

Market Rule Amendment Proposal Form

Part 1 - Market Rule Information

Identification No.:	MR-00449-R03
Subject:	Active and Reactive power references
Title:	Clarifications to the Market Rules (Omnibus 2021)
Nature of Proposal:	<input checked="" type="checkbox"/> Alteration <input checked="" type="checkbox"/> Deletion <input checked="" type="checkbox"/> Addition
Chapter:	Chapter 11
Appendix:	Appendices 4.15 & 4.24
Sections:	Various
Sub-sections proposed for amending:	
Current Market Rules Baseline	Issue 78, Baseline 45.0, February 26, 2021

Part 2 - Proposal History

Version	Reason for Issuing	Version Date
1.0	Draft for Technical Panel Review and Comment	June 22, 2021
2.0	Posted for stakeholder review and comment	June 29, 2021
3.0	Submitted for Technical Panel vote	July 20, 2021

Approved Amendment Publication Date:	
Approved Amendment Effective Date:	

Part 3 Explanation for Proposed Amendment

Provide a brief description of the following:

- The reason for the proposed amendment and the impact on the *IESO-administered markets* if the amendment is not made.
- Alternative solutions considered.
- The proposed amendment, how the amendment addresses the above reason and impact of the proposed amendment on the *IESO-administered markets*.

Summary

The defined terms *gross MW and MX* and *net MW and MX* are not used in the market rules. Instead, variations of these terms are used throughout Appendix 4.15 and are incorrectly italicized (i.e. gross MW and gross or net MX as used in section 1- Major Generation Facilities). Appendix 4.24, which was created for electricity storage resources, also uses these terms, but omits italics as there are no defined terms that can be correctly referred to. To correct for this, this proposal will remove the defined terms *gross MW and MX* and *net MW and MX* and create four new defined terms; gross MW, gross MX, net MW and net MX. These new defined terms will largely follow the existing gross MW and MX and net MX and MX terms, with some slight changes to provide clarity on where the real or active energy measurement is taken, and to include electricity storage facilities. References to these defined terms will then be updated in Appendices 4.15 and 4.24. References to defined terms will also be corrected in the opening paragraph of 4.15. Due to the volume of changes related to this correction, along with the slight change to the measurement reference, this is being placed in its own proposal.

Background

The IESO proposes a number of market rule amendments in this year’s omnibus process. The IESO is proposing that a suite of rule amendments be considered that includes two amendments that may not be considered minor according to the defined term *minor amendment*, as they impact the obligations of some market participants. In both cases however, the impact is expected by the IESO to be non-material. As such, their inclusion in an existing amendment process will reduce the effort involved by Technical Panel members and the IESO in administering separate initiatives. These amendment proposals are included in proposal packages R01 and R02 along with a rationale in each of why they are being included in this amendment process. Proposal R00 includes the other amendments that would typically be considered minor amendments. Minor market rule amendments are defined in Chapter 11 of the market rules as: “.....an amendment to the market rules to correct a typographical or grammatical error, or to effect a change of a non-material procedural nature;”. Proposals R03 and R04 are also considered minor amendments, however they are included as separate packages due to the volume of changes entailed in each.

Discussion

The defined terms gross MW and MX and net MW and MX are to be removed;

gross MW and MX, as related to active and reactive power output from a *generation unit* or *facility*, is the total amount of active or reactive power produced by a *generation unit* or *facility* as measured at the *generation unit's* or *facility's* low voltage terminal;

net MW and MX, as related to active and reactive power output from a *generation unit* or *facility*, is equal to the applicable *generation unit's* or *facility's* *gross MW and MX* output less the applicable *generation unit* or *facility station service* and losses to the *defined meter point* for that applicable *generation unit* or *facility*;

The following defined terms will be created;

Gross MW as related to active power output from an *electricity storage unit*, *generation unit*, or *facility*, is the total amount of active power produced by such unit or *facility* as measured at the unit's terminal or as measured as a sum of active power produced by the *facility's* individual units.

