



Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00381		
Subject:	Renewable Integration Initiative		
Title:	Market Schedule and Congestion Management Settlement Credits for Variable Generation		
Nature of Proposal:	<input checked="" type="checkbox"/> Alteration	<input type="checkbox"/> Deletion	<input checked="" type="checkbox"/> Addition
Chapter:	7, 9, 11	Appendix:	
Sections:	Chapter 7, sections 6.4.2.9A (new), 7.1.1B1 (new), 7.1.2A1(new), Chapter 9, section 3.5.1E (new), 3.5.2, Chapter 11 definitions (new)		
Sub-sections proposed for amending:			

PART 2 – PROPOSAL HISTORY

Version	Reason for Issuing	Version Date
1.0	Draft for Technical Panel review	August 14, 2012
2.0	Publish for Stakeholder Review and Comment	August 23, 2012
3.0	Submitted for Technical Panel Vote	September 21, 2012
4.0	Recommended by Technical Panel; Submitted for IESO Board Approval	October 16, 2012
5.0	Approved by IESO Board	November 29, 2012
Approved Amendment Publication Date:	January 3, 2013	
Approved Amendment Effective Date:	The effective date is anticipated to be in the third/fourth quarter of 2013, and shall be specified by the Chief Executive Officer of the IESO in a notice to all market participants.	

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

This amendment submission proposes to specify the use of a 5-minute forecast produced by the forecasting entity in the IESO's determination of the market schedule and price, and subsequently the market schedule quantity for each facility to be used for all settlement purposes, including congestion management settlement credits (CMSC) for variable generators that are registered market participants.

This proposal is based on stakeholder consultation as part of SE-91 Renewable Integration which includes the Dispatch Technical Working Group (DTWG) and the Floor Price Focus Group (FPFG).

Further information on SE-91 can be found on the IESO's website at:

http://www.ieso.ca/imoweb/consult/consult_se91.asp

Background

As part of the renewable integration design, the IESO will actively dispatch all variable generation¹ directly connected to the IESO-controlled grid and those embedded variable resources that are registered market participants through the five-minute security constrained economic dispatch.

This proposal specifies how the market schedule and corresponding CMSC for applicable variable generators will be determined. Variable generators are different from existing generators in that their ability to economically produce energy is a function of their available fuel, over which they have no control. As a result, the following changes are required:

- The IESO's dispatch algorithm must take into account a 5-minute forecast for each dispatch interval indicating available fuel when determining the market schedule for variable generators and the market clearing price for a given interval. The market schedule quantities determined by the dispatch algorithm will be inputs into the calculation of CMSC for variable generators.
- A new defined term, "release notification," which allows a variable generator to supply energy according to ambient fuel conditions once "released" by the IESO from a previously issued dispatch instruction.

¹ Market Rules, Chapter 11 Definition: *variable generation* means all wind and solar photovoltaic resources with an installed capacity of 5MW or greater, or all wind and solar photovoltaic resources that are directly connected to the *IESO-controlled grid*.

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Discussion

Market Schedule for Variable Generation

The following change is proposed in Chapter 7, section 6.4.2.9A (new):

- Specify that for variable generators that are registered market participants, if the registered facility is issued a dispatch instruction by the IESO in accordance with section 7.1 (“IESO Dispatch Instructions”), the market schedule quantity for that dispatch interval shall:
 - i. Be limited to reflect the least of offers, outage information, and 5-minute forecast for the generation facility for that dispatch interval. Similar to the mechanism used to integrate centralized forecasting into the pre-dispatch and Day-Ahead Commitment Process (DACP) via [MR-00381-R00: Centralized Forecasting Integration](#), IESO systems will incorporate the 5-minute forecast produced by the forecasting entity for a dispatch interval as a limit to be applied on offers submitted by variable generators. The 5-minute forecasted quantity will be used in the pricing process.

Section 7.1.1A of Chapter 7 specifies the current practice where the IESO only issues dispatch instructions for a given dispatch interval when there is a change in the quantity relative to the last dispatch instruction issued to the registered facility. For clarity, the mechanism limiting the quantity in the market scheduled (to reflect offers, outages, and the 5-minute forecast) will be used in all intervals during which a dispatch instruction is applicable (for example, if a dispatch instruction is received for 50MW and is applicable for five consecutive intervals, all five intervals will have the limiting mechanism apply).

In the absence of the requirement for a variable generator to follow a dispatch instruction sent by the IESO in a dispatch interval, the market schedule will be determined using a telemetry snapshot at the end of the dispatch interval, and this quantity will be used in the pricing process as is the case today for intermittent generators.

