

Market Rules

Chapter 5

Power System Reliability - Appendices



Library Record No. MDP_RUL_0002_07

Document Name Market Rules for the Ontario Electricity Market; MRP Consolidated Draft

MRA's included;

- Market Entry and Prudentials:
 - o MR.461.R00
 - o MR.450.R00
 - o MR.451.R00
 - o MR.453.R00
 - o MR.453.R01
 - o MR.453.R02
 - o MR.453.R03
 - o MR.453.R04
- Market Power Mitigation:
 - o MR.461.R01
 - o MR.455.R00 (March 2023 update)
- Calculation Engines:
 - o MR.458.R00
 - o MR. 459.R00
 - o MR. 460.R00
 - o MR. 461.R02
- Interim Alignment:
 - o MR.457.R00
 - o MR.457.R01
 - o MR.457.R02
 - o MR.457.R03
 - o MR.00461.R03
- Settlements:
 - o MR.452.R00
 - o MR.456.R03
 - o MR.456.R02
 - o MR.456.R01
 - o MR.461.R04
 - o MR.456.R00

Publication date: June 1 2023 (includes MR-00474- enabling Hybrid Resources, MR-00475 RSS, MR-00467 Improving Accessibility of Operating Reserve and MR-00471 Updates to Synchrophasor Monitoring Requirements in advance of their inclusion in Baseline).

Document Change History

Issue/Draft	Reason for Issue	Date
Issue 1.0	Baseline 8.0	September 25, 2002
Issue 2.0	Baseline 22.0	September 9, 2009
Issue 3.0	Baseline 23.1	June 2, 2010
Issue 4.0	Baseline 29.1	June 5, 2013
Issue 5.0	Baseline 33.1	June 3, 2015
Issue 6.0	Baseline 38.1	December 6, 2017
Issue 7.0	Baseline 45.0	February 26, 2021
Issue 8.0	Baseline 46.1	December 1, 2021

Related Documents

Library Record No.	Document Title	Version
MDP_RUL_0002	Market Rules for the Ontario Electricity Market	81.0

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Appendix 5.1 – Performance Standards for Ancillary Services

1.1 Regulation

- 1.1.1 A *registered facility-market participant whose resource is* providing *regulation* shall submit to the energy management system referred to in section 12 of Chapter 5 the monitoring and control information required to be provided pursuant to Chapter 4.
- 1.1.2 The telemetering between the energy management system referred to in section 12 of Chapter 5 and a *registered facility-resource* providing *regulation* shall indicate:
- 1.1.2.1 whether the *registered facility-resource* is synchronized to the *IESO-controlled grid*, connected to a *distribution system*, or connected to another *market participant's facility*;
 - 1.1.2.2 whether the *registered facility-resource* is providing *regulation* or not; and
 - 1.1.2.3 the net injection or withdrawal of the *registered facility-resources as a whole*.
- 1.1.3 A *registered facility-resource* providing *regulation* must achieve at least the ramp rate specified in its *contracted ancillary services* contract for the full amount of *regulation* capacity offered in such contract.
- 1.1.4 A *registered facility-resource* providing *regulation* must be able to adjust its output or consumption at least at the ramp rate specified in its *contracted ancillary services* contract to the maximum and minimum values specified in such contract.
- 1.1.5 No *registered facility-market participant* shall offer *for a resource* to provide *regulation* capacity that exceeds an amount equal to the *registered facility's resource's* maximum ramp rate multiplied by ten minutes.
- 1.1.6 A *registered facility-facility associated with a resource* providing *regulation* must be capable of receiving control signals sent from the *IESO* at the rate of at least

one signal every two seconds. If the *regulation* control signals are received by a ~~control centre~~*control centre*, the ~~control centre~~*control centre* must forward these signals to the ~~registered facility~~*facility associated with the resource* providing *regulation* within two seconds of having received the signal from the *IESO*.

- 1.1.7 All ~~registered facilities~~*associated with resources* providing *regulation* must meet, at a minimum, the performance requirements for off-nominal frequency, speed/frequency regulation and voltage ride through specified in Appendix 4.2. For greater certainty, the foregoing obligation applies to all ~~registered facilities~~*such facilities* providing *regulation*, regardless of size, technology or connection location.

