Market Rule Amendment Proposal Form

Part 1 - Market Rule Information

Identification No.:	MR-00446-R00
Subject:	Implementation of the Interim Storage Design
Title:	Updates to Defined Terms
Nature of Proposal:	☒ Alteration ☐ Deletion ☒ Addition
Chapter:	11
Appendix:	NA
Sections:	NA
Sub-sections proposed for amending:	NA

Part 2 - Proposal History

Version	Reason for Issuing	Version Date
1.0	Draft for Technical Panel Review and Comment	September 8, 2020
2.0	Publish for Stakeholder Review and Comment	September 16, 2020
3.0	Submitted for Technical Panel Vote	October 13, 2020
4.0	Recommended by Technical Panel; Submitted for IESO Board Consideration	October 20, 2020

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 proposed market rule amendments to integrate electricity storage into IESO markets have been split thematically into six packages for Technical Panel review. To implement the interim design a number of new defined terms will be required, along with a number of revisions to existing defined terms, which are the focus of this proposal. These additions and revisions facilitate the inclusion of electricity storage participants and their resources as a new participant class and resource into the market for this interim period and are used throughout the accompanying proposals. Most, if not all, of these definitions are expected to be needed in the enduring participation model.

Background

The IESO proposes to amend the market rules to address a specific set of barriers to the integration of energy storage resources in the IESO's markets. These barriers within the IESO's purview were identified in the December 2018 IESO report, "Removing Obstacles for Storage Resources in Ontario". Addressing these barriers required changes to both Market Rules and Market Manuals, consistent with one of the report's recommendations that the IESO "should review and amend its market rules, where possible, to clarify the participation of storage resources in IESO-administered markets".

The IESO developed a design to integrate electricity storage resources for an interim and longer term period of time. An interim period was needed to facilitate the near term participation of electricity storage resources until the IESO's scheduling and optimization tool can recognize the unique characteristics of energy storage resources: they participate both as a load and a supply and are limited in each by its state of charge. The suite of changes in MR-00446 are designed to both clarify the participation of storage resources in the interim period and include rules that may not need to change to support the long term design.

Both the interim design for integrating electricity storage resources along with draft market rules were reviewed with stakeholders though the Energy Storage Advisory Group. Feedback has been largely supportive of the proposed amendments. Stakeholders had requested clarifications in a few sections and revisions have been made to reflect this feedback.

Discussion

Chapter 11

New defined terms;

- *commissioning electricity storage facility*
- *electricity storage capacity*

- *electricity storage energy rating*
- *electricity storage facility*
- *electricity storage facility size*
- *electricity storage participant*
- *electricity storage station service*
- *electricity storage unit*
- *electricity storage unit size*
- *embedded electricity storage facility*
- *embedded electricity storage participant*
- *lower energy limit*
- *major electricity storage facility*
- *minor electricity storage facility*
- *remaining duration of service*
- *self-scheduling electricity storage facility*
- *significant electricity storage facility*
- *small electricity storage facility*
- *state of charge*
- *upper energy limit*

Revisions to existing defined terms;

- *automatic generation control*
- *automatic voltage regulation*
- *basecase*
- *called capacity export*
- *capacity auction eligible storage resource*
- *capacity export request*
- *connection applicant*
- *connection point*
- *connection station service*
- *constrained off dispatchable load*
- *constrained off event*
- *constrained off generation unit*
- *constrained on dispatchable load*

- *constrained on event*
- *constrained on generation unit*
- *curtailment*
- *facility*
- *meter point*
- *operating reserve*
- *quick start facility*
- *reliability must-run contract*
- *self-schedule*
- *start-up time*
- *station service*
- *transmission station service*

Part 4 - Proposed Amendment

Chapter 11

automatic generation control or *AGC* means the process that automatically adjusts the output from a *generation facility* or an *electricity storage facility* that is providing *regulation;*

automatic voltage regulation or *AVR* means the process that automatically adjusts the reactive output of a *generation unit*, *electricity storage unit,* or synchronous condenser to maintain the *unit* terminal voltage within a pre-determined range;

basecase means a model of electrical components of the *IESO-controlled grid* and *neighbouring electricity systems*. Such components may include but are not limited to transformers, *generation facilities*-, *electricity storage facilities,* and transmission lines, and includes the steady-state, dynamic and short circuit attributes of each component where applicable.

