

## Final Alignment Supplementary: Incremental Amendments

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| Incremental Revisions from Provisionally Approved baseline   |   |
| <b>Title:</b>  | Chapter 0.4 and Appendices – Grid Connection Requirements |
| <b>Current Market Rules Baseline:</b>  |   |
| <p>This document shows only excerpts from sections that have been revised since the Technical Panel provisionally recommended/IESO Board provisionally approved version with tracked changes. For the full version of this and other chapters, refer to the market rule amendment proposal documents (MR-00481-R00-R12).</p> |   |

# Introduction

- A.1.1 This Chapter is part of the *renewed market rules*, which pertain to:
- A.1.1.1 the period prior to a *market transition* insofar as the provisions are relevant and applicable to the rights and obligations of the *IESO* and *market participants* relating to preparation for operation in the *IESO administered markets* following commencement of *market transition*; and
  - A.1.1.2 the period following commencement of *market transition* in respect of all the rights and obligations of the *IESO* and *market participants*.
- A.1.2 All references herein to chapters or provisions of the *market rules* will be interpreted as, and deemed to be references to chapters and provisions of the *renewed market rules*.
- A.1.3 Upon commencement of the *market transition*, the *legacy market rules* will be immediately revoked and only the *renewed market rules* will remain in force.
- A.1.4 For certainty, the revocation of the *legacy market rules* upon commencement of *market transition* does not:
- A.1.4.1 affect the previous operation of any *market rule* or *market manual* in effect before the *market transition*;
  - A.1.4.2 affect any right, privilege, obligation or liability that came into existence under the *market rules* or *market manuals* in effect prior to the *market transition*;
  - A.1.4.3 affect any breach, non-compliance, offense or violation committed under or relating to the *market rules* or *market manuals* in effect prior to the *market transition*, or any sanction or penalty incurred in connection with such breach, non-compliance, offense or violation
  - A.1.4.4 affect an investigation, proceeding or remedy in respect of,
    - (a) a right, privilege, obligation or liability described in subsection A.1.4.2, or
    - (b) a sanction or penalty described in subsection A.1.4.3.
- A.1.5. An investigation, proceeding or remedy described in subsection A.1.4.3 may be commenced, continued or enforced, and any sanction or penalty may be imposed, as if the *legacy market rules* had not been revoked.

# 1. Introduction

1.1.1 This Chapter sets forth rules to assist the *IESO* in maintaining the *reliability* of the *IESO-controlled grid* by:

1.1.1.1 requiring all *market participants* to adhere to established standards for all equipment *connected* to the *IESO-controlled grid* and to comply with certain other obligations relating generally to *connection* to the *IESO-controlled grid* and to participation in the *IESO-administered markets*; and

1.1.1.2 setting forth certain *reliability*-related obligations of *embedded generators* and *embedded electricity storage participants* that may not be *market participants*.

1.1.2 ~~Section MR Ch.1 s.7.5 of Chapter 1~~ does not apply to this Chapter and any action or event that is required to occur on or by a stipulated time or day under this Chapter or pursuant to a direction, instruction, or order made by the *IESO* under this Chapter shall occur on or by that time, whether or not a business hour, or on or by that day, whether or not a *business day*, unless otherwise specified in this Chapter or in the direction, instruction or order of the *IESO*.

1.1.3 ~~For the purposes of this Chapter, "maintaining" *reliability* shall include re-establishing or restoring *reliability* and "maintain" and "maintenance" shall be interpreted accordingly.~~[Intentionally left blank]

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# 2. Equipment Standards

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2.1.6 Nothing in this Chapter shall be deemed to interfere with the right of each *transmitter* and *distributor* to establish standards and criteria for the design, construction, and operation of equipment connected to their systems, provided that such standards and criteria:

2.1.6.1 are applied in a non-discriminatory manner to all *market participants* and *connection applicants connecting* or seeking to *connect* to the *IESO-controlled grid*;

2.1.6.2 satisfy *reliability standards* and any minimum general performance standards set forth in Appendix MR Ch.4 App.4.1; and

2.1.6.3 shall be subject to review by the *IESO* in the event there is a dispute regarding compliance with this section 2.1.6 and to the right of the *IESO* to override the application of such standards and criteria in the event it determines that they do not so comply.