1.2 Operating Reserve

Ten-Minute Operating Reserve

- 1.2.1 An *ancillary service provider* offering *ten-minute operating reserve* shall ensure that ~~the registered facility, or registered facilities~~*each resource*, that it has scheduled to provide *ten-minute operating reserve* is available for *dispatch* as scheduled.
- 1.2.2 An *ancillary service provider* offering *ten-minute operating reserve* shall be capable of achieving at least the ramp rate stated in its *offer* for the full amount of *ten-minute operating reserve* offered.
- 1.2.3 When activated by the *IESO*, *ten-minute operating reserve* shall be available for *dispatch* for at least one hour.

Thirty-Minute Operating Reserve

- 1.2.4 An *ancillary service provider* offering *thirty-minute operating reserve* shall ensure that ~~the registered facility, or registered facilities~~*each resource*, that it has scheduled to provide *thirty-minute operating reserve* is available for *dispatch* as scheduled.
- 1.2.5 An *ancillary service provider* offering *thirty-minute operating reserve* shall be capable of achieving at least the ramp rate stated in its *offer* for the full amount of *thirty-minute operating reserve* offered.
- 1.2.6 When activated by the *IESO*, *thirty-minute operating reserve* shall be available for *dispatch* for at least one hour.

1.3 Reactive Support and Voltage Control – Generation Facilities and Electricity Storage Facilities

- 1.3.1 All ~~registered facilities~~ associated with a generation unit or an electricity storage unit that provides that are generation facilities or electricity storage facilities providing reactive support service and voltage control service must be capable of meeting the requirements specified in Chapter 4.
- 1.3.2 Subject to section 1.3.6, *automatic voltage regulators* shall be in service and in automatic mode as indicated in Chapter 4 unless the generation unit or electricity storage unit registered facility that is a generation facility or electricity storage facility is specifically directed by the IESO to operate the AVRs in manual mode.
- 1.3.3 Subject to section 1.3.4, ~~registered facilities that are~~ generation facilities units or electricity storage facilities units providing reactive support service and voltage control service shall be operated to within the standard power factor range described in Appendix 4.2 of Chapter 4.
- 1.3.4 The IESO may direct a ~~registered facility that is a~~ generation facility unit providing reactive support service and voltage control service to operate in an under- or over-excited state for a certain period of time in order to maintain prescribed voltages on the IESO-controlled grid. Such direction may require ~~such registered facility the~~ generation unit to operate in ~~the~~ condense mode or to reduce active power output in order to increase its ability to provide reactive power.
- 1.3.4A The IESO may direct ~~a registered facility that is an~~ electricity storage facility unit to provide reactive support service and voltage control service to absorb reactive power or inject reactive power for a certain period of time in order to maintain the prescribed voltages on the IESO-controlled grid. If applicable and required, the IESO may direct such ~~registered facility~~ electricity storage unit to reduce the withdrawal or injection of active power in order to increase its ability to provide reactive power.
- 1.3.5 Unless otherwise specified by the IESO, each generation unit or electricity storage unit registered facility that is a generation facility or electricity storage facility providing reactive support service and voltage control service shall respond to voltage or reactive power schedules immediately following receipt of the IESO's request. Where ~~the generation unit or electricity storage unit such registered facility~~ cannot be dispatched as directed by the IESO, the ancillary service provider shall immediately provide the IESO with notice to this effect.
- 1.3.6 Each ancillary service provider shall:

- 1.3.6.1 notify the *IESO* immediately upon the *forced outage* of the *AVR* at its ~~*generation unit or electricity storage unit registered facility that is a generation facility or electricity storage facility*~~ being forced out of service; or
- 1.3.6.2 for *planned outages*, prior to the *AVR* being removed from its ~~*registered facility that is a generation facility or electricity storage facility*~~*generation unit or electricity storage unit* for maintenance, follow the procedures outlined in section 6.
- 1.3.7 Following a *contingency event*, each ~~*generation unit or electricity storage unit registered facility that is a generation facility or an electricity storage facility*~~ shall automatically respond to provide or absorb the reactive power in accordance with ~~the-its~~ established maximum and minimum reactive power capabilities ~~of such registered facility~~. Each *ancillary service provider* shall immediately notify the *IESO* whenever its ~~*generation unit or electricity storage unit registered facility that is a generation facility or an electricity storage facility*~~ cannot perform to ~~its the~~ established maximum and minimum reactive power capabilities ~~of such registered facility~~.

