Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00349-R00			
Subject:	Enhanced Day-Ahead Commitment Process (EDAC): Settlement Guarantees			
Title:	Day-Ahead Commitment Process Variables, Data, and Information			
Nature of Proposal:	☒ Alteration	☐ Deletion	☐ Addition	
Chapter:	9	Appendix:		
Sections:				
Sub-sections proposed for amending:	3.1.2A, 3.1.2B, 3.1.2C, 3.1.2D (new)			

PART 2 – PROPOSAL HISTORY

Version	Reason for Issuing	Version Date
1.0	Working Draft for Discussion Purposes	September 11, 2009
2.0	Working Draft for Discussion Purposes	November 17, 2009
3.0	Draft for Technical Panel Review	December 9, 2009
4.0	Publish for Stakeholder Review and Comment	December 17, 2009

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 MR-00349 market rule amendments specify the settlement activities for the determination of reliability guarantee payments and related settlement amounts for the enhanced day-ahead commitment process (EDAC).

This amendment, MR-00349-R00, specifies the IESO obligations to determine and carry forward to the settlement process the information and data necessary to determine EDAC reliability guarantees and other related settlement amounts.

These IESO obligations are necessary to ensure transparent, accurate and timely determination of the relevant settlement amounts.

Background

In 2007, the IESO initiated a study to assess how IESO day-ahead mechanisms might be amended to support anticipated changes in Ontario's electricity sector. The study addressed both current and future challenges including how to most efficiently integrate and optimize Ontario's changing infrastructure. The merits of various possible day-ahead mechanisms were studied and assessed under Stakeholder Engagement Plan 21 (SE-21).

Cost benefit analysis (CBA) techniques were used to help identify improvements to day-ahead mechanisms that would result in net benefits to the Province as a whole relative to the current day-ahead commitment process (DACP). The cost-benefit analysis included both IESO and stakeholder costs and compared them to benefits measured through overall market efficiency impacts.

Following a review of the Assessment with stakeholders, the IESO day-ahead team recommended, and the IESO Board of Directors agreed at its June 19, 2008 meeting, to proceed with a stepped approach for moving forward, starting with the design of the common elements of the differing options.

These common elements are:

- Optimization of commitment over the entire 24 hours of the next day;
- Use of multiple passes of the constrained algorithm to determine commitment and

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resource scheduling; and

- Three-part offers, i.e. the use of offers for energy supported by submitted 'fixed'[1] costs and technical data.

From the results of the preliminary work, the large majority of stakeholders and Stakeholder Advisory Committee (SAC) members concluded that the proposed design of the common elements, the principles behind the cost guarantees, and the inclusion of exports were acceptable because they would benefit the province.

At its meeting on September 5, 2008 the IESO Board granted approval for the development of the common elements (described above) and delegated to the Audit Committee of the IESO Board the responsibility for oversight of the EDAC project.

On February 11, 2009 the IESO's Audit Committee approved version 1.0 of the EDAC Market Design and directed IESO staff and the Technical Panel to develop the market rule amendments necessary to implement the design.

For further information on the EDAC Settlement Guarantees please refer to:

http://www.ieso.ca/imoweb/pubs/mr2009/MR-00349-Q00.pdf

The following design document outlines the design details for the common elements, export inclusion and day-ahead guarantees for both generators and importers: http://www.ieso.ca/imoweb/pubs/consult/se21-edac/se21-20090206-EDAC_Market_Design_v1.pdf

For further information on the EDAC calculation engine market rules please refer to:

MR-00348: Enhanced Day-Ahead Commitment Process (EDAC): 24 Hour Optimization and 3-part Offers at the following links: http://www.ieso.ca/imoweb/pubs/mr2009/MR-00348-R00-R05.pdf and http://www.ieso.ca/imoweb/pubs/mr2009/MR-00348-R06.pdf.

Discussion

One of the key elements of the EDAC Settlement Guarantees is the introduction of a new Day-Ahead Production Cost Guarantee (DA-PCG) which will replace the Day-Ahead Generation Cost Guarantee.

The design of the Day-Ahead Production Cost Guarantee (DA-PCG) allows eligible dispatchable generation facilities guaranteed cost recovery if dispatched to produce in the real-time market when real-time revenue is insufficient to cover as-offered costs incorporated in

[1] Typically includes unit start-up and minimum generation costs (commonly referred to as 'fixed costs' although this may not meet the formal accounting definition of a fixed production cost).

PART 3 – EXPLANATION FOR PROPOSED AMENDMENT

schedules committed to day-ahead.

Commitments, schedules and DA–PCG will be based upon cost and technical information made available in advance of the day-ahead scheduling process.

In contrast to the existing DACP day-ahead generation cost guarantee (DA-GCG) program, with the implementation of EDAC, those eligible resources receiving day-ahead commitments and schedules cannot reject their commitment and can only remove themselves from day-ahead commitments through a withdrawal process.

The DA-PCG calculations:

- will consider the schedule of record quantity for each start over the entire 24-hour dispatch day;
- will consider real-time energy-only schedules on a 5-minute interval basis for the lower of allocated quantity of energy injected (AQEI) and real-time constrained schedule; and
- will be based on the total day-ahead schedules versus today's minimum loading point for minimum generation block run time (MGBRT).

<u>The Derivation of Day-Ahead Production Cost Guarantees</u>

The proposed method for calculating the DA-PCG payments made to eligible dispatchable generators consists of five components:

1. Component 1: Any shortfall in payment on the delivered real-time dispatch of the schedule of record quantity will be based upon the real-time revenue received for that amount of energy in comparison with the offered costs as represented in the generator's day-ahead offer;
2. Component 2: For the portion of the schedule of record quantity that is not implemented in the real-time dispatch schedule, the DA-PCG will guarantee the cost of arranging the delivery (where the real-time offer price is less than the day-ahead offer price), or subtract any gain (where the real-time offer price is greater than the day-ahead offer price);
3. Component 3: Any income from real-time CMSC included in a generator's schedule of record quantity delivered in real-time will be used to reduce the DA-PCG payment; and
4. Component 4: The net operating reserve (OR) income realized by generators whose real-time dispatch for energy is less than their day-ahead constrained schedule for energy. Any net income from real-time operating reserve in a generator's schedule of record quantity will be used to reduce the DA-PCG payment.
5. Component 5: As offered value of bringing an off-line generator on-line to minimum loading point.

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The DA-PCG payment is calculated as follows:

- DA-PCG payment = Component 1 + Component 2 – Component 3 – Component 4 + Component 5

If the DA-PCG payment result from this calculation is negative, the DA-PCG payment is equal to zero.

The DA-PCG payment is calculated for each EDAC start event. An EDAC start event is defined as the period from the first hour with a day-ahead constrained schedule to the last consecutive hour with a day-ahead constrained schedule. A dispatch day may have multiple EDAC start events.
In the example below (Figure 1), there are 2 EDAC start events within the dispatch day:

- EDAC start event A is from HE 4 to HE 13; and
- EDAC start event B is from HE17 to HE 23.

The DA-PCG payment is assessed separately for each EDAC start event (i.e. a DA-PCG payment is assessed for EDAC start event A and a DA-PCG payment is assessed for EDAC start event B).

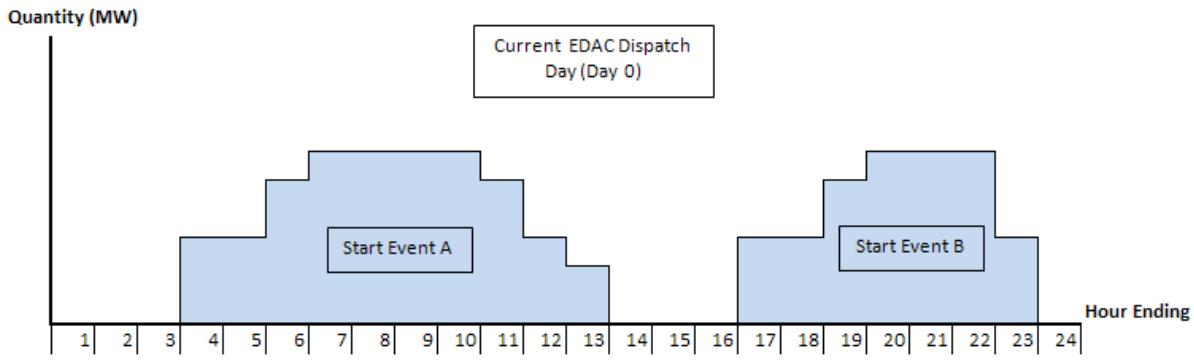

Figure 1: Example of Multiple EDAC Start Events

A market participant may withdraw their offers for the day-ahead schedule associated with each start or may withdraw after starting but before completing each day-ahead schedule. In both cases, the market participant may or may not be eligible for the DA-PCG as follows:

- If the withdrawal was not within the market participant's control, the market participant is eligible for the DA-PCG for the hours not withdrawn. The market participant will not be assessed the Day-Ahead Generator Withdrawal Charge.
- If the withdrawal was within the market participant's control, the market participant is not eligible for the DA-PCG for that start. The market participant will be assessed the Day-Ahead Generator Withdrawal Charge.