Net MW as related to active power output from an *electricity storage unit*, *generation unit*, or *facility* is equal to the applicable unit or *facility's* *gross MW* output less the applicable unit or *facility station service* MW load and MW losses to the *defined meter point* for that applicable unit or *facility*.

Gross MX as related to reactive power output from an *electricity storage unit*, *generation unit*, or *facility*, is the total amount of reactive power produced by such unit or *facility* as measured at the unit's terminal or as measured as a sum of reactive power produced by the *facility's* individual units.

Net MX as related to reactive power output from an *electricity storage unit*, *generation unit*, or *facility* is equal to the applicable unit or *facility's* *gross MX* output less the applicable unit or *facility station service* MX load and MX losses to the *defined meter point* for that applicable unit or *facility*.

The references will be updated throughout Appendices 4.15 and 4.24.

Part 4 Proposed Amendment

Chapter 11

~~*gross MW and MX*, as related to active and reactive power output from a *generation unit* or *facility*, is the total amount of active or reactive power produced by a *generation unit* or *facility* as measured at the *generation unit's* or *facility's* low voltage terminal;~~

~~net MW and MX, as related to active and reactive power output from a generation unit or facility, is equal to the applicable generation unit's or facility's gross MW and MX output less the applicable generation unit or facility station service and losses to the defined meter point for that applicable generation unit or facility;~~

~~Gross MW as related to active power output from an electricity storage unit, generation unit, or facility, is the total amount of active power produced by such unit or facility as measured at the unit's terminal or as measured as a sum of active power produced by the facility's individual units.~~

~~Net MW as related to active power output from an electricity storage unit, generation unit, or facility is equal to the applicable unit or facility's gross MW output less the applicable unit or facility station service MW load and MW losses to the defined meter point for that applicable unit or facility.~~

~~Gross MX as related to reactive power output from an electricity storage unit, generation unit, or facility, is the total amount of reactive power produced by such unit or facility as measured at the unit's terminal or as measured as a sum of reactive power produced by the facility's individual units.~~

~~Net MX as related to reactive power output from an electricity storage unit, generation unit, or facility is equal to the applicable unit or facility's gross MX output less the applicable unit or facility station service MX load and MX losses to the defined meter point for that applicable unit or facility.~~

Appendix 4.15 – IESO Monitoring Requirements: Generators

The following information, as a minimum, shall be available on a continual basis to the IESO from:

(a) any ~~generator~~ generator (i) whose ~~generation facility~~ generation facility is connected to the IESO-controlled grid IESO-controlled grid, or (ii) that is participating in the ~~IESO-administered markets~~ IESO-administered markets; and

(b) any ~~embedded generator~~ embedded generator (i) that is not a ~~market participant~~ market participant or whose ~~embedded generation facility~~ embedded generation facility is not a ~~registered facility~~ registered facility; (ii) whose ~~embedded generation facility~~ embedded generation facility includes a ~~generation unit~~ generation unit rated at greater than 20 MVA or that comprises ~~generation units~~ generation units the ratings of which in the aggregate exceeds 20 MVA; and (iii) that is designated by the ~~IESO~~ IESO for the purposes of section 7.3.1 of this

Chapter as being required to provide such data in order to enable the ~~IESO~~ IESO to maintain the ~~reliability~~ reliability of the ~~IESO-controlled grid~~ IESO-controlled grid.

TYPE	INFORMATION REQUIREMENTS
Major generation facility	<p>Monitored Quantities</p> <ol style="list-style-type: none"> 1. Active Power (MW) and Reactive Power (MX) <ol style="list-style-type: none"> a) The standard requirement for active and reactive power is the provision of <i>net MW</i> and <i>net MX</i> or <i>gross MX</i>. <i>Gross MW</i> and <i>and gross MX</i> or <i>net MX</i> are also to be provided, if designated by the <i>IESO</i> as required for: <ol style="list-style-type: none"> (i) determination of operating <i>security limits</i>; (ii) to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i>; (iii) for compliance monitoring purposes; or (iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>. b) For <i>generation units</i> rated greater than or equal to 100 MVA, the standard requirement as defined in part a) for each <i>generation unit</i> shall be provided, and <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a). c) For <i>generation units</i> rated at less than 100 MVA: <ol style="list-style-type: none"> (i) for a group of <i>generation units</i> if those <i>generation units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>generation units</i>, and total <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or (ii) if designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>generating unit</i> shall be provided, and <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a). d) For <i>generation facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3: <ol style="list-style-type: none"> (i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or (ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each

