

JANUARY 21, 2020

Market Development Advisory Group

Increasing Competition in Ancillary Services through Regulation Service Procurement

Meeting Participation

- Webcast participation (including audio):
 - [Meetview link](#)
 - Use the chat function to ask a question
- Teleconference participation (audio only)
 - Local (+1) 416-764-8640; Toll Free (+1) 888-239-2037
 - Press *1 to alert the operator that you have a question;
 - Press *0 for any other operator assistance
- There will be pauses throughout to ask questions; when asking a question, state your name and who you represent
- The activities of the MDAG are guided by the [IESO Engagement Principles](#)

Purpose

- Provide stakeholders with a background on existing market-based and contracted ancillary services
- Review previous Regulation Service procurement and lessons learned
- Review future opportunities to deliver more transparent and competitive ancillary services procurement
- Outline the IESO's near-term plans for meeting its Regulation Service needs through regular competitive procurements



Background on IESO's Ancillary Services

Ancillary Services

Ancillary services are the set of reliability services of beyond energy and capacity needed to operate the power system reliably

- Includes operating reserve, frequency regulation, black start services, reactive support and voltage control, and reliability-must-run services

The IESO Market Rules Section 9.2, Chapter 7 states:

- “...*IESO* shall procure contracted *ancillary services* through contracts between the *IESO* and *ancillary service providers* that are *registered market participants* who have demonstrated the ability to provide such *contracted ancillary services* from *registered facilities* in accordance with the performance standards and other applicable requirements of section 4 of Chapter 5...”

Applicable NERC & NPCC Standards

- **Regulation**

- NERC – BAL-001 (Real Power Balancing Control Performance), BAL-002 (Disturbance Control Standard – Contingency Reserve for Recovery from a Balancing Contingency Event), BAL-003 (Frequency Response and Frequency Bias Setting), and BAL-005 (Balancing Authority Control); NPCC – Directory 2 (Emergency Operations) and 5 (Reserve)

- **RSVC**

- NERC – VAR-001-5 (Voltage and Reactive Control); NPCC – Directory 1 (Design and Operation of Bulk Power System)

Applicable NERC & NPCC Standards (cont'd)

- **Black Start**

- NERC – EOP-005-3 (System Restoration from Blackstart Resources) and EOP-006-3 (System Restoration Coordination); NPCC – Directory 8 (System Restoration)

- **Operating Reserve**

- NERC – BAL-002 (Disturbance Control Standard – Contingency Reserve for Recovery from a Balancing Contingency Event); NPCC – Directory 5 (Reserve)

View the [NERC standards](#)

View the [NPCC directories](#)

Market-Based Ancillary Services

- Operating Reserve (OR)
 - Stand-by power or demand reduction that the IESO can call on in short notice to deal with an unexpected mismatch between electricity generation and consumption. We procure three types every hour:
 - 10-Minute Spinning – resources synchronized to the grid and required to respond fully within 10 minutes of being called upon
 - 10-Minute Non-Spinning – resources required to respond fully within 10 minutes of being called upon
 - 30-Minute Reserve – resources required to respond fully within 30 minutes of being called upon
 - Agreements with neighbouring interconnected jurisdictions also allow the IESO to participate in the 'shared activation of reserve' program in the event of large contingency needs in Ontario

Contract-Based Ancillary Services

- In addition to Operating Reserve, the IESO currently contracts for four ancillary services to help ensure the reliable operation of the power system:
 - Services of certified black start facilities
 - Frequency regulation (regulation service)
 - Reactive support and voltage control service
 - Reliability must-run services (no current contracts)

Certified Black Start Facilities

- Provide grid restoration support by being able to start their generation facility with no outside source of power
- In the event of a system-wide blackout, black start facilities would be called on during restoration efforts by helping to re-energize other portions of the power system
- Currently have three hydroelectric units and one gas unit contracted as certified black start facilities, strategically located across the province
- Key components of the black start agreements include:
 - Monthly fixed payments
 - Annual and monthly testing requirements
 - Payment reductions if the facility fails to pass tests or fails to perform during a blackout
 - Obligates facility to provide 24/7 operation

Reactive Support and Voltage Control

- All generating facilities that inject energy into the IESO-controlled grid are required to provide reactive support and voltage control (RSVC) service to maintain acceptable reactive power and voltage levels on the grid (Market Rules, Chapter 5, section 4.6)
- RSVC needs can be met by generators as well as specific transmission infrastructure (e.g., static var compensators), and are very location-specific, depending on the transmission configuration, line lengths, amount of load or generation in the area, etc.
 - All market participating generators are eligible to contract with the IESO to receive payment for providing this service
 - IESO also contracts with certain providers to provide RSVC outside the standard power factor range to maintain reliability