The Day-Ahead Generator Withdrawal Charge is assessed independently for each scheduled EDAC start event. In the example above (Figure 1), if the market participant withdraws in HE10 and the withdrawal was within the market participant's control, the market participant is assessed the Day-Ahead Generator Withdrawal Charge for EDAC start event A, from HE10 through HE13, and is assessed a separate Day-Ahead Generator Withdrawal Charge for EDAC

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start event B from HE17 through HE23.

De-commitment refers to the IESO removing the Minimum Loading Point constraint of a non-quick start generator from the system. It is neither a de-rate nor forced outage but a complete removal of the unit initiated by the IESO.

If the generation unit is de-committed, the market participant may or may not be eligible for the DA-PCG, for each start event, as follows:

- For de-commitment before the start of the day-ahead schedule, the IESO will not calculate the DA-PCG for the market participant. The market participant will not be assessed the Generator Withdrawal Charge.
- For de-commitment after the start of the day-ahead schedule, the IESO will calculate the DA-PCG incurred by the market participant prior to de-commitment. The market participant will not be assessed the Generator Withdrawal Charge.

The specific market rule amendments associated with the Generator Withdrawal Charge can be found in MR-00349-R02.

With respect to the day-ahead commitment process variables, data, and information it is proposed to modify Chapter 9 of the market rules in the following fashion:

- Delete section 3.1.2A and replace it with a new section 3.1.2A to specify the day-ahead commitment process variables, data and information;
- Modify section 3.1.2B to specify the IESO's obligations in regards to the provision of information to the settlement process;
- Modify section 3.1.2C to specify, in accordance with the EDAC design, the provision to the settlement process of pre-dispatch quantities and prices; and
- Added section 3.1.2D to specify the pre-dispatch process variables, data and information.

All of this information is necessary to determine the applicable settlement amounts associated with the EDAC design.

Please note that aside from MR-00349-R00 there will also be consequential amendments also required in section 4.7D of Chapter 9 of the market rules in relation to the DA-PCG and these are located within MR-00349-R04.

PART 4 – PROPOSED AMENDMENT

Day-Ahead Commitment Process Variables, Data and Information

3.1.2A The *IESO* shall determine the following day-ahead ~~pre-dispatch~~ quantities from the ~~*pre-dispatch*~~*schedule of record,* and provide them directly to the *settlement process*:

~~PDR~~DA_DQSI$_{k,h}^{i,t}$	=	*schedule of record* quantity scheduled for injection by *market participant* 'k' for an import transaction at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'~~*pre-dispatch of record* constrained quantity scheduled for injection by *market participant* 'k' for an import transaction at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'~~
~~PDR~~DA_DQSI$_{k,h}^{m,t}$	=	*schedule of record* quantity scheduled for injection by *market participant* 'k' at *delivery point* 'm' during *metering interval* 't' of *settlement hour* 'h'~~*pre-dispatch of record* constrained quantity scheduled for injection by *market participant* 'k' at *delivery point* 'm' during *metering interval* 't' of *settlement hour* 'h'~~
DA_DQSW$_{k,h}^{i,t}$	=	*schedule of record* quantity scheduled for withdrawal by *market participant* 'k' for an export transaction at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'
DA_ELMP$_{h}^{m,t}$	=	day-ahead constrained schedule intertie price at the *delivery point* 'm' of the sink for the export transaction during *metering interval* 't' of *settlement hour* 'h'
DA_ILMP$_{h}^{m,t}$	=	day-ahead constrained schedule intertie price at the *delivery point* 'm' of the source for the import transaction during *metering interval* 't' of *settlement hour* 'h'

3.1.2B The *IESO* shall provide directly to the *settlement process*:

3.1.2B.1 information to identify *market participants* which ~~elected to~~ are ~~receive~~deemed to have accepted in accordance with section 5.8.4 of Chapter 7 a day-ahead ~~generation~~ production cost guarantee for their *generation facility*;

3.1.2B.2 information to identify any event in which the *IESO* de-commits a *generation facility* between the release and publication of ~~the *pre-*~~

~~*dispatch schedules* from~~ the ~~*pre-dispatch*~~ *schedule of record* and the end of its committed scheduled ~~*minimum*~~ in the *schedule of record* ~~*run time*~~ where the *market participant* has ~~elected~~ been deemed ~~to receive~~ to have accepted in accordance with section 5.8.4 of Chapter 7 a day-ahead ~~generation~~ production cost guarantee for that *facility*;

3.1.2B.3 exemptions from the day-ahead import failure charge described in section 3.8B, for any applicable import transactions scheduled in the ~~*pre-dispatch*~~*schedule of record* where such exemptions have been determined in accordance with chapter 7, section 7.5.8B;

~~3.1.2B.4 any necessary information regarding import transactions in the constrained schedule from the *pre-dispatch of record* the financially-binding status of which the *market participant* has demonstrated to the satisfaction of the *IESO* in accordance with the applicable *market manual*; and~~

3.1.2B.4 exemptions from the day-ahead export failure charge described in section 3.8D, for any applicable export transactions scheduled in the *schedule of record* where such exemptions have been determined in accordance with chapter 7, section 7.5.8B;

~~3.1.2B.5 the following information:~~

~~$PDR\_BE_{k,h}^{t,t}$ = *energy offers* submitted into the *pre-dispatch of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price-quantity pair*, where *offered prices* are in column 1 and *offered quantities* are in column 2.~~

3.1.2B.5 exemptions from the day-ahead linked wheel failure charge described in section 3.8E, for any applicable linked wheel transactions scheduled in the *schedule of record* where such exemptions have been determined in accordance with chapter 7, section 7.5.8B; and

3.1.2B.6 exemptions from the day-ahead generator withdrawal charge described in section 3.8F, for any applicable *registered facility* scheduled in the *schedule of record* where such exemptions have been determined in accordance with chapter 7, section 7.5.3.

3.1.2B.7 the following information:

$DA\_BE_{k,h}^{m,t}$ = *energy offers* submitted in day-ahead, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k'

		at *delivery point* ‘m’ during *metering interval* ‘t’ of *settlement hour* ‘h’ arranged in ascending order by the offered price in each *price quantity pair* where offered prices ‘P’ are in column 1 and offered quantities ‘Q’ are in column 2
$DA\_BE_{k,h}^{i,t}$	=	*energy offers* submitted in day-ahead, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* ‘k’ at *intertie metering point* ‘i’ during *metering interval* ‘t’ of *settlement hour* ‘h’ arranged in ascending order by the offered price in each *price quantity pair* where offered prices ‘P’ are in column 1 and offered quantities ‘Q’ are in column 2
$DA\_BL_{k,h}^{i,t}$	=	*energy bids* submitted in day-ahead, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* ‘k’ at *intertie metering point* ‘i’ during *metering interval* ‘t’ of *settlement hour* ‘h’ arranged in ascending order by the offered price in each *price quantity pair* where offered prices ‘P’ are in column 1 and offered quantities ‘Q’ are in column 2
$DA\_SNLC_{k,h}^{m}$	=	as-offered *speed-no-load cost* associated with *three-part offers* for a given *settlement hour* ‘h’ for *market participant* ‘k’ at *delivery point* ‘m’
$DA\_SUC_{k,h}^{m}$	=	as-offered *start-up cost* associated with *three-part offers* for a given *settlement hour* ‘h’ for *market participant* ‘k’ at delivery point ‘m’
$MLP_{k,h}^{m,t}$	=	minimum output of *energy* the *market participant* ‘k’ at *delivery point* ‘m’ can maintain without ignition support in *metering interval* ‘t’ of *settlement hour* ‘h’

3.1.2C The *IESO* shall determine from the *pre-dispatch schedule* and the *pre-dispatch* projected *market schedule*, and provide directly to the *settlement process* the following *pre-dispatch prices* and quantities:

~~PD_D~~QSI$_{k,h}^{i,t}$	=	*pre- dispatch* constrained quantity scheduled for injection by *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'~~.~~
PD_DQSW$_{k,h}^{i,t}$	=	*pre- dispatch* constrained quantity scheduled for withdrawal by *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'~~.~~
PD_EMP$_h^{m,t}$	=	*pre-dispatch* projected *energy market price* applicable to all *delivery points* 'm' in the Ontario zone in *metering interval* 't' of *settlement hour* 'h' In instances where this variable is provided to the *settlement process* on an hourly basis as determined in section 3.9, it shall be deemed to apply uniformly to all *metering intervals* 't' in *settlement hour* 'h'~~.~~
PD_ELMP$_h^{m,t}$	=	*pre-dispatch* constrained schedule *intertie* price at the *delivery point* 'm' of the sink for the export transaction during *metering interval* 't' of *settlement hour* 'h'
PD_ILMP$_h^{m,t}$	=	*pre-dispatch* constrained schedule *intertie* price at the *delivery point* 'm' of the source for the import transaction during *metering interval* 't' of *settlement hour* 'h'

3.1.2D The *IESO* shall provide directly to the *settlement process*:

3.1.2D.1 the following information:

PD_BE$_{k,h}^{i,t}$	=	*energy offers* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2
PD_BL$_{k,h}^{i,t}$	=	*energy bids* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

PART 5 – IESO BOARD DECISION RATIONALE

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Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00349-R01			
Subject:	Enhanced Day-Ahead Commitment Process (EDAC): Settlement Guarantees			
Title:	Day-Ahead Intertie Offer Guarantee			
Nature of Proposal:	☒ Alteration	☐ Deletion	☐ Addition	
Chapter:	9	Appendix:		
Sections:				
Sub-sections proposed for amending:	3.8A.1, 3.8A.2, 3.8A.2A, 3.8A.2B, 3.8A.3, 3.8A.4, 3.8A.5, 3.8A.6, 3.8A.7, 3.8A.8, 3.8A.9			

PART 2 – PROPOSAL HISTORY – PLEASE REFER TO MR-00349-R00

Version	Reason for Issuing	Version Date
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

MR-00349-R01 proposes to modify the market rules to specify the conditions and calculation of the following EDAC settlement amounts:

- The day-ahead intertie offer guarantee; and
- The real-time and day-ahead intertie offer guarantee settlement credit offset.