TYPE	INFORMATION REQUIREMENTS
	<p><i>generating unit</i> shall be provided, and <i>gross MW and and gross MX</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>e) For frequency changers:</p> <ul style="list-style-type: none"> (i) total MW and MX at either frequency; or (ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i>, total MW and MX at both frequencies. <p>f) For synchronous condensers:</p> <ul style="list-style-type: none"> (i) total MX. <p>2. Voltage:</p> <p>a) For each <i>generation unit</i>, unit terminal voltage, except if <i>generation units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>generation units</i>.</p> <p>3. Frequency:</p> <p>a) For each <i>generation unit</i> or <i>generation facility</i> providing <i>black start capability</i>, frequency of the applicable <i>generation unit</i> or <i>generation facility</i>.</p> <p>4. Equipment Status</p> <p>a) Unit mode (i.e. generator, condenser, pump) for each <i>generation unit</i> capable of different modes of operation.</p> <p>b) AGC status for each <i>generation unit</i> providing <i>regulation</i>.</p> <p>c) AVR and Stabilizer Status for each <i>generating unit</i> with a rated capacity ≥ 100 MVA. Stabilizer status reporting is only required if it can be switched off by <i>generation facility</i> personnel remotely or at the <i>facility</i>.</p> <p>d) AVR and Stabilizer status for each <i>generation unit</i> with a rated capacity ≤ 100 MVA if the status of this equipment is designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i>. Stabilizer status reporting is only required if it can be switched on or off by <i>market participant</i> operating personnel remotely or at the <i>facility</i>.</p> <p>e) Synchronizing Breaker status for each <i>generation unit</i>. Where a <i>generation facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>generation unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>generation unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>Where a <i>generation facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p>

TYPE	INFORMATION REQUIREMENTS
	f) <i>Special Protection System</i> status for each applicable <i>generation unit</i> .
Significant generation facility and minor generation facility connected to IESO-controlled grid	<p>Monitored Quantities</p> <p>1. Active Power (MW) and Reactive Power (MX):</p> <p>a) The standard requirement for active and reactive power is the provision of <i>net MW</i> and <i>net MX</i> or <i>gross MX</i>. <i>Gross MW</i> and <i>gross MX</i> or <i>net MX</i> are also to be provided, if designated by the <i>IESO</i> as required for:</p> <p>(i) determination of operating <i>security limits</i>;</p> <p>(ii) to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i>;</p> <p>(iii) for compliance monitoring purposes; or</p> <p>(iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>.</p> <p>b) For <i>generation facilities</i> that have not been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) for a group of <i>generation units</i> if those <i>generation units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>generation units</i>, and total <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a);</p> <p>(ii) if designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>generating unit</i> shall be provided, and <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>c) For <i>generation facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or</p> <p>(ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each <i>generating unit</i> shall be provided, and <i>gross MW</i> and <i>gross MX</i> or <i>net MX</i> for each <i>generation unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>d) For frequency changers:</p>