1.4 Reactive Support and Voltage Control – Facilities that are neither Generation nor Electricity Storage

- 1.4.1 Except for *forced outages* and *planned outages* coordinated with the *IESO* pursuant to these *market rules*, each *transmitter* shall keep its transmission assets in service at all times unless released from service by the *IESO* or directed by the *IESO* to be removed from service pursuant to this section 1.4.
- 1.4.2 The *IESO* may direct a *transmitter* to remove transmission assets from service to the extent necessary to maintain reactive support and voltage control.
- 1.4.3 Each *connected wholesale customer*, *transmitter* and *distributor connected to the IESO-controlled grid* providing *reactive support service* and *voltage control service* shall respond immediately following receipt of a direction from the *IESO* with respect to directions concerning but not limited to, static capacitors, static VAR compensators and reactors. For directions concerning synchronous condensers, the response time will be as soon as practicable recognizing the device characteristics and operating state of the device at the time of receipt of the *IESO's* direction. Each such *ancillary service provider* shall immediately notify the *IESO* whenever the devices referred to in this section 1.4.3 cannot be switched in accordance with the *IESO* direction.

1.5 Black Start

- 1.5.1 A *certified black start facility* will be tested and/or assessed for its ability to comply with the performance standards as specified in its *contracted ancillary services* contract for *certified black start facilities*.
- 1.5.2 Prior to registering a *generation facility* as a *certified black start facility*, the *IESO* shall be satisfied that the *generator* has demonstrated through completion of tests and assessments that the *generation facility* can provide sufficient MWs and MVARs to:
- 1.5.2.1 energize or assist in energizing the specified transmission path within the applicable time period referred to in section 1.5.7;
 - 1.5.2.2 provide *energy* requirements along such transmission path, including the requirements of any load connected to the transmission path; and
 - 1.5.2.3 provide start-up power to the *generation facility* as specified by the *IESO* which will meet the objectives and priorities of the *Ontario power system restoration plan*.
- 1.5.3 A *certified black start facility* will be tested and/or assessed for its ability to maintain voltage within emergency voltage limits over a range of loading from no external load to full external load in accordance with *reliability standards*.
- 1.5.4 A *certified black start facility* must be equipped with governors that are capable of operating in an isochronous mode.
- 1.5.5 Adequate transmission capacity shall be available to connect the *certified black start facility* to the source providing station services to other specified generation stations referred to in 1.5.8.
- 1.5.6 A *generator* operating a *certified black start facility* shall make efforts consistent with *good utility practice* to comply with a direction from the *IESO* to deliver power without assistance from the electrical system unless:
- 1.5.6.1 the *certified black start facility* is on an *outage*, which *outage* is not a removal of the *certified black start facility* from service caused by the de-energization of the electrical network to which the *certified black start facility* is connected, or
 - 1.5.6.2 where to do so would endanger the safety of any person, damage equipment, or violate any *applicable law*, regulation, or operating limit.

- 1.5.7 A *certified black start facility* will be tested and/or assessed for its ability to start and energize the applicable transmission path specified in 1.5.2.1 as follows:
- 1.5.7.1 if the *certified black start facility* is comprised of a hydroelectric *generation unit* or a *generation unit* that generates using aero-derivative gas turbines, within 30 minutes of the initiation of the black start process;
 - 1.5.7.2 if the *certified black start facility* is comprised of a *generation unit* that generates using industrial gas turbines, within 60 minutes of the initiation of the black start process;
 - 1.5.7.3 if the *certified black start facility* is comprised of a *generation unit* that generates using hot, steam-driven turbines, within 2.5 hours of the initiation of the black start process; and
 - 1.5.7.4 if the *certified black start facility* is in another operating state or is comprised of an unspecified technology, within such time as may be specified in its *contracted ancillary services* contract for *certified black start facilities*.
- 1.5.8 A *certified black start facility* will be tested and/or assessed for its ability to provide startup power for the period of time it takes to switch the applicable transmission path specified in section 1.5.2.1 into service and to complete the start-up process at the generating station specified in section 1.5.2.3.
- 1.5.9 A *certified black start facility*:
- 1.5.9.1 referred to in section 1.5.7.1, 1.5.7.2 or 1.5.7.3 will be tested and/or assessed for its ability to complete three successive starts within eight hours of the initiation of the black start process; or
 - 1.5.9.2 referred to in section 1.5.7.4, will be tested and/or assessed for its ability to complete such number of successive starts within such period of time as may be specified in its *contracted ancillary services* contract for *certified black start facilities*.
- 1.5.10 A *certified black start facility* will be tested and/or assessed for its ability to produce the range of reactive power resources required by the *IESO-controlled grid* as described in Chapters 4, 5 and 7.
- 1.5.11 A *certified black start facility* must participate in the training activities and restoration drills referred to in sections 11.3.7.1 and 11.3.7.2, respectively.