Release Notifications

The following change is proposed in Chapter 7, section 7.1.1B1 (new):

- Specify that for variable generators that are registered market participants, existing section 7.1.1B will apply until the registered facility is issued a release notification. Variable generators are the only subset of dispatchable generation facilities that will receive a release notification, and the last “instruction” from the IESO will be the last dispatch instruction or release notification.

In addition, the following changes are proposed in Chapter 7, section 7.1.2A1 (new):

- Specify that the IESO shall issue a release notification to a variable generator that is a registered market participant if the registered facility is not required to be at or below forecasted output. In other words, when issued a release notification, the registered facility may generate at any level which ambient fuel conditions allow until the next dispatch

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instruction is sent by the IESO.

- Obligate each variable generator to acknowledge the receipt of a release notification using the systems and protocols defined in the applicable market manual (MM 4.3: Real-Time Scheduling of the Physical Markets). Similar to responding to a (mandatory) dispatch instruction, the market manual will specify that variable generators must acknowledge receipt of a release notification for each dispatch interval (when issued) within 60 seconds of receipt of the notification via an “ACCEPT” action through the IESO’s Web-Based Message Exchange.

It is also proposed to add a defined term in Chapter 11:

- “release notification,” meaning in respect of a variable generator that is a registered market participant, a notification issued by the IESO providing that energy may be supplied from the variable generation facility to the IESO-controlled grid as ambient fuel conditions allow until a dispatch instruction is sent.

When the security or economic constraints of a previous (mandatory) dispatch instruction no longer exist, and once the generator can ramp to the full level allowed by ambient fuel conditions, the variable generator will be issued a release notification whereby the generation facility may operate according to available wind/irradiance (note: any ramp-up limitations will generate a mandatory dispatch instruction). A release notification will only be issued in one interval following a (mandatory) dispatch instruction (i.e. there will be no instances of a release notification being issued in consecutive intervals).

CMSC for Variable Generation

The following change is proposed in Chapter 9, section 3.5.1E (new):

- Specify that for the purpose of calculating CMSC for variable generators that are registered market participants:
 - i. If the registered facility is required to follow dispatch instructions issued by the IESO for any given dispatch intervals, the corresponding CMSC for those dispatch intervals will be calculated using the market schedule quantity determined in accordance with section 6.4.2.9A of Chapter 7 (i.e. represent the estimated amount of energy the generation facility could have produced considering offers, outages, and the 5-minute forecast for the interval).
 - ii. In cases where the registered facility is not required to follow dispatch instructions issued by the IESO, the market participant will not be eligible for CMSC in that interval.

PART 4 – PROPOSED AMENDMENT

Chapter 7

6. The Real-Time Scheduling Process**6.4 Market Schedules and Market Prices**

- 6.4.1 Subject to section 8.4A the *IESO* shall, within five minutes after the end of each *dispatch interval*, use the *dispatch algorithm* to determine a *market schedule* and *market prices* for that *dispatch interval* based on the most recent *real-time schedule* for such *dispatch interval*.
- 6.4.2 Subject to section 8.4A for the purpose of determining the *market schedule* and *market prices* for any *dispatch interval*, the *IESO* shall use the same information and data used for determining the *real-time schedule* for that *dispatch interval*, except that:
- 6.4.2.1 the unconstrained *IESO-controlled grid* model shall be used;
 - 6.4.2.2 subject to section 3.1.2 of Appendix 7.5, the initial conditions to be used for any *dispatch interval* in the *market schedule* shall be the final conditions of the *market schedule* for the preceding *dispatch interval*;
 - 6.4.2.3 the total demand (including losses) to be satisfied within a *dispatch interval* in the *market schedule* shall be set at the *IESO's* best estimate of its actual value, as determined from real-time system data;
 - 6.4.2.4 total system *energy* losses determined in the *real-time schedule* shall be represented as an increase in *non-dispatchable load* within the *IESO control area*;
 - 6.4.2.5 any *registered facility* in respect of which a *forced outage* has been detected during a *dispatch interval* shall be recognized by an adjustment to the input data;
 - 6.4.2.6 subject to section 6.4.2A, the estimated deviations between scheduled quantities and actual quantities shall be represented as a change in *non-dispatchable load* in the *IESO control area*;
 - 6.4.2.7 subject to section 6.4.2A, the *market schedule* shall reflect dispatch adjustments computed using scheduled injections from the *constrained schedule*, outlined in Appendix 7.5;