called capacity export means an *energy* export from the *IESO control area* that is supported by the capacity of a *generation unit* or the capacity for injection of an *electricity storage unit* within the *IESO control area* that has committed its capacity, or a portion thereof, to an external *control area* and that capacity has been called by the external *control area operator* in accordance with section 20.3 of Chapter 7;

capacity auction eligible storage resource means a *non-committed resource* associated with an ~~*generation*~~ *electricity storage facility*, which is also a *connected facility* at the commencement of the capacity enrollment process for a given *capacity auction*, and which is registered as ~~a~~ dispatchable ~~*generation facility* and a *dispatchable load facility*~~ with the *IESO* prior to the *obligation period* in accordance with the timelines specified in the applicable *market manual*;

capacity export request means a request submitted to the *IESO* by a *market participant* for approval to commit the Ontario-based capacity of a *generation unit* or the injection capacity of an *electricity storage unit* to an external *control area* in accordance with section 20.1 of Chapter 7;

commissioning electricity storage facility means an *electricity storage facility* located within the *IESO control area* that is either (i) newly constructed or (ii) significantly redesigned or rebuilt and is designated by the *IESO* as a *commissioning electricity storage facility* and, in either case, that has not yet completed the commissioning tests referred to in section 2.2D.4.2 of Chapter 7;

connection applicant means any of:
(i) a *market participant* or person that applies to the *IESO* for approval of a new *connection* to the *IESO-controlled grid* or for approval of the modification of an existing *connection* to the *IESO-controlled grid*, or
(ii) a *distributor* in whose *distribution system* a *market participant* or person is or intends to be connected as an *embedded generator* or *embedded electricity storage participant* whose ~~*generation* *facility*~~ is or will be rated greater than 10 MW, that seeks to establish a new or modify an existing connection pursuant to section 6.1.6 of Chapter 4;

connection point means a point of connection between the *IESO-controlled grid* and a *generation facility*, *electricity storage facility*, or *load facility*, or the point at which a neighbouring *transmission system* is connected to the *IESO-controlled grid*;

connection station service is *station service* associated with transformers, capacitors, switchgear, protection systems and control systems that *connect generation facilities*, *electricity storage facilities*, *load facilities* or *distribution facilities* to the *IESO-controlled grid*;

constrained off dispatchable load means a *dispatchable load*, *electricity storage unit* or *boundary entity dispatched* by the *IESO* to consume (or to withdraw in the case of an *electricity storage unit* or *boundary entity*) less *energy* in order to assist in addressing a transmission flow constraint on the *IESO-controlled grid* or a *security limit* in circumstances where such *dispatchable load*, *electricity storage unit* or *boundary entity* would, but for such constraint or *security limit*, otherwise be or have been *dispatched* to consume (or to withdraw in the case of an *electricity storage unit* or *boundary entity*) more *energy*;

constrained off event means, in respect of a *generation unit*, an *electricity storage unit*, a *dispatchable load*, or a *boundary entity*, the event of being *dispatched* as a *constrained off facility*;

constrained off generation unit means a *generation unit*, *electricity storage unit*, or *boundary entity dispatched* by the *IESO* to supply (or to inject in the case of an *electricity storage unit* or *boundary entity*) less *energy* in order to assist in addressing a transmission flow constraint on the *IESO-controlled grid* or a *security limit* in circumstances where such *generation unit*, *electricity storage unit*, or *boundary entity* would, but for such constraint or *security limit*, otherwise be or

have been *dispatched* to supply (or to inject in the case of an *electricity storage unit* or *boundary entity*) more *energy*;

constrained on dispatchable load means a *dispatchable load*, *electricity storage unit* or *boundary entity dispatched* by the *IESO* to consume (or to withdraw in the case of an *electricity storage unit* or *boundary entity*) more *energy* in order to assist in addressing a transmission flow constraint on the *IESO-controlled grid* or a *security limit* in circumstances where such *dispatchable load*, *electricity storage unit* or *boundary entity* would, but for such constraint or *security limit*, otherwise be or have been *dispatched* to consume (or to withdraw in the case of an *electricity storage unit* or *boundary entity*) less *energy*;