Reactive Support and Voltage Control (cont'd)

- The IESO currently contracts with three entities and/or their affiliated organizations for RSVC service*
 - 53 generation facilities with 202 generation units currently under the applicable contracts
- Key components of the RSVC agreements include:
 - Prices are based on the costs of providing the RSVC service
 - Testing requirements are in accordance with NERC planning standards
 - Facilities that provide speed-no-load and condensing modes of operation (e.g., hydro-electric) receive payments based on a cost of providing the service when required

**As of January 2020. This does not include the seven Energy Storage facilities contract for under the Energy Storage Phase 1 Pilot procurement initiative conducted in 2014*

Reliability Must-Run

- Reliability-must-run (RMR) contracts are used to ensure the reliability of the IESO-controlled grid, in the absence of other suitable market mechanisms
- RMR contracts enable the IESO to call on the contracted provider to provide electricity if and when it is needed to maintain the reliability of the electricity system
- There are no current RMR contracts in Ontario
- Historically, RMRs have been triggered under the Market Rules when certain generators have applied to deregister their facilities
- RMR contracts must be approved by the OEB

Regulation Service

- Regulation service controls power system frequency and maintains the short-term balance between load and generation
- Regulation service has historically been provided by generation facilities with automatic generation control (AGC) capability, which controls a facility's output in response to signals sent by the IESO
- The Market Rules stipulate that a:
 - Minimum of ± 100 MW of regulation service must always be scheduled
 - Minimum overall ramp rate of 50 MW/min must be maintained

Regulation Service (cont'd)

- The IESO holds contracts with 7 facilities with AGC capability
 - Monthly and variable payments on a cost-of-service basis
- In addition, 4 facilities are contracted for research and testing purposes:
 - 2 Alternative Technologies for Regulation (ATR) facilities
 - 2 Phase 1 Energy Storage facilities

Regulation Service Scheduling

- Regulation Service is scheduled by the IESO in the Day-Ahead process; Ancillary Service Providers (ASPs) indicate to the IESO:
 - Regulation capacity to be supplied by each facility or unit
 - Min and max limits for the regulation range
 - Ramp rates

Regulation Service Scheduling (cont'd)

- The IESO reviews the submissions and selects Regulation resources for each hour of the following day
 - Each ASP is informed of the schedule for their applicable resources
 - Selected resources are included in the Dispatch Scheduling and Optimization (DSO) engine
 - DSO calculates the economic dispatch of a generator in the market but does not currently consider the cost of providing Regulation Service
 - Establishes upper/lower limits of a resource based on total of all offers
 - Results are transferred to the AGC control package in SCADA to be implemented for the following day

Summary: 2018 Ancillary Service Quantities

Service	Facilities	Quantity of Service	Cost
Certified Black Start	4 generation facilities	Certified Black Start Service from each facility	\$1,548,629.73
Regulation Service	7 generation facilities 2 ATR facilities 2 Phase 1 Energy Storage facilities	±234.81 MW (nominal contracted regulation capacity) with typically ±100 MW of regulation service scheduled	\$48,970,409.19
Reactive Support and Voltage Control	55 generation facilities having 209 generation units 7 Phase 1 Energy Storage facilities	Reactive support and voltage control service as required by prevailing system conditions	\$24,948,889.23
Reliability Must-Run	None	None	None
Total			\$75,467,928.15



Previous Regulation Service Procurement

2017 Regulation Services RFP

- In 2017, the IESO held an initial competitive procurement for incremental Regulation Services capacity
- The RFP was aimed at obtaining incremental regulation capacity; participation was open to:
 - Existing facilities registered facilities in the IESO-administered markets, and
 - those that had the ability to register in the IESO-administered markets at a later date
- Two new-build energy storage facilities were offered contracts
- Both facilities did not achieve commercial operation and contracts have been terminated

Lessons Learned

- The procurement and contract would have benefitted from:
 - Greater clarity on regulation service obligations, including interconnection arrangements needed to ensure deliverability
 - Improved balance between mandatory IESO requirements and the options that were at each bidder's discretion
- The IESO welcomes additional feedback on the 2017 RFP
 - Aspects that worked well and should be considered again
 - Aspects that should be re-examined with stakeholders