Background

Please refer to MR-00349-R00.

Discussion

Intertie Offer Guarantee

The Intertie Offer Guarantee (IOG) payment process has been introduced to reflect the new EDAC design where a market participant will be paid a single IOG payment for an import transaction net of any offset.

Based on the existing *IESO market rules*, a market participant can be paid a Day-Ahead Intertie Offer Guarantee (DA-IOG) and a Real-Time Intertie Offer Guarantee (RT-IOG) for the same import transaction, with the lesser of the two payments being reversed to ensure that the market participant receives the higher of the two payments.

In addition, a separate process is then used to determine an offset (clawback) of the market participant's imports (MW) up to the market participant's level of real-time unconstrained export (MW) within the hour. The offset dollars (i.e. all or a portion of the RT-IOG payment or DA-IOG payment) associated with the import transaction's offset (clawback) MW is settled through a charge to the market participant.

With EDAC, DA-IOG and RT-IOG continue to exist however they are not settled separately. Instead the DA-IOG payment and the RT-IOG payment will feed into the EDAC IOG process where any IOG offsets will be determined and the net IOG payment will be determined.

A Modified Day-Ahead Intertie Offer Guarantee (DA-IOG)

It is proposed to modify sections 3.8A.1, 3.8A.2A and 3.8A.2B of Chapter 9 to specify the following elements of the EDAC design.

Similar to the existing day-ahead processes, import offers will:

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- remain voluntary and participating in the day-ahead process does not preclude real-time import offers which may be in addition to, or may replace day-ahead import transactions.
- be committed in the selection of resources to serve the market demand and in real-time, if the day-ahead forecast and resource dispatch is identical, that import should remain economic into real-time pre-dispatch and be appropriately selected to serve real-time market demand.

The Day-Ahead Intertie Offer Guarantee (DA-IOG) gives importers a guaranteed cost recovery when real-time revenue is insufficient to cover as-offered costs to provide energy that was committed the day-ahead and that actually flowed in the real-time market.

The Derivation of Day-Ahead Intertie Offer Guarantees:

The design of DA-IOG is consistent with the principles of the DA-PCG and, for the most part, the existing design of the Day-Ahead Intertie Offer Guarantee Settlement Credit of the DACP. The proposed method for calculating the DA-IOG payments made to eligible importers consists of three components:

1. Component 1: Any shortfall in payment on the real-time import flow of the schedule of record quantity will be based upon the real-time revenue received for that amount of energy in comparison with the offered costs submitted in the importer's day-ahead offer;
2. Component 2: For the portion of schedule of record quantity that is not implemented in the real-time dispatch schedule, the DA- IOG will guarantee the cost incurred of arranging the import (where the real-time offer price is less than the day-ahead offer price) or subtract any revenue gained (where the real-time offer price is greater than the day-ahead offer price); and
3. Component 3: Any income from real-time CMSC included in an importer's schedule of record quantity delivered in real-time will be used to reduce the DA-IOG payment.

Modifications to IOG Offset Mechanism

It is proposed to modify sections 3.8A.3 – 3.8A.6 to specify the following EDAC design elements.

The IOG Offset mechanism as described in the current IESO market rules for Real-time Intertie Offer Guarantee and Intertie Offer Guarantee Offset must be revised to recognize the addition of exports into the day-ahead scheduling process and to recognize the difference in payments made to importers under the different options.

Financially Binding Status Eliminated

An exception to the intertie offer guarantee (IOG) offset process allows traders with financially binding status (FBS) to retain IOGs paid in respect of day-ahead import transactions which received a schedule in a neighbouring day-ahead market even when there are scheduled real-time exports out of Ontario in the same hour (called an implied wheel-through). The inclusion of exports into day-ahead removes some of the drivers for FBS.

As well, a review of the current FBS revealed the following:

- FBS exemption has very little impact to the IOG Offset as determined through historical analysis;
- FBS exemption does not always provide a financial benefit to traders through reduced IOG

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Offset as determined through analysis; and

- DA-IOG is subjected to IOG Offset calculations whether with FBS or not.

Including Day-Ahead exports in EDAC increases the complexity of an already complicated IOG Offset calculation in the event that FBS exemption was to continue.

There will be no exceptions to the IOG offset process in EDAC. That is the current FBS will cease with the implementation and the consideration of whether a transaction has FBS status will be removed from the IOG Offset settlement process.

Day-Ahead Intertie Offer Guarantee Adjustments

It is proposed to delete sections 3.8A.7 – 3.8A.9 of Chapter 9 because the EDAC settlement guarantees design does not require these adjustments.

PART 4 – PROPOSED AMENDMENT

3.8A Hourly Settlement Amounts for Intertie Offer Guarantees

3.8A.1 The *market prices* determined by the *real-time market schedule* provided by the *IESO* used for the *settlement* of a *boundary entity* associated with an *intertie metering point* will sometimes deviate from:

- in the case of an import transaction not scheduled in the ~~constrained schedule from the *pre-dispatch*~~*schedule* *of record*, its accepted *offer* prices in the *pre-dispatch market schedule* (the "*projected market schedule*") in ways that, based on the *real-time dispatch process*, imply a change to *market participant* 'k's net operating profits relative to the operating profits implied by the *pre-dispatch market schedule* for that *boundary entity*; or
- in the case of an import transaction scheduled in the ~~constrained schedule from the *pre-dispatch*~~*schedule* *of record*, its accepted *offer* prices ~~in the constrained schedule~~ in the *schedule*~~*pre-dispatch*~~ *of record* in ways that, based on the *real-time dispatch process*, imply a change to *market participant* 'k's net operating profits relative to the operating profits implied by the ~~constrained schedule in the *pre-dispatch*~~*schedule* *of record* for that *boundary entity*.

When this occurs but subject to section 3.8A.3, *market participant* 'k' associated with that *boundary entity* for *settlement hour* 'h' shall receive as compensation:

3.8A.1.1 in the case of an import transaction not scheduled in the ~~*pre-dispatch*~~*schedule* *of record*, a *real-time intertie offer* guarantee ($RT\_IOG_{k,h}$) *settlement* credit for the import of *energy* into the *IESO-administered markets* equal to the cumulative losses resulting from a negative change in implied operating profits over the course of each

settlement hour, resulting from such *settlement*, calculated in accordance with section 3.8A.2; or

3.8A.1.2 in the case of an import transaction scheduled in the ~~*pre-dispatch*~~*schedule of record*, the real-time *intertie offer* guarantee *settlement* credit ($RT\_IOG_{k,h}$) or the day-ahead *intertie offer* guarantee *settlement* credit ($DA\_IOG_{k,h}$) for the import of *energy* into the *IESO-administered markets* equal to the cumulative losses resulting from a negative change in implied operating profits over the course of each *settlement hour*, resulting from such *settlement*, calculated in accordance with section 3.8A.2 or 3.8A.2B as the case may be.

Real-Time Intertie Offer Guarantee

3.8A.2 The real-time *intertie offer* guarantee *settlement* credit for *market participant* 'k' for *settlement hour* 'h' ("$RT\_IOG_{k,h}$") shall be determined by the following equation:

Let OP(P,Q,B) be a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of *price-quantity pairs*:

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter 'B' this may be expressed as follows:

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s* is the highest indexed row of B such that $Q_{s^*} \leq Q \leq Q_n$ and where, $Q_0=0$

'P' is $EMP_h^{i,t}$: the real-time 5-minute *energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

'Q' is $MQSI_{k,h}^{i,t}$: the market quantity scheduled for injection in the *market schedule* by *market participant* 'k' at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h'

'B' is matrix $BE_{k,h}^{i,t}$ of N price-quantity pairs offered by market participant 'k' to supply energy from a particular boundary entity associated with an intertie metering point 'i' in the IESO-administered markets, during metering interval 't' of settlement hour 'h' arranged in ascending order by offered price where offered prices are in column 1 and offered quantities are in column 2.