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### 3. Performance Standards and Obligations of Market Participants

#### 3.2 Development of Rules for Waivers of Standards

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3.2.3 A *generator* or *electricity storage participant* may comply with its requirement to provide reactive power either by modifying any of its ~~*generatinggeneration*~~ *units* or *electricity storage units* that do not comply with any standard with respect to the provision of reactive power, or by obtaining reactive power from other appropriate ~~*generatinggeneration*~~ *units*, *electricity storage units* or *market participants*. The *IESO* shall determine whether these other ~~*generatinggeneration*~~ *units*, *electricity storage units* or *market participants* are in sufficiently close electrical proximity to the non-compliant ~~*generatinggeneration*~~ *unit* or *electricity storage unit* so as to provide the comparable or equivalent reactive power.

#### 3.3 Obligations of Transmitters

3.3.1 Each *transmitter* shall:

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3.3.1.6 obtain the prior approval of the *IESO* for all changes in or removals of equipment or *facilities connected* to the *IESO-controlled grid* that could impact on the ~~*reliable-reliable*~~ operation of the *IESO-controlled grid*;

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## 4. Connection Agreements

- 4.1.1 Each *connected wholesale customer* and each *distributor, generator and electricity storage participant* connected to the *IESO-controlled grid* shall have a signed *connection agreement*, in such form as may be prescribed by the ~~OEB~~*OEB*, with the applicable *transmitter* with whom it is *connected*.
- 4.1.2 ~~Each embedded facility that is a market participant~~*Market participants* shall have a signed ~~connection agreement~~*connection agreements for each embedded facility*, in such form as may be prescribed by the *OEB*, with the applicable *distributor* with whom it is *connected*.

## 5. Compliance, Inspection, Testing, and Monitoring

### 5.1 General Requirements

- 5.1.1 Each *transmitter, generator, electricity storage participant, connected wholesale customer or distributor* connected to the *IESO-controlled grid* shall have the obligation to test and monitor its equipment to ensure and maintain compliance with all applicable *reliability standards* required by these *market rules*. The requirement to conduct and pay for such activities shall be specified in each *connection agreement*. If any *transmitter, generator, electricity storage participant, distributor or connected wholesale customer* connected to the *IESO-controlled grid* in respect of which no relevant waiver has been granted by the *IESO* fails to comply with the provisions of this Chapter, the *IESO* shall notify the *transmitter* and the ~~connecting~~*connecting* party of such non-compliance and shall ask that the parties achieve prompt compliance with this Chapter, subject to the imposition of such penalties for failure to comply as may be specified in these *market rules*. Pending such compliance, the *IESO* may direct the *transmitter* and the ~~connecting~~*connecting* party to operate their respective equipment and *facilities* so as to maintain the *reliability* of the *IESO-controlled grid*.

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### 5.2 IESO-Required Tests of Generators and Electricity Storage Participants

- 5.2.1 In addition to any tests required by a ~~connection agreement~~*connection agreement*, the *IESO* may require a *generator or electricity storage participant* to test any *generation facility or electricity storage facility* connected to the *IESO-controlled grid* in order to determine whether such *facility* meets the requirements of this Chapter. The relevant *generator or electricity storage participant* shall comply with such request. If possible, the *IESO* shall permit such tests to be performed during the

next scheduled *planned outage* of the ~~facility~~*facility*. If the *IESO* determines that a test is required for *reliability* reasons prior to the next scheduled *planned outage* of the *facility*, the *IESO* shall cooperate with the *generator* or *electricity storage participant* to ensure that the test is conducted in a manner designed to create the minimum impact on the operation of that *facility*.