TYPE	INFORMATION REQUIREMENTS
	<ul style="list-style-type: none"> (i) total MW and MX at either frequency; or (ii) if so designated by the IESO as required for determination of operating <i>security limits</i>, total MW and MX at both frequencies. <p>e) For Synchronous Condensers:</p> <ul style="list-style-type: none"> (i) Total MX. <p>2. Voltage:</p> <ul style="list-style-type: none"> a) For <i>generation units</i> that are VAR <i>dispatchable</i>, unit terminal voltage, except if the <i>generation units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>generation units</i>. <p>3. Frequency:</p> <ul style="list-style-type: none"> a) For each <i>generation unit</i> or <i>generation facility</i> providing <i>black start capability</i>, frequency of the applicable <i>generation unit</i> or <i>facility</i>. <p>4. Equipment Status</p> <ul style="list-style-type: none"> a) Unit mode (i.e. generator, condenser, pump) for each <i>generation unit</i> capable of different modes of operation. b) AVR and Stabilizer Status for each <i>generation unit</i> if the status of this equipment is designated by the IESO as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the IESO-controlled grid. Stabilizer status reporting is only required if it can be switched on or off by <i>market participant</i> operating personnel remotely or at the <i>facility</i>. c) Synchronizing Breaker Status for each <i>generation unit</i>. Where a <i>generation facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>generation unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>generation unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration. Where a <i>generation facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required. d) <i>Special Protection System</i> status for each applicable <i>generation unit</i>.
Self-scheduling generation facility with a name-plate rating of less than 10 MW	None

TYPE	INFORMATION REQUIREMENTS
Intermittent and transitional scheduling generator	<ul style="list-style-type: none"> • if a major generation facility, as described above for a major generation facility • if a significant generation facility, as described above for a significant generation facility • if a <i>minor generation facility</i>, as described above for a <i>minor generation facility</i> if designated by the <i>IESO</i> at the time of registration as affecting the <i>reliability</i> of the <i>IESO-controlled grid</i> • if a small generation facility, none
Small generation facility	None
Minor generation facility that is embedded in a distribution system and registered as a dispatchable generator	<ul style="list-style-type: none"> • Total active power (MW) output of the individual <i>generation unit</i> or of the aggregated resource. • Unit status if the <i>facility</i> is comprised of a single <i>generation unit</i>. • Aggregated resource status if the <i>facility</i> is comprised of aggregated resources, i.e. if at least one unit of the aggregated resource is synchronized, the aggregated resource is synchronized or if no unit in the aggregated resource is synchronized, the aggregated resource is not synchronized. • Reactive Power (MX) output, if requested by the <i>IESO</i> for reliable operation of the <i>IESO-controlled grid</i>, of individual <i>generation units</i> or of the aggregated resource.

Appendix 4.24 – IESO Monitoring Requirements: Electricity Storage Participants

The following information, as a minimum, shall be available on a continual basis to the IESO from:

- (a) any *electricity storage participant* (i) whose *electricity storage facility* is connected to the IESO-controlled grid, or (ii) that is participating in the IESO-administered markets; and
- (b) any *embedded electricity storage participant* (i) that is not a *market participant* or whose *embedded electricity storage facility* is not a *registered facility*; (ii) whose *embedded electricity storage facility* includes an *electricity storage unit* with an *electricity storage unit size* rated at greater than 20 MVA or that comprises multiple *electricity storage units*, the aggregated *electricity storage unit size* ratings of which exceeds 20 MVA; and (iii) that is designated by the IESO for the purposes of section 7.3.1 of this Chapter as being required to provide such data in order to enable the IESO to maintain the *reliability* of the IESO-controlled grid.

TYPE	INFORMATION REQUIREMENTS
Major electricity storage facility	<p>Monitored Quantities</p> <ol style="list-style-type: none"> 1. Active Power (MW) and Reactive Power (MX) injected or withdrawn <ol style="list-style-type: none"> a) The standard requirement for active and reactive power is the provision of net MW-net MW and net MX-net MX or gross MX-gross MX. Gross MW-Gross MW and gross MX-gross MX or net MX-net MX are also to be provided, if designated by the IESO as required for: <ol style="list-style-type: none"> (i) determination of operating <i>security limits</i>; (ii) to maintain <i>reliable</i> operation of the IESO-controlled grid; (iii) for compliance monitoring purposes; or (iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>. b) For <i>electricity storage units</i> with an <i>electricity storage unit size</i> greater than or equal to 100 MVA, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW-gross MW and gross MX-gross MX or net MX-net MX for each <i>electricity storage unit</i> shall be provided if designated by the IESO as required using the criteria listed above in part a). c) For <i>electricity storage units</i> with an <i>electricity storage unit size</i> of less than 100 MVA: <ol style="list-style-type: none"> (i) for a group of <i>electricity storage units</i> if those <i>electricity storage units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>electricity storage units</i>, and total gross MW-gross MW and