Using the terms below, let $RT\_IOG_{k,h}$ be expressed as follows:

$$RT\_IOG_{k,h} = EIM_{k,h}$$

Where:

$EIM_{k,h}$ represents that component of the real-time *intertie offer* guarantee *settlement* credit for *market participant* 'k' during *settlement hour* 'h' attributable to import of *energy* into the *IESO-administered markets* at all relevant *intertie metering points* 'i' in accordance with the rationale referred to in section 3.8A.1 and is calculated as follows:

$$EIM_{k,h} = \sum_{I} (-1) \bullet MIN\left[0, \sum_{T} OP(EMP_{h}^{i,t}, MQSI_{k,h}^{i,t}, BE)\right]$$

Such that:

I is the set of all relevant *intertie metering points* 'i'

T is the set of all *metering intervals* 't' in *settlement hour* 'h'

$EMP_{h}^{i,t}$ is the real-time 5-minute *energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

Day-Ahead Intertie Offer Guarantee

3.8A.2A The day-ahead *intertie offer* guarantee *settlement* credit for *market participant* 'k' for *settlement hour* 'h' ("$DA\_IOG_{k,h}$") shall be determined for import transactions that are not part of a day-ahead linked wheel.

3.8A.2B The day-ahead *intertie offer* guarantee *settlement* credit for *market participant* 'k' for *settlement hour* 'h' ("$DA\_IOG_{k,h}$") shall be determined by the following equation:

~~PDR~~DA_$BE_{k,h}^{i,t}$ is the offer matrix of N price-quantity pairs for the eligible import transaction scheduled in the ~~pre-dispatch~~schedule of record for market participant 'k' during metering interval 't' for settlement hour 'h' at intertie metering point 'i' arranged in ascending order by offered price where offered prices are in column 1 and offered quantities are in column 2.

Let OP(P,Q,B) be a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of *price-quantity pairs*:

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter 'B' this may be expressed as follows :

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s* is the highest indexed row of B such that $Q_{s^*} \leq Q \leq Q_n$ and where, $Q_0=0$

'P' is $EMP_h^{i,t}$: the real-time 5-minute *energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

'Q' is the minimum of:

- ~~PDR~~DA_$DQSI_{k,h}^{i,t}$: the ~~*pre-dispatch*~~*schedule of record* constrained quantity scheduled for injection by *market participant* 'k' for an import transaction at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'; or
- $DQSI_{k,h}^{i,t}$: the real-time constrained quantity scheduled for injection by *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h';

'B' is matrix ~~PDR~~DA_$BE_{k,h}^{i,t}$: *energy offers* submitted into the ~~*pre-dispatch*~~*schedule of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2;

such that the day-ahead *intertie offer* guarantee is formulated as follows:

The principles for the settlement of the day-ahead *intertie offer* guarantee are as follows:

1. Component 1: Any shortfall in payment on the real-time import flow of the *schedule of record* will be based upon the real-time revenue received for that amount of *energy* in comparison with the costs submitted in the importer's day-ahead *offer*;
2. Component 2: For the portion of *schedule of record* that is not implemented in the real-time *dispatch* schedule, the day-ahead *intertie offer* guarantee will guarantee the cost incurred of arranging the import (where the real-time *offer* price is less than day ahead *offer* price) or subtract any revenue gained (where the real-time *offer* price is greater than the day-ahead *offer* price) [2]; and
3. Component 3: Any income from real-time congestion management settlement credit (CMSC) included in an importer's *schedule of record* delivered in real-time will be used to reduce the day-ahead *intertie offer* guarantee payment.

The Day-Ahead Intertie Offer Guarantee is calculated as follows:

[2] Where the real-time *offer* is equal to the day-ahead *offer*, the cost/gain is equal to zero (0).

$$DA\_IOG_{k,h} = MAX\left[0, \sum_{T}\left(DA\_IOG\_COMP1_{k,h}^{i,t} + DA\_IOG\_COMP2_{k,h}^{i,t} - DA\_IOG\_COMP3_{k,h}^{i,t}\right)\right]$$

Where:

T = set of all *metering intervals* 't' in the set of all *settlement hour* 'h'

Component 1

Component 1 includes any shortfall in payment on the delivered real-time *dispatch* of the *schedule of record* based upon the real-time revenue received for that amount of *energy* in comparison with the costs as represented in the importer's day-ahead *offer*. Component 1 is calculated as follows:

$DA\_IOG\_COMP1_{k,h}^{i,t}$ = As-offered day-ahead costs for the minimum of the importer's *schedule of record* and the real-time constrained schedule for the interval minus all real-time revenue received over the interval for that amount of *energy*

$$DA\_IOG\_COMP1_{k,h}^{i,t} = (-1)\times OP\left(EMP_{h}^{i,t}, MIN\left(DA\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t},\right), DA\_BE_{k,h}^{i,t}\right)$$

Component 2

If, as a result of economic selection, a portion of the *schedule of record* is not implemented in the real-time *dispatch* schedule, the day-ahead *intertie offer* guarantee:

- Guarantees the cost of arranging the delivery if the real-time *offer* is less than the day-ahead *offer*; or
- Subtracts any gain where the real-time *offer* is greater than the day-ahead *offer*.

If there are no real-time *energy offers* submitted by the *market participant* for any portion of the day-ahead constrained schedule, the real-time *energy offers* for that portion of *energy* will be set to MMCP (*Maximum Market Clearing Price*) for the purposes of calculating Component 2.

If the real-time *energy offers* for any portion of the day-ahead constrained schedule is below $0.00 $/MWh (i.e. negative), the real-time *energy offers* for that portion of *energy* will be set to $0.00 $/MWh for the purposes of calculating Component 2.

Component 2 is calculated as follows:

$DA\_IOG\_COMP2_{k,h}^{i,t}$ = As-offered day-ahead costs for the difference between:

- the minimum of the importer's *schedule of record* quantity,

or the real-time constrained schedule; and

- the minimum of the importer's *schedule of record* quantity.

over the interval minus all real-time *energy offers* (with a minimum limit of zero) over the interval for that amount of *energy*

$$DA\_IOG\_COMP2_{k,h}^{i,t} = XDA\_BE_{k,h}^{i,t} - MAX\left(0, XBE_{k,h}^{i,t}\right)$$

Where:

Let $XBE_{k,h}^{i,t}$ be the function which calculates the area under the curve created by an n x matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=p^*}^{s^*} P_n \times \left(Q_n - Q_{n-1}\right)\right] + \left(Q - Q_{s^*}\right) \times P_{s^*+1}$$

where matrix (B) is *energy offers* submitted in real-time, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

Let $XDA\_BE_{k,h}^{i,t}$ be the function which calculates the area under the curve created by an n x 2 matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=c^*}^{d^*} P_n \times \left(Q_n - Q_{n-1}\right)\right] + \left(Q - Q_{d^*}\right) \times P_{d^*+1}$$

where matrix (B) is *energy offers* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

c^* = the highest indexed row of matrix $XDA\_BE_{k,h}^{i,t}$ such that $Q_{c^*} \leq \min[DA\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t},] \leq Q_n$ and where $Q_{c^*-1} = \min[DA\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t},]$ and where if $Q_{c^*} < Q_{c^*-1}$, let $Q_{c^*} = Q_{c^*-1}$

d^* = the highest indexed row of matrix $XDA\_BE_{k,h}^{i,t}$ such that $Q_{d^*} \leq$

$DA\_DQSI_{k,h}^{i,t} \leq Q_n$

p^* = the highest indexed row of matrix $XBE_{k,h}^{i,t}$ such that $Q_{p^*} \leq \min[DA\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t}] \leq Q_n$ and where $Q_{p^*-1} = \min[DA\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t}]$ and where if $Q_{p^*} < Q_{p^*-1}$, let $Q_{p^*} = Q_{p^*-1}$

s^* = the highest indexed row of matrix $XBE_{k,h}^{i,t}$ such that $Q_{s^*} \leq DA\_DQSI_{k,h}^{i,t} \leq Q_n$

Component 3

- The DA-IOG payment for an import will be reduced by the income received from real time *congestion management settlement credit* (CMSC) for the importer's *schedule of record* delivered in real-time.
- The importer's *schedule of record* will be measured against both the real-time constrained schedule and the real-time unconstrained schedule to determine the amount of revenue from CMSC that should be included in the day-ahead *intertie offer* guarantee calculation.
- For any interval, there are six possible orderings of the amount of an importer's capacity that may be included in the *schedule of record*, the real-time unconstrained schedule and the real-time constrained schedule. Table 0-1: Ordering of Importer's Capacity and Day-Ahead Intertie Offer Guarantee Component 3 summarizes the six possible orderings and the inclusion of Component 3 in the day-ahead *intertie offer* guarantee calculation.
- For the purposes of determining the applicable CMSC in Component 3, the *offer price* is subject to Section 3.5.6.