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## 5.3 IESO-Required Tests of Interconnections

- 5.3.1 The *IESO* may perform or require *transmitters* to perform tests to verify the magnitude of the power transfer capability of *interconnections* whenever:
- 5.3.1.1 a new *interconnection* between the *IESO-controlled grid* and a ~~neighboring~~*neighbouring* *electricity system* is placed into operation, augmented or substantially modified; or
  - 5.3.1.2 the *IESO* has reasonable grounds to believe that power transfer capability across that *interconnection* has materially changed.
- 5.3.2 Prior to performing or directing the performance of the tests referred to in section 5.3.1, the *IESO* shall provide as much advance notice as practicable to *market participants* and other *interconnected transmitters* whose systems, equipment or *facilities* could be materially affected by the tests. All *market participants* shall cooperate with the *IESO* and/or the relevant *transmitter* in planning, preparing for and conducting tests to assess the technical performance of *interconnections* on the *IESO-controlled grid*.
- 5.3.3 The *IESO* may temporarily direct the operation of *generation facilities* or *electricity storage facilities* during the testing of *interconnections* if and to the extent necessary to obtain operational conditions on the *IESO-controlled grid* that are required in order to achieve valid test results. The *IESO* shall plan the timing of tests so that the duration of the tests and the variation in the *dispatch* of ~~the~~*any associated* *generation facility*~~resource~~ or *electricity storage facility*~~resource~~ relative to its *dispatch* under non-test conditions are minimized to the extent possible.
- 5.3.4 Any costs that are incurred by a *generator* or *electricity storage participant* to assist in the performance of the tests required under section 5.3 that are otherwise unrecoverable shall be recovered from *market participants* in accordance with ~~section MR Ch.9 s.4.14.128 of Chapter 9~~. All such costs shall be subject to verification and audit by the *IESO* before being so recovered.

## 6. Establishing or Modifying IESO-Controlled Grid Facilities and

# Connections

## 6.1 General Requirements

6.1.1 Subject to the *reliability standards* required by these *market rules* and to sections 6.1.7, 6.1.22 and 6.1.23, the requirements associated with the design and construction of *connections* to the *IESO-controlled grid* shall be established between the *connecting market participant* or *connection applicant* and the *transmitter* with whom the *market participant* or *connection applicant* seeks to *connect*.

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~~6.1.2.2 [Intentionally left blank]~~

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~~6.1.4.2 [Intentionally left blank]~~

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6.1.16 The *IESO* shall process each *request for connection assessment* in accordance with the procedures referred to in section 6.1.14 and as follows:

6.1.16.1 the *IESO* shall, unless the *request for connection assessment* is withdrawn or deemed to have been withdrawn pursuant to the procedures referred to in section 6.1.14, conduct a *connection assessment* in respect of the subject-matter of the *request for connection assessment* in accordance with the procedures referred to in section 6.1.14;

6.1.16.2 the *IESO* shall provide to the *connection applicant* and to the applicable *transmitter* a copy of the report of the results of the completed *connection assessment* referred to in section 6.1.16.1;

6.1.16.3 provided that the *connection applicant* has met the requirements of section 6.1.15, within such time as may be specified in the procedures referred to in section 6.1.14,

~~a. [Intentionally left blank]~~

~~b. [Intentionally left blank]~~

~~c. [Intentionally left blank]~~

the *IESO* shall conduct a *connection assessment* in respect of the subject-matter of the *request for connection assessment* in accordance with the procedures referred to in section 6.1.14;

6.1.16.6 provided that the *connection applicant* has, within such time or times following the date of completion of the *connection assessment* that relates to its *request for connection assessment* as may be specified in the procedures referred to in section 6.1.14, filed with the *IESO* such confirmation or evidence, as the case may be and as may be specified in such procedures, of its intention to proceed with the new or modified *connection* that is the subject-matter of its *request for connection assessment*:

- a. the *connection applicant* shall retain the priority allocated to its *request for connection assessment*; and
- b. the *IESO* shall include the results of such *connection assessment* in such subsequent *connection assessment*, conducted within the times specified in the procedures referred to in section 6.1.14, as may be appropriate.

c. ~~[Intentionally left blank—section deleted]~~

### 6.3 Disconnection by Transmitter, Distributor or Market Participant

6.3.1 A *transmitter* may *disconnect* from the *IESO-controlled grid* the *facilities* or equipment of a *market participant* in accordance with the *market rules* and *applicable law*.