- 6.4.2.8 in accordance with section 4.13.1 of Appendix 7.5, the *market schedule* may use different trading period length to that of the *real-time schedule*; ~~and~~
- 6.4.2.9 in accordance with section 2.11.2 of Appendix 7.5, the *market schedule* may use a different ramp rate for *operating reserve* to that of the *real-time schedule*; ~~and-~~
- 6.4.2.9A for a variable generator that is a registered market participant, if the registered facility is issued a dispatch instruction by the IESO in accordance with section 7.1, the quantity of energy scheduled for injection in the market schedule for the applicable dispatch intervals shall be limited to reflect the least of energy offers, outages, and the forecast of energy produced by the forecasting entity for the registered facility.
- 6.4.2A Until such time that locational pricing is implemented in the *IESO-administered markets*, in determining the *market schedule* and *market prices* for any *dispatch interval*, the *IESO* shall not have regard to the estimated deviations referred to in section 6.4.2.6 or to the dispatch adjustments referred to in section 6.4.2.7.
- 6.4.3 The *IESO* shall determine for *registered facilities* that are *boundary entities* a *market schedule* for each *dispatch hour* using the outcome of the projected *market schedule* determined as at the preceding *dispatch hour* and modified as required by the *IESO*.

7. IESO Dispatch Instructions

7.1 Purpose and Timing of Dispatch Instructions

- 7.1.1 The *IESO* shall determine *dispatch instructions* for each *registered facility* as described in this section 7, as the primary means of co-ordinating the *real-time operation* of the *electricity system*.
- 7.1.1A The *IESO* shall only issue *dispatch instructions* for a *physical service* to a *registered facility* other than a *boundary entity* for a given *dispatch interval* when there is a change in the quantity of a *physical service* to be scheduled from that *registered facility* during that *dispatch interval* relative to the last *dispatch instruction* issued to the *registered facility* and with which the *registered market participant* has confirmed compliance in accordance with section 7.1.2 and 7.1.2A.
- 7.1.1B Where the *IESO*:

7.1.1B.1 is not required to issue a *dispatch instruction* at a *registered facility* other than a *boundary entity* for a given *dispatch interval* by virtue of section 7.1.1A; or

7.1.1B.2 for any reason fails to issue a *dispatch instruction* to a *registered facility* other than a *boundary entity* for a given *dispatch interval*,

subject to section 7.1.1B1, the last *dispatch instruction* issued to the *registered facility* and with which the *registered market participant* has confirmed compliance in accordance with sections 7.1.2 and 7.1.2A shall, for all purposes under these *market rules* but subject to section 7.1.4 and 7.4.3, be deemed to be the *dispatch instruction* issued for that *dispatch interval* for that *registered facility*.

7.1.1B1 For a variable generator that is a registered market participant, section 7.1.1B shall apply until the registered facility is issued a release notification.

7.1.1C Notwithstanding the identification of a portion of the consumption at a *registered facility* under section 3.3.18 as *non-dispatchable load*, the *IESO* shall issue *dispatch instructions* in accordance with the applicable *market manual* to that *registered facility* including that portion that has been identified pursuant to section 3.3.18 as *non-dispatchable load*.

7.1.2 Subject to section 7.1.1A, the *IESO* shall issue *dispatch instructions* for each *registered facility*, other than a *boundary entity*, for which a *dispatch instruction* is required no later than the start of each *dispatch interval* or, where section 7.1.4 or 7.4.3 applies, within a *dispatch interval*. The *IESO* shall:

7.1.2.1 [Intentionally left blank]

7.1.2.2 issue such *dispatch instructions* using the systems and protocols defined in the applicable *market manual*; and

7.1.2.3 record and time-stamp all such *dispatch instructions*, store such records for at least seven years and make such records available for purposes of audit and dispute resolution in accordance with these *market rules*.

7.1.2A Each *registered market participant* shall:

7.1.2A.1 acknowledge receipt of; and

7.1.2A.2 confirm its intention to comply or not to comply with,

each *dispatch instruction* issued to it in accordance with section 7.1.2 in respect of each of its *registered facilities*, other than a *boundary entity*, using the systems and protocols defined in the applicable *market manual* and within the time

required by such *market manual*.

7.1.2A1 The IESO shall issue a release notification to a variable generator that is a registered market participant if the registered facility is not required to be at or below forecasted output. Each variable generator shall acknowledge receipt of each release notification using the systems and protocols defined in the applicable market manual and within the time required by such market manual.