Table 0-1: Ordering of Importer's Capacity and Day-Ahead Intertie Offer Guarantee Component 3

Scenario	Ordering	Component 3 - CMSC Included?
1	DQSI >= MQSI >= DA_DQSI	N
2	MQSI >= DQSI >= DA_DQSI	N
3	DQSI > DA_DQSI > MQSI	Y (Partial CMSC)
4	MQSI > DA_DQSI > DQSI	Y (Partial CMSC)
5	DA_DQSI >= DQSI > MQSI	Y (All CMSC)
6	DA_DQSI >= MQSI > DQSI	Y (All CMSC)

Component 3 is calculated as follows :

$DA\_IOG\_COMP3_{k,h}^{i,t}$ = Income received from real time congestion management settlement credits (CMSC) for the importer's *schedule of record* delivered in

real-time over the interval

Component 3 is only calculated when the real-time CMSC for the same interval is a value other than zero.

Scenario 1

$$DA\_IOG\_COMP3_{k,h}^{i,t} = 0$$

Scenario 2

$$DA\_IOG\_COMP3_{k,h}^{i,t} = 0$$

Scenario 3

$$DA\_IOG\_COMP3_{k,h}^{i,t} = OP\left(EMP_{h}^{i,t}, MQSI_{k,h}^{i,t}, BE_{k,h}^{i,t}\right) - OP\left(EMP_{h}^{i,t}, DA\_DQSI_{k,h}^{i,t}, BE_{k,h}^{i,t}\right)$$

Scenario 4

$$DA\_IOG\_COMP3_{k,h}^{i,t} = OP\left(EMP_{h}^{i,t}, DA\_DQSI_{k,h}^{i,t}, BE_{k,h}^{i,t}\right) - OP\left(EMP_{h}^{i,t}, DQSI_{k,h}^{i,t}, BE_{k,h}^{i,t}\right)$$

Scenario 5

$DA\_IOG\_COMP3_{k,h}^{i,t}$ = Congestion management settlement credit calculated as per Section 3.5.

Scenario 6

$DA\_IOG\_COMP3_{k,h}^{i,t}$ = Congestion management settlement credit calculated as per Section 3.5.

~~$DA\_IOG_{k,h}$ (for all intertie metering points) =~~

~~-1 x MINIMUM of:~~

~~[Zero or~~

[The sum of all revenues implied by each import transaction valued at the real-time *energy market price* in the applicable *intertie zone* times the minimum of the quantity scheduled for injection in the *pre-dispatch of record* or the *real-time schedule*

minus

Those costs represented through the *offers* submitted by the *market participant* for the import transaction scheduled in the *pre-dispatch of record*.]

plus

That component of the real-time congestion management *settlement* credit *settlement amount* applicable to the same import transaction.]

In circumstances other than those where the import transaction is subsequently subject to a *constrained-on event* in the *real-time market*:

$$DA\_IOG_{k,h} = \sum_{I}(-1) \bullet MIN\left[0, \sum_{T}\left[OP(EMP_{h}^{i,t}, MIN(PDR\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t}), PDR\_BE_{k,h}^{i,t})\right] + OPE_{k,h}^{i}\right]$$

where:

'I' is the set of all *intertie metering points* 'i'

'T' is the set of all *metering intervals* 't' in *settlement hour* 'h'

$OPE_{k,h}^{i}$ is that component of the congestion management *settlement* credit *settlement amount* (CMSC) for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' as defined in section 3.5.2.

In circumstances where the import transaction is subsequently subject to a *constrained-on event* in the *real-time market*:

$$DA\_IOG_{k,h} = \sum_{I}(-1) \bullet MIN\left[0, \sum_{T}\left[OP(EMP_{h}^{i,t}, MIN(PDR\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t}), PDR\_BE_{k,h}^{i,t})\right] + OPE\{adj\}_{k,h}^{i}\right]$$

where:

'I' is the set of all *intertie metering points* 'i'.

'T' is the set of all *metering intervals* 't' in *settlement hour* 'h'

$OPE\{adj\}_{k,h}^{i}$ is an adjusted component of the congestion management *settlement* credit *settlement amount* (CMSC) for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' in which the constrained schedule is the lesser of $PDR\_DQSI_{k,h}^{i,t}$ or $DQSI_{k,h}^{i,t}$ but in all instances, greater than or equal to $MQSI_{k,h}^{i,t}$ such that it is formulated as follows:

$$OPE\{adj\}_{k,h}^{i} = \sum_{t}\left[\begin{array}{l} OP(EMP_{h}^{i,t}, MQSI_{k,h}^{i,t}, BE) - \\ OP(EMP_{h}^{i,t}, MAX(MQSI_{k,h}^{i,t}, (MIN(PDR\_DQSI_{k,h}^{i,t}, DQSI_{k,h}^{i,t}))), BE) \end{array}\right]$$

~~Until the *IESO* has the software capability to report $DA\_IOG_{k,h}$ *settlement amounts* pertaining to import transactions that are subject to a *constrained-on event* in the *real-time market* (i.e. using the variable $OPE\{adj\}_{k,h}^{i}$) on *settlements statements* for the *trading day* in which they were incurred, the *IESO* shall:~~

~~report such *settlement amounts* or any required adjustments to $DA\_IOG_{k,h}$ *settlement amounts* in a manner and schedule determined in the applicable *market manual;* and~~

~~recover such *settlement amounts* in a manner and schedule determined in the applicable *market manual*.~~

~~The *IESO* shall give *market participants* 5 days notice of when such software capability will be put into service.~~

~~Real-Time and Day-Ahead~~ Intertie Offer Guarantee Settlement ~~Credit Offset~~

3.8A.3 The cumulative ~~real-time~~ *intertie offer* guarantee *settlement* credits ~~and the cumulative day-ahead *intertie offer* guarantee *settlement* credits~~ payable to a *market participant* for any and all applicable *settlement hours* in the *real-time market* for an *energy billing period* shall be adjusted by the *IESO* in accordance with section 3.8A.4 to nullify such credits where:

3.8A.3.1 that *market participant* has submitted one or more *energy offers* and one or more *energy bids* as contemplated by section 3.5.8.1 of Chapter 7 for the same *dispatch interval*; or

3.8A.3.2 the *market assessment unit* has determined that the *market participant* has an agreement or arrangement to share the *intertie offer* guarantee *settlement* credit with one or more other *market participants* and they have submitted one or more *energy offers* and one or more *energy bids* as contemplated by section 3.5.8.1 of Chapter 7 for the same *dispatch interval*; or

3.8A.3.3 the *market participant* has one or more import transactions in the ~~*pre-dispatch*~~*schedule of record* at an *intertie metering point* and where:

- ~~it has not been determined by the *IESO* or demonstrated by the *market participant* to the satisfaction of the *IESO* in the manner described in the applicable *market manual*, that the import transaction scheduled in the *pre-dispatch of record* has a financially-binding status in the neighbouring *control area* that is the source of the transaction;~~

- the same import transaction is subsequently scheduled in the corresponding *metering interval* of the corresponding *settlement hour* in the *real-time market*; and

- the *market participant* submits one or more *schedule of record* and/or real-time *energy bids* as contemplated by section 3.5.8.1 of Chapter 7 for the same *dispatch interval*;

and, at least one of such *energy offers* and one of such *energy bids* is scheduled.

For certainty, any *market participant* shall have recourse to the dispute resolution provisions of section 2 of Chapter 3 if it believes that the *market assessment unit* did not have reasonable grounds for making the determination that the *market participant* had any such agreement or arrangement with another *market participant* as described in section 3.8A.3.2.

3.8A.4 The combined day-ahead and real-time *intertie offer* guarantees and intertie offer guarantee *settlement* credit offset ("IOG Offset") process is as follows. Any adjustment made by the *IESO* under section 3.8A.3 shall be applied with respect to any export transaction in the *market schedule* for *market participant* 'k' in each *settlement hour* 'h' for which *market participant* 'k' is entitled to receive a real-time or day-ahead *intertie offer* guarantee *settlement* credit meeting the conditions set out in section 3.8A.3. The total amount offset shall be limited by the cumulative quantity of the export transactions expressed in the *market schedule* for that *settlement hour* and shall not exceed the total combined real-time and day-ahead *intertie offer* guarantee *settlement* credits received for the *settlement hour*. Where the cumulative quantity of the export transactions expressed in the *market schedule* for the *settlement hour* is less than the cumulative quantity of imports triggering real-time and day-ahead *intertie offer* guarantee *settlement* credits for that same *settlement hour*, the real-time and day-ahead *intertie offer* guarantee *settlement* credits will be offset in ascending order from the import transaction with the smallest real-time and/or smallest day-ahead *intertie offer* guarantee *settlement* rate to the import transaction attracting the largest real-time and/or largest day-ahead *intertie offer* guarantee *settlement* rate and only up until the point at which the total quantity of import transactions equals the total quantity of export transactions, and may be expressed as described in the general rule that follows.

The offset process described in this section shall apply to:

- real-time *intertie offer* guarantee *settlement* credits meeting the criteria of section 3.8A.3.1; or
- real-time *intertie offer* guarantee *settlement* credits or day-ahead *intertie offer* guarantee *settlement* credits meeting the criteria of section 3.8A.3.3.