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~~6.3.1.2 [Intentionally left blank]~~

~~6.3.1.3 [Intentionally left blank]~~

6.3.1A Subject to section 6.4.3, a *transmitter* shall notify the *IESO* prior to *disconnecting* from the *IESO-controlled grid* the *facilities* or equipment of a *market participant* for any reason other than in response to a *disconnection order*.

6.3.2 Each *transmitter*, *distributor* and other *market participant* to whom a *disconnection order* is issued pursuant to section 6.4 shall, subject only to ~~section MR Ch.5 s.3.4.1.5 or s.3.7.1.5 of Chapter 5~~, as the case may be, on the date and at the time specified in the *disconnection order*, *disconnect* the *facilities* or equipment referred to in the *disconnection order*.



6.3.3 Without limiting the generality of ~~section MR Ch.1 s.8.3 of Chapter 1~~, a *disconnection order* may be issued by the *IESO* to a *transmitter*, *distributor* or other *market participant* pursuant to section 6.4 by voice communication.

## 6.4 Disconnection During an Emergency or For Safety or Reliability Reasons

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6.4.2B Where the *IESO* becomes aware that a *generator* or *electricity storage participant* has synchronized (respectively) either a *generation ~~unit~~ resource*, or an *electricity storage ~~unit~~ resource* to the *IESO-controlled grid* other than in accordance with section 11.2 of Chapter 7, the *IESO* may issue a *disconnection order* directing the relevant *transmitter* to *disconnect* the *generation unit* or *electricity storage unit* from the *IESO-controlled grid*.

6.4.3 A *transmitter* may, in accordance with the provisions of its *licence*, any code issued by the *OEB* with which the *transmitter* is required to comply, or the *market rules*, immediately *disconnect* from the *IESO-controlled grid* the *facilities* or equipment of a person where:

6.4.3.1 such action is urgently required to ensure the safety of any person, prevent the damage of equipment, or the environment;

6.4.3.2 the urgency is such that there is insufficient time to notify the *IESO* prior to such action being taken; and

6.4.3.3 the *transmitter* is the operator of a ~~connection facility~~ *connection facility*.

A *transmitter* that *disconnects* a person's *facilities* or equipment pursuant to this section 6.4.3 shall promptly inform the *IESO* that such action has been taken.

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## 7. Provision of Connection-Related Information

### 7.1 Provision of Information

7.1.5 Each *embedded generator* that:

7.1.5.1 participates in the *IESO-administered markets* and whose *embedded generation facility* includes a *generation unit* rated at 1 MW or higher;

7.1.5.2 is not a ~~non-market participant~~ market participant and whose *embedded generation facility* includes a *generation unit* rated at 10 MVA or higher,

and that is not required to provide data pursuant to section 7.1.4, shall provide the *IESO* with applicable *connection-related reliability information*.

7.1.6 Each *variable generator* shall provide data to the *IESO* in accordance with the applicable *market manual* for the purposes of deriving forecasts of the amount of *energy* that the *variable generator* is capable of producing.

7.1.7 Each *embedded electricity storage participant* whose *embedded electricity storage facility* includes an *electricity storage unit* with an *electricity storage unit size* greater than 10 MVA and that is designated by the *IESO* for the purposes of this section 7.1 shall provide to the *IESO* ~~the connection-related reliability information described in Part A of Appendix 4.6~~ as may be requested by the *IESO*.

7.1.8 Each *embedded electricity storage participant* that:

7.1.8.1 participates in the *IESO-administered markets* and whose *embedded electricity storage facility* includes an *electricity storage unit* with an *electricity storage unit size* of 1 MW or higher;

7.1.8.2 is not a ~~non-market participant~~ market participant and whose *embedded electricity storage facility* includes an *electricity storage unit* with a maximum *electricity storage unit size* of 10 MVA or higher,

and that is not required to provide data pursuant to section 7.1.7, shall provide the *IESO* with ~~the data listed in Part B of Appendix 4.6~~ applicable connection-related reliability information.