Future Ancillary Service Opportunities

Evolving Ancillary Services

- Ancillary services have historically been contracted primarily through bi-lateral negotiations, with some periodic competitions
- The IESO's goal is to increase transparency and competition for ancillary services where and when possible to align with technological advances and changing system needs
- Developing and implementing regular and open procurements will allow for increased participation, ensuring the IESO delivers reliability cost-effectively
- Over the long-term and where appropriate, the IESO would like to shift ancillary services from *procurement-based* to *market-based* approaches

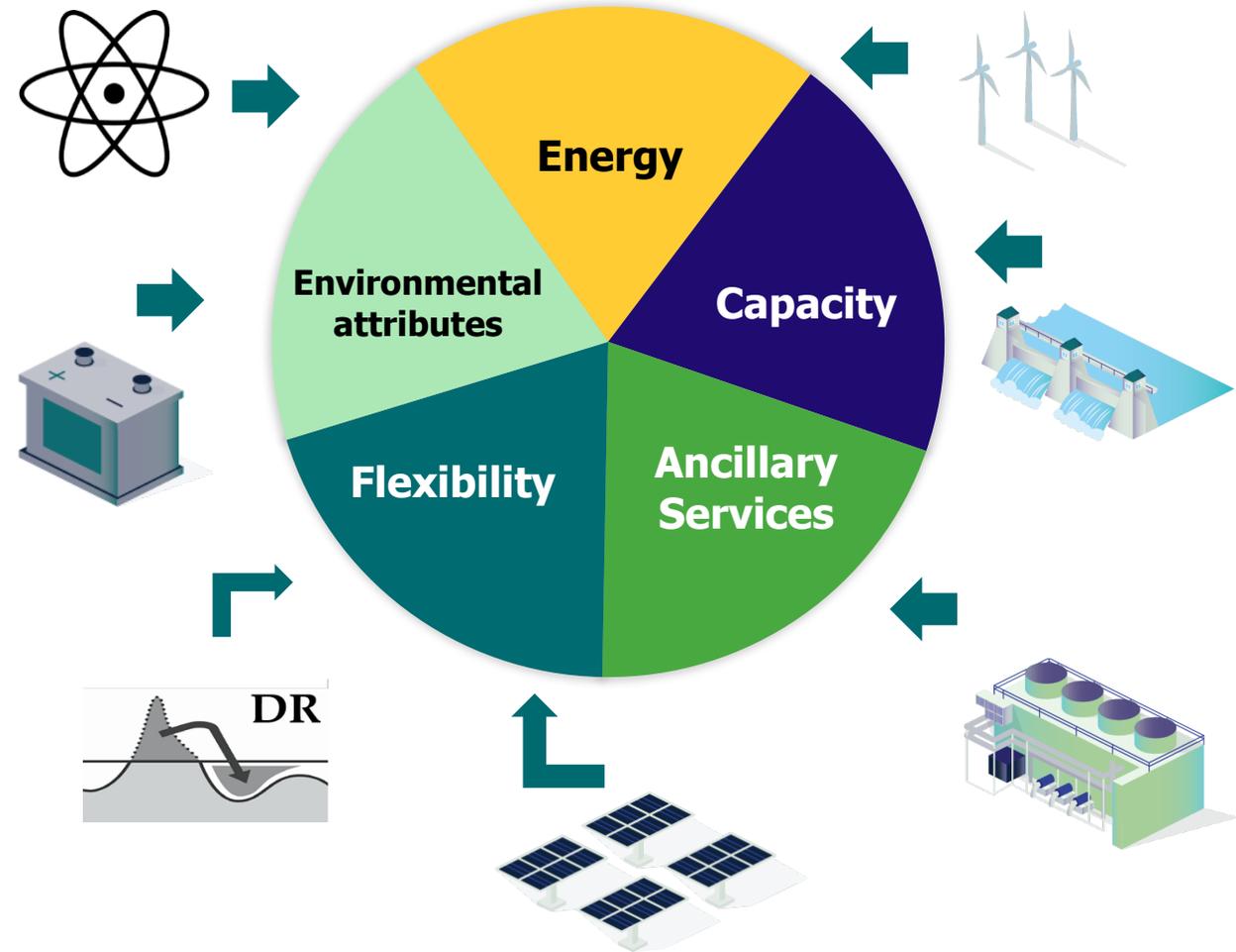
Evolving Ancillary Services (cont'd)

- To establish and deliver more transparent and competitive procurement processes for ancillary services, the IESO will:
 1. Develop and deliver an annual competitive procurement process for Regulation Services
 2. Develop competitive procurements for Black Start facilities (to be discussed at a later date)
 3. Work with MDAG to evolve acquisition of ancillary services with a focus on including Regulation Service into the optimization of the energy markets