For the purposes of this calculation all applicable real-time or day-ahead *intertie offer* guarantee *settlement* credits meeting the criteria described above, attributable to *market participant* 'k' for *settlement hour* 'h' shall be arranged in ascending order

by rate (dollars per megawatt per transaction), and subject to the following decision rules:

a. ~~Where a day-ahead *intertie offer* guarantee *settlement* credit and a real-time *intertie offer* guarantee *settlement* credit are associated with the same import transaction, the larger of the two *settlement amounts* will be included in order to reflect the fact that *market participant* 'k' is entitled to receive the higher of these two *settlement amounts* pursuant to section 3.8A.1;~~[Intentionally left blank - section deleted]

b. Where a day-ahead *intertie offer* guarantee *settlement* credit is associated with the import transaction, but no real-time *intertie offer* guarantee *settlement* credit was applicable, the day-ahead *intertie offer* guarantee *settlement credit* will be included;

c. Where a real-time *intertie offer* guarantee *settlement* credit is associated with the import transaction, but no day-ahead *intertie offer* guarantee *settlement* credit is applicable, the real-time *intertie offer* guarantee *settlement* credit will be included;

The ordering of these *settlement amounts* is described in terms of a general rule as follows:

Let $MI_{k,h}^{t}$ [N,13] be an N by 13 matrix of N pairs of import quantities scheduled for injection by *market participant* 'k' in the real-time *dispatch schedule* and/or the constrained schedule from the EDAC schedule of record in the *settlement hour* 'h' ($DA\_DQSI_{k,h}^{i}$ and/or $DQSI_{k,h}^{i}$ as the case may be) paired with the corresponding day-ahead intertie offer guarantee, the component of the real-time *intertie offer* guarantee settlement credit, DA-IOG rate, RT-IOG rate, DA Offset DQSW, DA-Offset Flag, Settlement rate, (gross) IOG$, RT Offset DQSW, IOG Offset $, (net) IOG $ for all *intertie metering points* 'i' arranged in ascending order by settlement rate in each row. Columns 1 through 4 are original inputs to the matrix, while columns 5 through 13 are derived~~N by 2 matrix of N pairs of import quantities scheduled for injection by *market participant* 'k' in the real-time *market schedule* or the constrained schedule from the *pre-dispatch schedule of record* in *metering interval* 't' of *settlement hour* 'h' ($MQSI_{k,h}^{it}$, $DQSI_{k,h}^{it}$ or PDR$DA_DQSI_{k,h}^{it}$ as the case may be) paired with the corresponding component of the real-time *intertie offer* guarantee *settlement* credit (or day-ahead *intertie offer* guarantee as the case may be) for all *intertie metering points* 'i' arranged in ascending order by the real-time *intertie offer* guarantee or day-ahead *intertie offer* guarantee in each row~~.

~~The general rule is as follows:~~

~~Event Type~~	~~Matrix $MI_{k,h}^{t}$ [Row 'n', Column 1]~~	~~Matrix $MI_{k,h}^{t}$ [Row 'n', Column 2]~~
~~General Rule~~	~~$MQSI_{k,h}^{i,t}$, or MIN ($PDR\_DQSI_{k,h}^{i,t}$, $DQSI_{k,h}^{i,t}$) associated with the settlement amount selected in column 2 as illustrated in the table below.~~	~~$MI_{k,h}^{t}[n,2] = MAX (RT\_IOG_{k,h}^{i,t}, DA\_IOG_{k,h}^{i,t})$~~ ~~Subject to:~~ ~~$MI_{k,h}^{t}[n,2] \geq MI_{k,h}^{t}[n-1,2]$~~ ~~$MI_{k,h}^{t}[1,2] = MIN[MI_{k,h}^{t}[1 to N,2]]$~~

~~The outcomes from the general rule are as follows:~~

~~Event Type~~	~~Matrix $MI_{k,h}^{t}$ [Row 'n', Column 1]~~	~~Matrix $MI_{k,h}^{t}$ [Row 'n', Column 2]~~
~~A real-time import transaction not arranged in the day-ahead commitment process meeting the criteria of section 3.8A.3.1~~	~~$MQSI_{k,h}^{i,t}$~~	~~$RT\_IOG_{k,h}^{i,t}$~~
~~Day-ahead import transaction without financially-binding status and a corresponding real-time import transaction with a real-time *intertie offer* guarantee that is greater than the day-ahead *intertie offer* guarantee meeting the criteria of section 3.8A.3.3~~	~~$MQSI_{k,h}^{i,t}$~~	~~$RT\_IOG_{k,h}^{i,t}$~~
~~Day-ahead import transaction without financially-binding status and a corresponding real-time import transaction with a real-time *intertie offer* guarantee that is less than the day-ahead *intertie offer* guarantee meeting the criteria of~~	~~MIN ($PDR\_DQSI_{k,h}^{i,t}$, $DQSI_{k,h}^{i,t}$)~~	~~$DA\_IOG_{k,h}^{i,t}$~~

~~Event Type~~	~~Matrix $MI_{k,h}^{t}$ [Row 'n', Column 1]~~	~~Matrix $MI_{k,h}^{t}$ [Row 'n', Column 2]~~
~~section 3.8A.3.3~~		

The general rules to settle IOG are as follows:

Note: $MI_{k,h}$ [N,13] matrix has been transposed such that the columns are on the rows.

Event Type	General Rule
Matrix $MI_{k,h}$ [Row 'n', Column 1]	$DA\_DQSI_{k,h}^{i}$ Associated with the settlement amount in column 3
Matrix $MI_{k,h}$ [Row 'n', Column 2]	$DQSI_{k,h}^{i}$ Associated with the settlement amount in column 3 and 4
Matrix $MI_{k,h}$ [Row 'n', Column 3]	$DA\_IOG_{k,h}^{i}$
Matrix $MI_{k,h}$ [Row 'n', Column 4]	$RT\_IOG_{k,h}^{i}$
Matrix $MI_{k,h}$ [Row 'n', Column 5]	$MI_{k,h}[n,5]\{DA\_IOG\_RATE_{k,h}^{i}\}=$ $DA\_IOG_{k,h}^{i} / MIN(DA\_DQSI_{k,h}^{i}, DQSI_{k,h}^{i})$
Matrix $MI_{k,h}$ [Row 'n', Column 6]	$MI_{k,h}[n,6]\{RT\_IOG\_RATE_{k,h}^{i}\}=$ $RT\_IOG_{k,h}^{i} / DQSI_{k,h}^{i}$
Matrix $MI_{k,h}$ [Row 'n', Column 7]	$MI_{k,h}[n,7]\{DA\_OFFSET\_DQSW_{k,h}^{i}\}$
Matrix $MI_{k,h}$ [Row 'n', Column 8]	$MI_{k,h}[n,8]\{DA\_OFFSET\_FLAG_{k,h}^{i}\}$ = "Y" or "N" Such that: $DA\_OFFSET\_FLAG_{k,h}^{i}$ = "Y" when $\{DA\_OFFSET\_DQSW_{k,h}^{i}\}$>= 50% of $MIN\{DA\_DQSI_{k,h}^{i}, DQSI_{k,h}^{i}\}$
Matrix $MI_{k,h}$ [Row 'n', Column 9]	$MI_{k,h}[n,9]\{IOG\_SETTLEMENT\_RATE_{k,h}^{i}\}$ = $RT\_IOG\_RATE_{k,h}^{i}$ if $DA\_OFFSET\_FLAG_{k,h}^{i}$ = "Y"; OR $MI_{k,h}^{i}[n,9]\{IOG\_SETTLEMENT\_RATE_{k,h}^{i}\}$ = $MAX[DA\_IOG\_RATE_{k,h}^{i}, RT\_IOG\_RATE_{k,h}^{i}]$ if $DA\_OFFSET\_FLAG_{k,h}^{i}$ = "N"; Subject to: $MI_{k,h}[n,9] >= MI_{k,h}[n-1,9]$;

	$MI_{k,h}$ [1,9] = MIN[$MI_{k,h}$ [1 to N,9]]; [$MI_{k,h}$ [1 to N,9]] <> 0
Matrix $MI_{k,h}$ [Row 'n', Column 10]	$MI_{k,h}^{i}$ [n,10] {$IOG\$_{k,h}^{i}$} = the $DA\_IOG\$_{k,h}^{i}$ or $RT\_IOG\$_{k,h}^{i}$ associated with the $Settlement\ Rate_{k,h}^{i}$ (i.e. $RT\_IOG\_RATE_{k,h}^{i}$ or $MAX(DA\_IOG\_RATE_{k,h}^{i}, RT\_IOG\_RATE_{k,h}^{i})$)
Matrix $MI_{k,h}$ [Row 'n', Column 11]	$MI_{k,h}$ [n,11] {$RT\_OFFSET\_DQSW_{k,h}^{i}$ }
Matrix $MI_{k,h}$ [Row 'n', Column 12]	$MI_{k,h}$ [n,12] {$IOG\_OFFSET_{k,h}^{i}$ }
Matrix $MI_{k,h}$ [Row 'n', Column 13]	$MI_{k,h}$ [n,13] {$Net\_IOG_{k,h}^{i}$ } = $MI_{k,h}$ [n,10] {$IOG\$_{k,h}^{i}$} - $MI_{k,h}^{i}$ [n,12] {$IOG\_OFFSET_{k,h}^{i}$ }