Chapter 9

3.5 Hourly Settlement Amounts for Congestion Management

3.5.1 The *dispatch instructions* provided by the IESO to *market participant 'k'* will sometimes instruct *k* to deviate from its *market schedule* in ways that, based on *market participant 'k's offers and bids*, imply a change to *market participant 'k's net operating profits* relative to the operating profits implied by *market participant 'k's market schedule*. When this occurs and *market participant 'k'* responds to the IESO's *dispatch instructions*, *market participant 'k'* shall, subject to Appendix 7.6 of Chapter 7, receive as compensation a *settlement credit* equal to the change in implied operating profits resulting from such response, calculated in accordance with section 3.5.2. If *market participant 'k'* does not fully or accurately respond to its *dispatch instructions* from the IESO, the compensation paid to *market participant 'k'* shall be altered as set forth in this section 3.5, or as otherwise specified by the IESO.

3.5.1A A *registered market participant* for a *registered facility* that is a *dispatchable load* is not entitled to a congestion management settlement credit determined in accordance with section 3.5.2 where that *registered facility's DQSW* is less than the corresponding *MQSW* at that location for the same *metering interval* as the result of that *registered facility's own equipment or operational limitations*, if:

- 3.5.1A.1 that *registered facility* does not fully or accurately respond to its *dispatch instructions*; or
- 3.5.1A.2 the ramping capability of that *registered facility*, as represented by the ramp rate set out in the *offers or bids*, is below the threshold for the IESO to modify *dispatch instructions* and thereby prevents changes to the *dispatch*;

and then the IESO may withhold or recover such congestion management settlement credits and shall redistribute any recovered payments in accordance with section 4.8.2 of Chapter 9.

- 3.5.1B *A market participant shall not be invoiced congestion management settlement credits for an export transaction if that transaction attracted the congestion management settlement credits under the following conditions:*
- 3.5.1B.1 *the net interchange schedule limit is binding in the market schedule on an economic export transaction in pre-dispatch, and subsequently, in accordance with section 6.1.3 of Chapter 7, the IESO increases the quantity of that transaction in the real-time schedule; or*
 - 3.5.1B.2 *the net interchange schedule limit is binding in the market schedule on an uneconomic export transaction in pre-dispatch, and subsequently, in accordance with section 6.1.3 of Chapter 7, the IESO decreases the quantity of that transaction in the real-time schedule.*

The amount of congestion management settlement credits referred to in this section is limited to the portion of the transaction that is modified by the IESO.

3.5.1C [Intentionally left blank – section deleted]

3.5.1D *A registered market participant for a registered facility that is a dispatchable load shall not be entitled to a congestion management settlement credit determined in accordance with section 3.5.2 for settlement hour ‘h’ where:*

- 3.5.1D.1 *the price-quantity pairs contained in the energy bid associated with that registered facility for settlement hour ‘h’ are not identical to the price-quantity pairs in the energy bid associated with the same registered facility for the applicable preceding settlement hour or following settlement hour;*
- 3.5.1D.2 *the change in energy bid as referred to in section 3.5.1D.1 results in a change in the quantity scheduled in the market schedule for that registered facility as described in the applicable market manual;*
- 3.5.1D.3 *the change in energy bid as referred to in section 3.5.1D.1 results in the ramping of the that registered facility as described in the applicable market manual; and*
- 3.5.1D.4 *that registered facility’s DQSW is less than the corresponding MQSW at that location for any metering interval falling within settlement hour ‘h’.*

3.5.1E For the purpose of calculating congestion management settlement credits for variable generators that are registered market participants:

- 3.5.1E.1 if the registered facility is required to follow dispatch instructions issued by the IESO for any given dispatch intervals, the corresponding congestion management settlement credits for those dispatch intervals shall be calculated using the market schedule quantity determined in accordance with section 6.4.2.9A of Chapter 7; and

3.5.1E.2 the market participant shall not be eligible for congestion management settlement credits in dispatch intervals where the registered facility is not required to follow dispatch instructions issued by the IESO.

3.5.2 Subject to sections 3.5.1A, 3.5.1D, 3.5.1E, 3.5.6, 3.5.6A, 3.5.6B, 3.5.6C, 3.5.6D and 3.5.9 and subject to Appendix 7.6 of Chapter 7, the hourly congestion management settlement credit for market participant ‘k’ for settlement hour ‘h’ (“CMSC_{k,h}”) shall be determined by the following equation:

Chapter 11

1. Definitions

release notification means in respect of a variable generator that is a registered market participant, a notification issued by the IESO providing that energy may be supplied from the variable generation facility to the IESO-controlled grid as ambient fuel conditions allow until a dispatch instruction is sent;

PART 5 – IESO BOARD DECISION RATIONALE

As part of the renewable integration design, this amendment is a component of the IESO’s ability to actively dispatch all variable generators that are registered market participants through the five-minute security constrained economic dispatch, which is an essential tool for the IESO to maintain system reliability and market efficiency.