TYPE	INFORMATION REQUIREMENTS
	<p>gross-MX-gross MX shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or</p> <p>(ii) if designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross-MW-gross MW and gross-MX-gross MX or net-MX-net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>d) For <i>electricity storage facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross-MW-gross MW and gross-MX-gross MX or net-MX-net MX shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or</p> <p>(ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain <i>reliable</i> operation of the <i>IESO-controlled grid</i> or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, gross-MW and gross-MW and gross-MX-gross MX or net-MX-net MX for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>2. State of Charge and Charge Limit</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the <i>state of charge</i> of the applicable <i>electricity storage unit</i> or <i>electricity storage facility</i></p> <p>b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum charge limit and the economic minimum charge limit expressed in MWh as per the applicable <i>market manual</i>.</p> <p>3. Base point</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, providing <i>regulation</i>, the basepoint, if applicable, of the <i>electricity storage unit</i> expressed in MW, according to the applicable <i>market manual</i>.</p> <p>4. Dynamic Maximum and Minimum Power</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum power mode and economic minimum power mode, expressed in MW.</p> <p>5. Voltage:</p>

TYPE	INFORMATION REQUIREMENTS
	<p>a) For each <i>electricity storage unit</i>, unit terminal voltage, except if <i>electricity storage units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>electricity storage units</i>.</p> <p>6. Equipment Status</p> <p>a) Voltage Control status and stabilizer status (if applicable) for each <i>electricity storage unit</i> with an <i>electricity storage unit size</i> > 100 MVA. When applicable, stabilizer status reporting is only required if it can be switched off by electricity storage participant personnel remotely or at the facility.</p> <p>b) AGC status for each <i>electricity storage unit</i> providing <i>regulation</i>.</p> <p>c) Voltage control status and stabilizer status (if applicable) for each <i>electricity storage unit</i> with an <i>electricity storage unit size</i> < 100 MVA if the status of this equipment is designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the <i>IESO-controlled grid</i>. When applicable, stabilizer status reporting is only required if it can be switched on or off by market participant operating personnel remotely or at the <i>facility</i>.</p> <p>d) Synchronizing Breaker status for each <i>electricity storage unit</i>. Where a <i>electricity storage facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>electricity storage unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the electricity storage unit must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>e) Where a <i>electricity storage facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>f) Special Protection System status for each applicable <i>electricity storage unit</i>.</p>
<p>Significant electricity storage facility and minor electricity storage facility connected to IESO-controlled grid</p>	<p>Monitored Quantities</p> <p>1. Active Power (MW) and Reactive Power (MX) injected or withdrawn:</p> <p>a) The standard requirement for active and reactive power is the provision of net MW <u>net MW</u> and net MX <u>net MX</u> or gross MX <u>gross MX</u> facility. Gross MW <u>Gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> are also to be provided, if designated by the IESO as required for:</p> <p>(i) determination of operating security limits;</p> <p>(ii) to maintain reliable operation of the <i>IESO-controlled grid</i>;</p> <p>(iii) for compliance monitoring purposes; or</p>

