reasons why IESO should enable future flexibility to procure multiple electricity products through contracts resulting from RFPs to meet Mid-Term and Long-Term supply needs. The following are some examples that could arise in the future over the timeframe to which IESO has projected that Ontario's power system will need supply (i.e., mid-2020s to mid-2030s) from existing resources and resources to be built, that could justify reasons for needed procurement/contracting flexibility.

³ See <https://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/Resource-Adequacy-Engagement>

- Maintaining existing energy supply at cost effective prices
- Continue utilizing existing sites and grid connections of existing resources for continued operation, re-powering, uprates, expansion
- Regarding potential re-powering, uprates, expansion, maintaining operations of renewable generators and energy storage will provide opportunities to develop 'hybrid' resources (e.g., VGs coupled with energy storage, etc.) that could meet multiple power system needs
- Monetizing Environmental Attributes (EAs) (e.g., Renewable Energy Certificates (RECs), etc.) from existing resources and/or new resources, especially considering the growing demand for EAs, RECs, etc.
- Exponential growth of 'corporate' buyers (e.g., commercial customers, industrial customers, etc.) of renewable energy, EAs/RECs, etc., that could be enabled in the future within Ontario if Global Adjustment charges decrease (as projected), additional to potential future emergence of other buyers (e.g., LDCs or affiliates of LDCs, retailers, aggregators, co-ops of buyers, etc.)
- Maintaining existing renewable generators and energy storage helps to maintain Ontario's relatively low greenhouse gas (GHG) emissions within Ontario's electricity market, helping to meet GHG emission targets, goals, objectives
- Maintaining existing renewable generators and energy storage is in-line with multiple government policies regarding climate change, technological innovation, economic development, etc., including policies set at multiple levels of government (i.e., federal, provincial, municipal)

Overall, the Consortium believes the above points represent powerful reasons why further stakeholder engagement is required regarding the future of renewable generators and energy storage resources well before their contracts expire with IESO. Therefore, the Consortium recommends these themes and points be specifically addressed within the Resource Adequacy stakeholder engagement throughout 2021 and 2022.

The Consortium requests meetings with IESO to discuss the contents of this submission at a mutually convenient times.



Sincerely,

A handwritten signature in black ink, appearing to read "Jason Chee-Aloy", enclosed within a thin black rectangular border.

Jason Chee-Aloy
Managing Director
Power Advisory

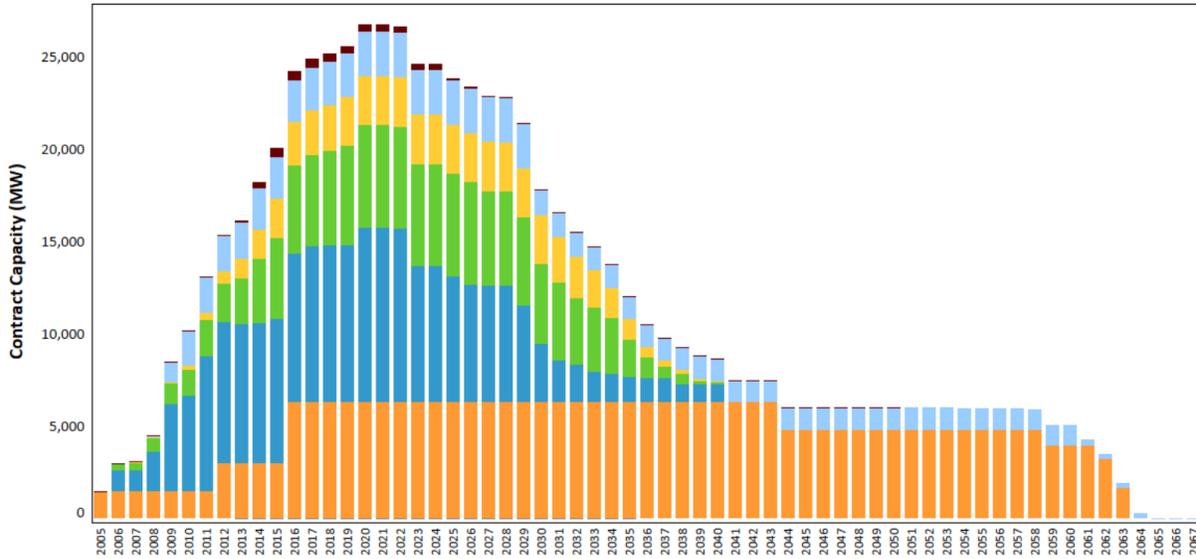
cc:

Chuck Farmer (IESO)
Candice Trickey (IESO)
Barbara Ellard (IESO)
Shawn Cronkwright (IESO)
Brandy Giannetta (Canadian Renewable Energy Association)
Elio Gatto (Axiom Infrastructure)
Roslyn McMann (BluEarth Renewables)
Adam Rosso (Boralex)
Greg Peterson (Capstone Infrastructure)
Paul Rapp (Cordelio Power)
David Thornton (EDF Renewables)
Ken Little (EDP Renewables)
Lenin Vadlamudi (Enbridge)
Carolyn Chesney (ENGIE)
Julien Wu (Evolugen by Brookfield Renewable)
Stephen Somerville (H2O Power)
JJ Davis (Kruger Energy)
Deborah Langelaan (Liberty Power)
Jeff Hammond (Longyuan)
Cheryl Dietrich (NextEra Energy)
Rob Campbell (Pattern Energy)
Chris Scott (Suncor)
Ian MacRae (wpc Canada)

Appendix A – Timing of Expiring IESO Contracts for Generators in Ontario

The graph below shows the timeline of expiring generator contracts held with IESO.⁴

Figure 5: Projected Lifecycle for Contracted Capacity



As seen by the graph above, well over 10,000 MW of contracts are due to expire between the mid-2020s to the mid-2030s. To maintain resource adequacy and power system reliability in Ontario, many of these operating generators will need to continue operations and not retire.

Some contracts with hydroelectric generators expire as early as 2024, some contracts with wind generators expire as early as 2027, and some contracts with energy storage expire as early as 2028.

⁴ See p. 17 in *IESO's A Progress Report on Contracted Electricity Supply Third Quarter 2020*

Appendix B – Methodologies to Calculate UCAP in U.S. ISOs/RTOs

The table below provides information on how the U.S. ISOs/RTOs calculate UCAP for the jurisdictions that administer full Capacity Markets (i.e., ISO-NE, NYISO, PJM), as of 2014.⁵

Table ES-1. Methods for Determining the Capacity Value of Wind and Solar in RTO/ISOs

RTO	Season	Months	Time	Term	Method
ISO-NE	Summer	June–September	1–6 p.m.	5-y rolling	Medium net generation
ISO-NE	Winter	October–May	5–7 p.m.	5-y rolling	Medium net generation
ISO-NE	All	Default based on summer and winter wind speed data and ISO oversight			
NYISO—Existing	Summer	June–August	2–6 p.m.	Previous year	Average capacity factor
NYISO—Existing	Winter	December–February	4–8 p.m.	Previous year	Average capacity factor
NYISO—New Onshore Resources	Summer	10% default capacity credit			
NYISO—New Onshore Resources	Winter	30% default capacity credit			
NYISO—New Offshore Resources	All	38% default capacity credit			
PJM	All	June–August	2–6 p.m.	3-y rolling	Average capacity factor
PJM—New Wind	All	13% default capacity credit			

Of the three U.S. ISOs/RTOs that administer Capacity Markets, PJM has evolved calculation of UCAP for VGs, energy storage, and other resources to account for ELCC.⁶

MISO administers a residual Capacity Market, and accounts for ELCC regarding VGs, etc.⁷

CAISO does not administer any form of a Capacity Market, as Load-Serving Entities (LSEs) have sole responsibility of securing resource adequacy. Therefore, LSEs must meet resource adequacy requirements set by CAISO as approved by the California Public Utilities Commission (CPUC). Based on CAISO

⁵ See *Evolution of Wholesale Electricity Market Design with Increasing Levels of Renewable Generation* (2014), National Renewable Energy Laboratory

⁶ See <https://www.pjm.com/committees-and-groups/issue-tracking/issue-tracking-details.aspx?Issue=83aadda8-b6c1-4630-9483-025b6b93fc28>

⁷ See <https://cdn.misoenergy.org/DRAFT%202021%20Wind%20&%20Solar%20Capacity%20Credit%20Report503411.pdf>



proposals that have been approved by CPUC, ELCC methodologies regarding VGs, etc. have been adopted.⁸

⁸ See <https://www.cpuc.ca.gov/general.aspx?id=6442451972>