constrained on event means, in respect of a *generation unit*, an *electricity storage unit*, a *dispatchable load* or a *boundary entity*, the event of being *dispatched* as a *constrained on facility*;

constrained on generation unit means a *generation unit*, *electricity storage unit*, or *boundary entity dispatched* by the *IESO* to supply (or to inject in the case of an *electricity storage unit* or a *boundary entity*) more *energy* in order to assist in addressing a transmission flow constraint on the *IESO-controlled grid* or a *security limit* in circumstances where such *generation unit*, *electricity storage unit*, or *boundary entity* would, but for such constraint or *security limit*, otherwise be or have been *dispatched* to supply (or to inject in the case of an *electricity storage unit*, *boundary entity*) less *energy*;

curtailment means the involuntary curtailment of *non-dispatchable load* as a result of insufficient *generation capacity* , or *electricity storage capacity*, of a limitation in the capacity of a *transmission system* or of actions taken by the *IESO* pursuant to Chapter 5 to maintain the *reliability* of the *IESO-controlled grid* or of the *electricity system*;

electricity storage capacity means the maximum power that an *electricity storage unit* or *electricity storage facility* can supply, usually expressed in megawatts (MWs);

electricity storage energy rating means the maximum amount of stored energy of an *electricity storage unit* or *electricity storage facility*, usually expressed in megawatt hours (MWhs);

electricity storage facility means a *facility* that is comprised of one or more *electricity storage units* and includes any structures, equipment or other things to support the functioning of its *electricity storage units;*

electricity storage facility size means the greater of the absolute values of the maximum injection and maximum withdrawal capabilities of the *electricity storage facility* expressed in either megawatts (MWs) or megavolt amperes (MVAs);

electricity storage participant means a person who owns or operates an *electricity storage facility*;

electricity storage station service means *station service* associated with an *electricity storage facility* comprising one or more *electricity storage units* each of which is a *registered facility* or

which together have been aggregated as a *registered facility* in accordance with section 2.3 of Chapter 7;

electricity storage unit means the equipment used for the sole purpose of withdrawing electricity from the *electricity system*, storing that electricity, and re-injecting it, or a portion thereof, into the *electricity system*;

electricity storage unit size means the greater of the absolute values of the maximum injection and maximum withdrawal capabilities of the *electricity storage unit* expressed in either megawatts (MWs) or megavolt amperes (MVAs);

embedded electricity storage facility means an *electricity storage facility* within the *IESO control area*, not directly connected to the *IESO-controlled grid* but is instead connected to a *distribution system*;

embedded electricity storage participant means an *electricity storage participant* within the *IESO control area* whose *electricity storage facility* is not directly connected to the *IESO-controlled grid* but is instead connected to a *distribution system;*

facility means a *generation facility*, a *load facility*, an *electricity storage facility*, a *connection facility*, a *transmission system*, or a *distribution system*, located within the *IESO control area*, or any other equipment that is a component or part of the *electricity system*;

lower energy limit means the lowest energy amount to which an *electricity storage unit* can be consistently discharged without damage beyond expected degradation from normal use;

major electricity storage facility means an *electricity storage facility* that includes an *electricity storage unit* with an *electricity storage unit size* rated at 100 MVA or higher; or that comprises multiple *electricity storage units*, the aggregated *electricity storage unit size* ratings of which equals or exceeds 100 MVA; or that is re-classified as a *major electricity storage facility* pursuant to section 1.5.1A of Appendix 2.2 of Chapter 2 or section 7.8.2A of Chapter 4;

meter point means, in respect of a *load facility* and of a *generation facility* or *electricity storage facility* that is injecting, with respect to which the current transformers are located on the output side of the *generation facility* or *electricity storage facility*, the physical location of the current transformers used to measure power flow and, in respect of a *generation facility* or an *electricity storage facility* with respect to which the current transformers are located on the grounded side of the *generation facility*, or the *electricity storage facility* the physical location of the voltage transformers;