TYPE	INFORMATION REQUIREMENTS
	<p>(iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating security limits.</p> <p>b) For <i>electricity storage facilities</i> that have not been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) for a group of <i>electricity storage units</i> if those <i>electricity storage units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these electricity storage units, and total gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> shall be provided if designated by the IESO as required using the criteria listed above in part a);</p> <p>(ii) if designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid or for compliance monitoring purposes, the standard requirement as defined in part a) for each electricity storage unit shall be provided, and gross MW and gross MX or net MX for each electricity storage unit shall be provided if designated by the IESO as required using the criteria listed above in part a).</p> <p>c) For <i>electricity storage facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> shall be provided if designated by the IESO as required using the criteria listed above in part a); or</p> <p>(ii) if so designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid or for dispatch compliance monitoring purposes, the standard requirement as defined in part a) for each electricity storage unit shall be provided, and gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u>. The application of a physical withholding framework for storage, reflective of two-resource model and state of charge limitations for each <i>electricity storage unit</i> shall be provided if designated by the IESO as required using the criteria listed above in part a).</p> <p>2. Voltage:</p> <p>a) For <i>electricity storage units</i> that are VAR dispatchable, unit terminal voltage, except if the electricity storage units are connected to a common low voltage bus section, then the bus section voltage is adequate for those electricity storage units.</p> <p>3. State of Charge and Charge Limit</p>

TYPE	INFORMATION REQUIREMENTS
	<p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the <i>state of charge</i> of the applicable <i>electricity storage unit</i> or <i>electricity storage facility</i></p> <p>b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum charge limit and the economic minimum charge limit expressed in MWh as per the applicable <i>market manual</i>.</p> <p>4. Dynamic Maximum and Minimum Power</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum power mode and economic minimum power mode, expressed in MW.</p> <p>5. Base point</p> <p>a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, providing <i>regulation</i>, the basepoint, if applicable, of the storage unit expressed in MW, according to the applicable <i>market manual</i>.</p> <p>5. Equipment Status</p> <p>a) Automatic Voltage Control and stabilizer status (if applicable) for each <i>electricity storage unit</i> if the status of this equipment is designated by the IESO as required for determination of operating security limits or to maintain reliable operation of the IESO-controlled grid. When applicable, stabilizer status reporting is only required if it can be switched on or off by the <i>market participant</i> operating personnel remotely or at the facility.</p> <p>b) Synchronizing Breaker Status for each <i>electricity storage unit</i>. Where an <i>electricity storage facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>electricity storage unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>electricity storage unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>Where an <i>electricity storage facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>c) Special Protection System status for each applicable <i>electricity storage unit</i>.</p>
Self-scheduling electricity storage facility with a name-plate rating of less than 10 MW	<p>Monitored Quantities</p> <p>1. Active Power (MW) and Reactive Power (MX) injected or withdrawn:</p> <p>a) The standard requirement for active and reactive power is the provision of <u>net MW-net MW</u> and <u>net MX-net MX</u> or <u>gross MX-gross MX</u>. <u>Gross MW-Gross MW</u> and <u>gross MX-gross MX</u> or <u>net MX-net MX</u> are also to be provided, if designated by the IESO as required for:</p> <p>(i) determination of operating <i>security limits</i>;</p>

TYPE	INFORMATION REQUIREMENTS
	<p>(ii) to maintain reliable operation of the <i>IESO-controlled grid</i>;</p> <p>(iii) for compliance monitoring purposes; or</p> <p>(iv) if provision of only the standard requirement values as defined above would have a negative impact on other <i>market participants</i> through reduced operating <i>security limits</i>.</p> <p>b) For <i>electricity storage facilities</i> that have not been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) for a group of <i>electricity storage units</i> if those <i>electricity storage units</i> are similar in size and operating characteristics, the standard requirement as defined in part a) shall be provided as a total for these <i>electricity storage units</i>, and total gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a);</p> <p>(ii) if designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>c) For <i>electricity storage facilities</i> that have been aggregated pursuant to Chapter 7 section 2.3:</p> <p>(i) the standard requirement as defined in part a) shall be provided as an aggregated total, and an aggregated total gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a); or</p> <p>(ii) if so designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i> or for <i>dispatch</i> compliance monitoring purposes, the standard requirement as defined in part a) for each <i>electricity storage unit</i> shall be provided, and gross MW <u>gross MW</u> and gross MX <u>gross MX</u> or net MX <u>net MX</u> for each <i>electricity storage unit</i> shall be provided if designated by the <i>IESO</i> as required using the criteria listed above in part a).</p> <p>2. Voltage:</p> <p>a) For <i>electricity storage units</i> that are VAR dispatchable, unit terminal voltage, except if the <i>electricity storage units</i> are connected to a common low voltage bus section, then the bus section voltage is adequate for those <i>electricity storage units</i>.</p>