Vision for the Future

A more transparent and flexible marketplace based on clearly defined and “unbundled” products and services with clear price signals will mean the IESO can continue to meet reliability cost-effectively by adjusting more flexibly to changes

Unbundled Services and Revenue Streams



Regulation Procurement and Market Principles

Market Principles	Regulation Procurement
Transparency	Acquire services through open procurements
Certainty	Commitment to a regular procurement cycle
Competition	Allow for participation of resources that are capable of meeting the requirements
Implementability	Evolve regulation service in a manner that is feasible and practical
Efficiency	Increase participation and competition with a goal to optimize regulation in the energy market

Regulation Service Procurements

- The future markets vision anticipates a need to (a) unbundle our market products and (b) transparently and competitively acquire these products, where and when needed
- Challenges with Ontario's Regulation Service product:
 - Services largely acquired through bilateral negotiation from one dominant supplier
 - Competitively procured emerging technologies have not been successful in developing their facilities and providing Regulation Service

Regulation Service Procurements (cont'd 2/3)

- Opening up competition for Regulation Service is important and running regular procurements is key; the approach for the procurements will need to:
 - Maintain adequate Regulation Service to ensure reliability
 - Acquire Regulation Service in a manner that creates equal opportunities between new and existing providers
- Procurement of Regulation Service is proposed to be conducted in annual cycles
- Each commitment period would be for 1 year beginning in January

Regulation Service Procurements (cont'd 3/3)

- Each annual cycle would procure a portion of the needed regulation capacity for the next three commitment periods
- This would allow resources to develop and become registered market participants for a future commitment period, providing them certainty
- Un-fulfilled Regulation capacity from a previous procurement cycle will be added to the next procurement cycle, as required
- The IESO will need to ensure it acquires sufficient Regulation Service to meet reliability needs while fostering the growth of new participants

Concept for Annual Cyclical Procurements

Procurement Cycle	Procurement Period		Commitment Periods						
	Start	Stop	Begin	End	2021	2022	2023	2024	2025
2020	June-20	Aug-20	01-Jan-21	31-Dec-21	Tranche 1				
			01-Jan-22	31-Dec-22		Tranche 2			
			01-Jan-23	31-Dec-23			Tranche 3		
2021	June-21	Aug-21	01-Jan-22	31-Dec-22		Tranche 1			
			01-Jan-23	31-Dec-23			Tranche 2		
			01-Jan-24	31-Dec-24				Tranche 3	
2022	June-22	Aug-22	01-Jan-23	31-Dec-23			Tranche 1		
			01-Jan-24	31-Dec-24				Tranche 2	
			01-Jan-25	31-Dec-25					Tranche 3

Regulation Service Procurements Concept

Each annual procurement cycle would procure a certain Regulation Service capacity for each of the next three commitment periods

Tranche	Forward Period	Eligibility
Tranche 1	4 Months	<ul style="list-style-type: none">Existing registered facility with AGC capability
Tranche 2	16 Months	<ul style="list-style-type: none">Existing registered facility with AGC capability; andNew facilities
Tranche 3	28 Months	<ul style="list-style-type: none">Existing registered facility with AGC capability; andNew facilities

Eligibility Requirements for New Facilities

- New facilities wishing to provide Regulation Service would need to complete a number of steps prior to service commencement, including:
 - Completing a new system impact assessment
 - Completing market registration
 - Installation of AGC equipment
 - Pass IESO testing

Proposed 2020 Regulation Service Procurement Timeline

The IESO is considering a procurement in 2020 to acquire Regulation capacity with the following proposed service commencement dates:

- Tranche 1 – January 1, 2021
- Tranche 2 – January 1, 2022
- Tranche 3 – January 1, 2023

Target timeframe	Draft Milestones
January - May	Procurement stakeholdering
April/May	Issue draft RFP and contract
June	Finalize RFP and contract, and launch procurement
June - August	Procurement open period
August	Bid submission and evaluation
September	Announce successful proponents and offer contracts

Questions for MDAG

- Feedback on IESO's previous procurements for Regulation Service, or others?
 - Aspects that worked well and should be considered again?
 - Aspects that should be re-examined with stakeholders?
- Does the proposed approach provide certainty to new resources to enter the market?
- Any additional features that the IESO should examine to strike a balance between meeting reliability needs and fostering new participants?
- What considerations should be included to ensure we meet our goal of transitioning Regulation Service into the market?
- Send comments and feedback to engagement@ieso.ca **by February 7**