minor electricity storage facility means an *electricity storage facility* that includes an *electricity storage unit* with an *electricity storage unit size* rated at 1 MVA or higher but less than 20 MVA; or that comprises multiple *electricity storage units*, the aggregated *electricity storage unit size* ratings of which equals or exceeds 1 MVA but is less than 20 MVA; or that is re-classified as a *minor electricity storage facility* pursuant to section 1.5.1A or 1.5.2A of Appendix 2.2 of Chapter 2 or section 7.8.2A or 7.8.2B of Chapter 4;

operating reserve means *generation capacity*, *electricity storage capacity* or load reduction capacity which can be called upon on short notice by the *IESO* to replace scheduled *energy* supply which is unavailable as a result of an unexpected *outage* or to augment scheduled *energy* as a result of unexpected *demand* or other contingencies;

quick start facility means a *generation facility* or an *electricity storage facility* whose electrical *energy* output can be provided to the *IESO-controlled grid* within 5 minutes of the *IESO's* request and is provided by equipment not synchronized to the *IESO-controlled grid* when the request to start providing *energy* is made;

reliability must-run contract means a contract between the *IESO* and a *registered market participant* or prospective *registered market participant* for a *registered facility* that is or will be a *generation facility*, an *electricity storage facility*, a *dispatchable load facility* or a *boundary entity*, which allows the *IESO* to call on that *registered market participant's* or prospective *registered market participant's registered facility* in order to maintain reliability of the *IESO-controlled grid*;

remaining duration of service means the remaining time it is expected that an *electricity storage facility* can continue injecting, or withdrawing, until it reaches its *lower energy limit*, or *upper energy limit*, respectively, assuming the *electricity storage facility* continues operating at its quantity offered or bid;

self-schedule means an hourly schedule specified by a *self-scheduling generation facility* or a *self-scheduling electricity storage facility*, and *self-scheduling* has an analogous meaning;

self-scheduling electricity storage facility means an *electricity storage facility* located within the *IESO control area* that can operate independently of *dispatch instructions* from the *IESO*, except for the provision of *regulation* services in respect of which it shall follow *dispatch instructions*;

significant electricity storage facility means an *electricity storage facility* that includes an *electricity storage unit* with an *electricity storage unit size* rated at 20 MVA or higher but less than 100 MVA; or that comprises multiple *electricity storage units*, the aggregated *electricity storage unit size* ratings of which equals or exceeds 20 MVA but is less than 100 MVA; or that is re-classified as a *significant electricity storage facility* pursuant to section 1.5.1A or 1.5.2A of Appendix 2.2 of Chapter 2 or section 7.8.2A or 7.8.2B of Chapter 4;

small electricity storage facility means an *electricity storage facility* that is comprised solely of an *electricity storage unit* with an *electricity storage unit size* rated at less than 1 MVA or that comprises multiple *electricity storage units*, the aggregated *electricity storage unit size* ratings of which is less than 1 MVA or that is re-classified as a *small electricity storage facility* pursuant to section 1.5.2A of Appendix 2.2 of Chapter 2 or section 7.8.2B of Chapter 4;

start-up time means the time in hours required to bring a *generation unit* or *electricity storage unit* on line. This is measured from the time of receiving a request to start the *generation unit* or *electricity storage unit* to the time of synchronization;

state of charge means the percentage of which an *electricity storage unit* is charged relative to the maximum registered *electricity storage energy rating* of the *electricity storage unit;*

station service means *energy* withdrawn from the *IESO-controlled grid* to power the on-site maintenance and operation of transmission *facilities, generation facilities*, *electricity storage facilities* and *connection facilities* located within the *IESO control area* but excludes *energy* consumed in association with activities which could be ceased or moved to other locations without impeding the normal and safe operation of the *facility* in question;

transmission station service means *station service* associated with transformers, capacitors, switchgear, protection systems and control systems that are part of a transmission *facility* and that do not *connect generation facilities*, *electricity storage facilities, load facilities* or *distribution facilities* to the *IESO-controlled grid*;

upper energy limit means the highest energy amount to which an *electricity storage unit* can be consistently charged without damage beyond expected degradation from normal use;