### **7.3 Monitoring Information Provided by Generators to the IESO**

7.3.1 Subject to section 7.3.2, in order to permit the *IESO* to direct the operations of the *IESO-controlled grid*, each:

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

7.3.1.2 *embedded generator* (i) that is not a *market participant* or whose *embedded generation facility* is not associated with any *resources*; (ii) whose *embedded generation facility* includes a *generation unit* rated at greater than 20 MVA or that comprises *generation units* the ratings of which in the aggregate exceeds 20 MVA; and (iii) that is designated by the *IESO* for the purposes of this section 7.3.1 as being required to provide such data in order to enable the *IESO* to maintain the *reliability* of the *IESO-controlled grid*,

shall provide the *IESO* with the data listed in Appendix 4.15 on a continual basis. Such data shall not be modified by the *generator* and shall be provided:

- 7.3.1.3 with equipment that meets the requirements set forth in ~~Appendix 2.2 of Chapter 2 MR Ch.2 App 2.2~~; and
- 7.3.1.4 subject to section 7.6A, in accordance with the performance standards set forth in Appendix 4.19.

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7.3.5 The *IESO* shall, as soon as practicable prior to each *dispatch hour*, ~~endeavour use reasonable efforts~~ to provide a confidential forecast produced by the *forecasting entity* to each *registered market participant* for each of their *variable generation facilities* as specified in the applicable *market manual*. ~~The IESO shall determine and publish the date when the confidential forecasts will first become available.~~

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### **7.3A Monitoring Information Provided by Electricity Storage Participants to the IESO**

- 7.3A.1 Subject to section 7.3A.2, in order to permit the *IESO* to direct the operations of the *IESO-controlled grid*, each:
  - 7.3A.1.1 *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
  - 7.3A.1.2 *embedded electricity storage participant* (i) that is not a *market participant* or whose *embedded electricity storage facility* is not associated with any *resources*; (ii) whose *embedded electricity storage facility* includes an *electricity storage unit* with a rated *electricity storage unit size* greater than 20 MVA or that comprises multiple *electricity storage units*, the aggregated *electricity storage unit size* ratings of which exceed 20 MVA; and (iii) that is designated by the *IESO* for the purposes of this section 7.3A.1 as being required to provide such data in order to enable the ~~IESO~~ *IESO* to maintain the reliability of the *IESO-controlled grid*,

shall provide the *IESO* with the data listed in Appendix 4.24 on a continual basis. Such data shall not be modified by the *electricity storage participant* and shall be provided:

- 7.3A.1.3 with equipment that meets the requirements set forth in ~~Appendix MR Ch.2 App.2 of Chapter 2~~; and
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## 7.4 Monitoring Information Provided by Transmitters to the IESO

7.4.1 In order to permit the *IESO* to direct the operations of the *IESO-controlled grid*, each *transmitter* shall provide the *IESO* with the data listed in Appendix 4.16 on a continual basis. Such data shall not be modified by the *transmitter* and shall be provided:

7.4.1.1 with equipment that meets the requirements set forth in [Appendix MR Ch.2 App2.2-of-Chapter-2](#); and

7.4.1.2 in accordance with the performance standards set forth in Appendix 4.20 and, subject to section 7.6A, Appendix 4.21.

~~7.4.2~~ ~~[Intentionally left blank]~~

## 7.5 Monitoring Information Provided to the IESO by Connected Wholesale Customers and Distributors Connected to the IESO-Controlled Grid

7.5.1 In order to permit the *IESO* to direct the operations of the *IESO-controlled grid*, each *connected wholesale customer* and each *distributor connected* to the *IESO-controlled grid* shall provide the *IESO* with the data listed in Appendix 4.17 on a continual basis. Such data shall not be modified by the *connected wholesale customer* or *distributor connected* to the *IESO-controlled grid*, as the case may be, and shall be provided:

7.5.1.1 with equipment that meets the requirements set forth in [Appendix MR Ch.2 App.2-of-Chapter-2](#); and

7.5.1.2 subject to section 7.6A, in accordance with the performance standards set forth in Appendix 4.22.