The outcomes from the general rules are as follows

	A	B	C	D
Event Type	An import transaction scheduled day ahead receiving a DA-IOG but no RT-IOG and is not offset Day Ahead	An import transaction scheduled day ahead receiving a DA-IOG but no RT-IOG and is offset Day Ahead	An import transaction scheduled only in the real-time and receiving a RT-IOG but no DA-IOG	An import transaction scheduled both in the day ahead and in the real-time receiving DA-IOG and RT-IOG.
Matrix $MI_{k,h}$ [Row 'n', Column 1]	$DA\_DQSI_{k,h}^{i}$	$DA\_DQSI_{k,h}^{i}$	NULL	$DA\_DQSI_{k,h}^{i}$
Matrix $MI_{k,h}$ [Row 'n', Column 2]	$DQSI_{k,h}^{i}$	$DQSI_{k,h}^{i}$	$DQSI_{k,h}^{i}$	$DQSI_{k,h}^{i}$
Matrix $MI_{k,h}$ [Row 'n', Column 3]	$DA\_IOG_{k,h}^{i}$	$DA\_IOG_{k,h}^{i}$	$DA\_IOG_{k,h}^{i}$ = NULL	$DA\_IOG_{k,h}^{i}$
Matrix $MI_{k,h}$ [Row 'n', Column 4]	$RT\_IOG_{k,h}^{i}$ = NULL	$RT\_IOG_{k,h}^{i}$ = NULL	$RT\_IOG_{k,h}^{i}$	$RT\_IOG_{k,h}^{i}$ = NULL
Matrix $MI_{k,h}$	{$DA\_IOG\_RATE_{k,}$	{DA_IOG_RATE	NULL	{DA_IOG_RATE

	A	B	C	D
Event Type	An import transaction scheduled day ahead receiving a DA-IOG but no RT-IOG and is not offset Day Ahead	An import transaction scheduled day ahead receiving a DA-IOG but no RT-IOG and is offset Day Ahead	An import transaction scheduled only in the real-time and receiving a RT-IOG but no DA-IOG	An import transaction scheduled both in the day ahead and in the real-time receiving DA-IOG and RT-IOG.
[Row 'n', Column 5]	$_{h}^{i}\}$	$_{k,h}^{i}\}$		$_{k,h}^{i}\}$
Matrix $MI_{k,h}$ [Row 'n', Column 6]	$\{RT\_IOG\_RATE_{k,h}^{i}\}$= NULL	$\{RT\_IOG\_RATE_{k,h}^{i}\}$= NULL	$\{RT\_IOG\_RATE_{k,h}^{i}\}$=	$\{RT\_IOG\_RATE_{k,h}^{i}\}$= NULL
Matrix $MI_{k,h}$ [Row 'n', Column 7]	$\{DA\_OFFSET\_DQSW_{k,h}^{i}\} = 0$	$\{DA\_OFFSET\_DQSW_{k,h}^{i}\} > 0$	NULL	$\{DA\_OFFSET\_DQSW_{k,h}^{i}\} >= 0$
Matrix $MI_{k,h}$ [Row 'n', Column 8]	$\{DA\_OFFSET\_FLAG_{k,h}^{i}\}$ = "N"	$\{DA\_OFFSET\_FLAG_{k,h}^{i}\}$ = "Y"	NULL	$\{DA\_OFFSET\_FLAG_{k,h}^{i}\}$ = "Y" or "N"
Matrix $MI_{k,h}$ [Row 'n', Column 9]	$MI_{k,h}$ [n,9] $\{IOG\_SETTLEMENT\_RATE_{k,h}^{i}\} = \{DA\_IOG\_RATE_{k,h}^{i}\}$	NULL	$MI_{k,h}$ [n,9] $\{IOG\_SETTLEMENT\_RATE_{k,h}^{i}\} = \{RT\_IOG\_RATE_{k,h}^{i}\}$	$MI_{k,h}$ [n,9] $\{IOG\_SETTLEMENT\_RATE_{k,h}^{i}\} = \{RT\_IOG\_RATE_{k,h}^{i}\}$ or $MAX(DA\_IOG\_RATE_{k,h}^{i}, RT\_IOG\_RATE_{k,h}^{i})$
Matrix $MI_{k,h}$ [Row 'n', Column 10]	$MI_{k,h}$ [n,10] $\{IOG\$_{k,h}^{i}\}$ = the $DA\_IOG\$_{k,h}^{i}$	NULL	$MI_{k,h}$ [n,10] $\{IOG\$_{k,h}^{i}\}$ = the $RT\_IOG\$_{k,h}^{i}$	$MI_{k,h}$ [n,10] $\{IOG\$_{k,h}^{i}\}$ = $\{RT\_IOG\$_{k,h}^{i}\}$ or $MAX(DA\_IOG\$_{k,h}^{i}, RT\_IOG\$_{k,h}^{i})$
Matrix $MI_{k,h}$ [Row 'n', Column 11]	$MI_{k,h}$ [n,11] $\{RT\_OFFSET\_DQSW_{k,h}^{i}\} >= 0$	NULL	$MI_{k,h}$ [n,11] $\{RT\_OFFSET\_DQSW_{k,h}^{i}\} >= 0$	$MI_{k,h}$ [n,11] $\{RT\_OFFSET\_DQSW_{k,h}^{i}\} >= 0$
Matrix $MI_{k,h}$ [Row 'n', Column 12]	$MI_{k,h}$ [n,12] $\{IOG\_OFFSET_{k,h}^{i}\} >= 0$	NULL	$MI_{k,h}$ [n,12] $\{IOG\_OFFSET_{k,h}^{i}\} >= 0$	$MI_{k,h}$ [n,12] $\{IOG\_OFFSET_{k,h}^{i}\} >= 0$

	A	B	C	D
Event Type	An import transaction scheduled day ahead receiving a DA-IOG but no RT-IOG and is not offset Day Ahead	An import transaction scheduled day ahead receiving a DA-IOG but no RT-IOG and is offset Day Ahead	An import transaction scheduled only in the real-time and receiving a RT-IOG but no DA-IOG	An import transaction scheduled both in the day ahead and in the real-time receiving DA-IOG and RT-IOG.
Matrix $MI_{k,h}$ [Row 'n', Column 13]	$MI_{k,h}$ [n,13] {$Net\_IOG_{k,h}^{i}$ } = $MI_{k,h}$ [n,10] {$IOG\$_{k,h}^{i}$} - $MI_{k,h}$ [n,12] {$IOG\_OFFSET_{k,h}^{i}$ }	NULL	$MI_{k,h}$ [n,13] {$Net\_IOG_{k,h}^{i}$ } = $MI_{k,h}$ [n,10] {$IOG\$_{k,h}^{i}$} - $MI_{k,h}$ [n,12] {$IOG\_OFFSET_{k,h}^{i}$ }	$MI_{k,h}$ [n,13] {$Net\_IOG_{k,h}^{i}$ } = $MI_{k,h}$ [n,10] {$IOG\$_{k,h}^{i}$} - $MI_{k,h}$ [n,12] {$IOG\_OFFSET_{k,h}^{i}$ }

The Day-Ahead IOG rate ($DA\_IOG\ RATE_{k,h}^{i}$) column 5, at an *intertie metering point* 'i' in *settlement hour* 'h' is calculated using the day ahead constrained import schedule value in columns 1 ($DA\_DQSI_{k,h}^{i}$) and real time import schedule value in column 2 ($DQSI_{k,h}^{i}$) and the $DA\_IOG_{k,h}^{i}$ value in Column 3 of each unique row 'n' in matrix $MI_{k,h}$ as follows:

$$DA\_IOG\ RATE_{k,h}^{i} = \text{IF}\left[DA\_IOG_{k,h}^{i} \text{ is not NULL}, \frac{DA\_IOG_{k,h}^{i}}{\text{MIN}(DA\_DQSI_{k,h}^{i}, DQSI_{k,h}^{i})}, 0\right]$$

The Real-Time IOG rate ($RT\_IOG\_RATE_{k,h}^{i}$) column 6 at an *intertie metering point* 'i' in *settlement hour* 'h' is calculated using the real-time constrained import schedule of column 2 and the $RT\_IOG_{k,h}^{i}$ value of Column 4 of each unique row 'n' in matrix $MI_{k,h}$ as follows:

$$RT\_IOG\ RATE_{k,h}^{i} = \text{IF}\left[RT\_IOG_{k,h}^{i} \text{ is not NULL}, \frac{RT\_IOG_{k,h}^{i}}{DQSI_{k,h}^{i}}, 0\right]$$

The matrix is arranged in ascending order on $DA\_IOG\_RATE_{k,h}^{i}$ (Column 5) from the lowest rate to the highest rate.