TYPE	INFORMATION REQUIREMENTS
	<p>3. State of Charge and Charge Limit</p> <p>a) For each electricity storage unit or electricity storage facility, the state of charge of the applicable <i>electricity storage unit</i> or <i>electricity storage facility</i></p> <p>b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i> the economic maximum charge limit, the economic minimum charge limit expressed in MWh</p> <p>4. Dynamic Maximum and Minimum Power</p> <p>a) For each <i>electricity storage unit</i>, the economic maximum power mode and economic minimum power mode, expressed in MW.</p> <p>5. Base point</p> <p>a) For each <i>electricity storage unit</i>, providing <i>regulation</i>, the basepoint of the applicable <i>electricity storage unit</i> expressed in MW according to the applicable <i>market manual</i>.</p> <p>6. Equipment Status</p> <p>a) Automatic Voltage Control status and Stabilizer status (if applicable) for each <i>electricity storage unit</i> if the status of this equipment is designated by the <i>IESO</i> as required for determination of operating <i>security limits</i> or to maintain reliable operation of the <i>IESO-controlled grid</i>. When applicable, stabilizer status reporting is only required if it can be switched on or off by <i>market participant</i> operating personnel remotely or at the <i>facility</i>.</p> <p>b) Synchronizing Breaker Status for each <i>electricity storage unit</i>. Where an <i>electricity storage facility</i> is designed such that no low voltage synchronizing breaker is installed for each <i>electricity storage unit</i>, the status of the appropriate HV breaker(s) and disconnect switch(es) normally used to isolate the <i>electricity storage unit</i> must be provided. Where this results in access to the majority of breakers on a bus, the status of the remainder of the breakers shall be provided to complete the bus configuration.</p> <p>Where an <i>electricity storage facility</i> is designed such that there are disconnect switches in parallel, or directly in series, with the synchronizing breaker, the status of those switches is also required.</p> <p>c) Special Protection System status for each applicable <i>electricity storage unit</i>.</p>
Small electricity storage facility	None
Minor electricity storage facility that is embedded in a distribution system and	<p>Monitored Quantities</p> <p>1. Total active power (MW) output of the individual <i>electricity storage unit</i> or of the aggregated resource.</p> <p>a) Unit status if the <i>facility</i> is comprised of a single <i>electricity storage unit</i>.</p>

TYPE	INFORMATION REQUIREMENTS
registered as a dispatchable electricity storage participant	<ul style="list-style-type: none"> b) Aggregated resource status if the <i>facility</i> is comprised of aggregated resources, i.e. if at least one unit of the aggregated resource is synchronized, the aggregated resource is synchronized or if no unit in the aggregated resource is synchronized, the aggregated resource is not synchronized. c) Reactive Power (MX) output, if requested by the <i>IESO</i> for reliable operation of the <i>IESO-controlled grid</i>, of individual <i>electricity storage units</i> or of the aggregated resource. d) Unit terminal voltage (kV) if requested by the <i>IESO</i> for reliable operation of the <i>IESO controlled grid</i> <p>2. State of Charge and Charge Limit</p> <ul style="list-style-type: none"> a) For each electricity storage unit or electricity storage facility, the state of charge of the applicable electricity storage unit or electricity storage facility expressed as a percentage b) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum charge limit, the economic minimum charge limit expressed in MWh <p>3. Dynamic Maximum and Minimum Power</p> <ul style="list-style-type: none"> a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, the economic maximum power mode and economic minimum power mode, expressed in MW. <p>4. Base point</p> <ul style="list-style-type: none"> a) For each <i>electricity storage unit</i> or <i>electricity storage facility</i>, providing <i>regulation</i>, the basepoint, if applicable, of the <i>electricity storage unit</i> expressed in MW according to the applicable <i>market manual</i>.