7.5.2 A *distributor* that is not *connected* to the *IESO-controlled grid* and that is designated by the *IESO* for the purposes of this section 7.5.2 as being required to provide the data listed in Appendix 4.17 in order to enable the *IESO* to maintain the *reliability* of the *IESO-controlled grid* shall comply with the obligations set forth in section 7.5.1.

## 7.6 Monitoring Information Provided by Embedded Load Customers to the IESO

7.6.1 In order to permit the *IESO* to direct the operations of the *IESO-controlled grid*, each *embedded load consumer* that is designated by the *IESO* for the purposes of this section 7.6.1 as being required to provide such data in order to enable the *IESO* to maintain the *reliability* of the *IESO-controlled grid* shall provide the *IESO* with the data listed in Appendix 4.18 on a continual basis. Such data shall not be modified by the *embedded load consumer* and shall be provided:

- 7.6.1.1 with equipment that meets the requirements set forth in ~~Appendix 2.2 of Chapter MR Ch.2 App2.2~~; and
- 7.6.1.2 subject to section 7.6A, in accordance with the performance standards set forth in Appendix 4.23.

## 7.6A Alternative Arrangements for Submission of Data Measurements

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7.6A.2 Where an alternative arrangement proposed pursuant to section 7.6A.1 relates to the requirement to make data measurements or equipment status changes available at the *IESO* communications interface within less than 2 seconds from the change in field monitored quantity or field status change, as the case may be, the *IESO* shall approve the alternative arrangement if:

- 7.6A.2.1 the proposed alternative arrangement demonstrates to the satisfaction of the *IESO* that the *market participant's facilities* and equipment are capable of providing the data measurements or equipment status changes in such a manner that such data will be displayed on the communications terminals located at the *IESO's* principal and back-up control ~~centers~~centres within less than 8 seconds from the change in field monitored quantity or field status change; and

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7.6A.3 Where an alternative arrangement proposed pursuant to section 7.6A.1 relates to the requirement to make data measurements or equipment status changes available at the *IESO* communications interface within less than 10 seconds from the change in field monitored quantity or field status change, as the case may be, the *IESO* shall approve the alternative arrangement if:

- 7.6A.3.1 the proposed alternative arrangement demonstrates to the satisfaction of the *IESO* that the *market participant's facilities* and equipment are capable of providing the data measurements or equipment status changes in such a manner that such data will be displayed on the communications terminals located at the *IESO's* principal and back-up control ~~centers~~centres within less than 20 seconds from the change in field monitored quantity or field status change; and
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## 7.7 Reliability, Maintenance and Repair of Monitoring and Control Equipment

7.7.2 Each person referred to in section 7.7.1 and 7.3.2A shall respond to an *outage* of or defect in the equipment referred to in section 7.7.1 or the applicable *market manual*:

7.7.2.1 immediately, in the case of equipment relating to *facilities* to which the high performance information monitoring standard applies pursuant to Appendices 4.19 to 4.23 and Appendix 4.25 other than *significant generation facilities, significant dispatchable load facilities* and *significant electricity storage facilities*.

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7.7.2.2 no later than the next day following the day on which the *outage* or defect is discovered, in the case of equipment relating to *significant generation facilities, significant electricity storage facilities, significant dispatchable load facilities, variable generation*, and *facilities* to which the medium performance information monitoring standard applies pursuant to Appendices 4.19 to 4.23 and Appendix 4.25.

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7.7.4 The *IESO* may direct a person referred to in section 7.7.1 and 7.3.2A to respond and restore the equipment referred to in section 7.7.1 or the applicable *market manual* to a fully operational state following an *outage* of or defect in such equipment within such longer or shorter time periods than those referred to in sections 7.7.2 and 7.7.3 based on the immediate or short-term impact of the unavailability of the equipment

| on the ~~reliable~~-reliable operation of the *IESO-controlled grid*, provided that where a person is directed to respond and restore any such equipment in less than 24 hours, the person shall use commercial best efforts to achieve such direction.