The day-ahead export schedule quantity offset by *market participant* 'k' at an *intertie metering point* 'i' in *settlement hour* 'h' ($DA\_OFFSET\_DQSW_{k,h}^{i}$) column 7 is calculated using the day ahead constrained import schedule value in columns 1 ($DA\_DQSI_{k,h}^{i}$), real time import schedule value in column 2 ($DQSI_{k,h}^{i}$) and the day ahead constrained export schedule value for the market participant for an hour as follows:

$DA\_DQSW\_REM_{k,h}$	=	$\left[MAX\left[0,\left(\sum^{I} DA\_DQSW^{I}_{k,h} - \sum_{i=1}^{n} DA\_OFFSET\_DQSW^{i}_{k,h}\right)\right]\right]$

$DA\_OFFSET\_DQSW_{k,h}{}^{i}$	=	$MIN[DA\_DQSI^{i}_{k,h}, DQSI^{i}_{k,h}, DA\_DQSW\_REM_{k,h}]$

Where:

I	=	set of all *intertie metering points* 'i'

n	=	The number of day ahead import transactions with DA_OFFSET_DQSW at each pass.

The day-ahead IOG offset flag ($DA\_OFFSET\ FLAG_{k,h}{}^{i,t}$) column 8 at an *intertie metering point* 'i' in *settlement hour* 'h' is calculated using the values in column 7 $DA\_OFFSET\_DQSW_{k,h}{}^{i}$, columns 1 ($DA\_DQSI_{k,h}{}^{i}$) and real time import schedule value in column 2 ($DQSI_{k,h}{}^{i}$) of each unique row 'n' in matrix $MI_{k,h}$ as follows:

$DA\_OFFSET\_FLAG_{k,h}{}^{i}$	=	$IF\left(DA_{OFFSET_{DQSW}}{}^{i}_{k,h} > [50\% \times MIN(DA_{DQSI}{}^{i}_{k,h}, DQSI^{i}_{k,h})], Y, N\right)$

The IOG offset rate ($IOG\_SETTLEMENT\_RATE_{k,h}{}^{i}$) column 9 at an *intertie metering point* 'i' in *settlement hour* 'h' is calculated using the values in Column 5 ($DA\_IOG\_RATE_{k,h}{}^{i}$) and Column 6 ($RT\_IOG\_RATE_{k,h}{}^{i}$) of each unique row 'n' in matrix $MI_{k,h}$ as follows:

$IOG\_SETTLEMENT\_RATE_{k,h}{}^{i}$	=	$IF[DA\_OFFSET\_FLAG=Y, RT\_IOG\_RATE_{k,h}{}^{i}, MAX(RT\_IOG\_RATE_{k,h}{}^{i}, DA\_IOG\_RATE_{k,h}{}^{i})]$
		Subject to: $MI_{k,h}[n,9] >= MI_{k,h}[n-1,9]$; $MI_{k,h}[1,9] = MIN[MI_{k,h}[1 \text{ to } N,9]]$; $[MI_{k,h}[1 \text{ to } N,9]] <> 0$

The IOG dollar amount ($IOG\$_{k,h}^{i}$) column 10 at an *intertie metering point* 'i' in *settlement hour* 'h' is the IOG dollar amount associated with the rate used in Column 9 ($IOG\_SETTLEMENT\_RATE_{k,h}^{i}$).

The matrix is arranged in ascending order of ($IOG\_SETTLEMENT\_RATE_{k,h}^{i}$) (Column 9) from the lowest rate to the highest rate.

The real-time export schedule quantity offset by *market participant* 'k' at an *intertie metering point* 'i' in *settlement hour* 'h' ($RT\_OFFSET\_DQSW_{k,h}^{i}$) column 11 is calculated using the real-time constrained import schedule values in column 2 ($DQSI_{k,h}^{i}$) and the real time constrained export schedule value for the market participant for an hour as follows:

$RT\_DQSW\_REM_{k,h}$	=	$\left[MAX\left[0,\left(\sum^{I} DQSW_{k,h}^{i} - \sum_{i=1}^{n} RT\_OFFSET\_DQSW_{k,h}^{i}\right)\right]\right]$

$RT\_OFFSET\_DQSW_{k,h}^{i}$	=	$MIN\left[DQSI_{k,h}^{i}, RT\_DQSW\_REM_{k,h}\right]$

Where:

I	=	set of all *intertie metering points* 'i'

n	=	The number of real time import transactions with RT_OFFSET_DQSW at each pass.

The IOG offset *settlement amount* for *market participant* 'k' at an *intertie metering point* 'i' in *settlement hour* 'h' ($IOG\_OFFSET_{k,h}^{i}$) column 12 is calculated using column 9 ($IOG\_SETTLEMENT\_RATE_{k,h}^{i}$) and column 11($RT\_OFFSET\_DQSW_{k,h}^{i}$) as follows:

$IOG\_OFFSET_{k,h}^{i}$	=	$\left(IOG\_SETTLEMENT\_RATE_{k,h}^{i} \times RT\_OFFSET\_DQSW_{k,h}^{i}\right)$

The IOG *settlement amount* for *market participant* 'k' at an *intertie metering point* 'i' in *metering settlement hour* 'h' ($NET\_IOG_{k,h}^{i}$) column 13 is calculated using column10 ($IOG\$_{k,h}^{i}$) and column 12 ($IOG\_OFFSET_{k,h}^{i}$) as follows:

$NET\_IOG_{k,h}^{i}$	=	$\left(IOG\$_{k,h}^{i} - IOG\_OFFSET_{k,h}^{i}\right)$

~~The adjusted import schedule quantities by *market participant* 'k' at an *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h' ($QSI\{adj\}_{k,h}^{t,t}$) shall be calculated using the schedule values in column 1 of each unique row 'n' in matrix $MI_{k,h}^{t}$ as follows:~~

$$QSI\{adj\}_{k,h}^{i,t} = MIN\left[MI_{k,h}^{t}[n,1] \ , \ MAX\left[0, \left(\sum_{x=1}^{n} MI_{k,h}^{t}[x,1] \ - \ \sum^{Y} MQSW_{k,h}^{y,t} \right) \right] \right]$$

Where:

'n' is a row in the set of N rows within matrix $MI_{k,h}^{t}$ corresponding to each applicable *intertie metering point* 'i'

$QSI\{adj\}_{k,h}^{i,t}$ is each quantity (and where applicable, adjusted quantity) scheduled for injection by *market participant* 'k' at an *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h' corresponding with each import quantity in matrix $MI_{k,h}^{t}$ [row n, column 1];

'Y' is the set of all *intertie metering points* 'y';

Given the above, the total IOG offset *settlement amount* for *market participant* 'k' during *settlement hour* 'h' shall be derived as follows:

$$IOG_{k,h}OFFSET = \sum_{x=1}^{N} MI_{k,h}^{t}[x,2] - \sum_{I} (-1) \bullet MIN\left[0, \sum_{T} OP(EMP_{h}^{i,t}, QSI\{adj\}_{k,h}^{i,t}, BE_{k,h}^{i,t} \text{ or } PDR\_BE_{k,h}^{i,t}) + \frac{\sum^{T} QSI\{adj\}_{k,h}^{i,t}}{\sum^{T} MI_{k,h}^{t}[n,1]} \bullet OPE'_{k,h}^{i} \right]$$

Where:

'T' is the set of all metering intervals in settlement hour 'h'

'I' is the set of all *intertie metering points* 'i'

'N' is the number of rows n in matrix $MI_{k,h}^{t}$ [N,2];

'n' is a row in the set of N rows within matrix $MI_{k,h}^{t}$ [N,2] corresponding to each applicable *intertie metering point* 'i'

$MI_{k,h}^{t}$ [N,2] is an N by 2 matrix of N pairs of import quantities scheduled for injection by *market participant* 'k' in the real-time *market schedule* or the constrained schedule from the *pre-dispatch of record* in *metering interval* 't' of *settlement hour* 'h' ($MQSI_{k,h}^{i,t}$, $DQSI_{k,h}^{i,t}$ or $PDR\_DQSI_{k,h}^{i,t}$ as the case may be) paired with the corresponding component of the real-time *intertie offer* guarantee *settlement* credit (or day-ahead *intertie offer* guarantee as the case may be) for all *intertie metering points* 'i' arranged in ascending order by the *settlement amount* in each row.

$QSI\{adj\}_{k,h}^{i,t}$) is as defined above

$PDR\_BE_{k,h}^{i,t}$ are *energy offers* submitted into the *pre-dispatch of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in

ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2 where the value $QSI\{adj\}_{k,h}^{i,t}$ applies to a day-ahead *intertie offer* guarantee;

$BE_{k,h}^{i,t}$ is the *real-time market offer* matrix of *price-quantity pairs* for the eligible import transaction for *market participant* 'k' during *metering interval* 't' of *settlement hour* 'h' where the value $QSI\{adj\}_{k,h}^{i,t}$ applies to a real-time *intertie offer* guarantee;

$EMP_h^{i,t}$ is the real-time 5-minute *energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

$OPE'_{k,h}{}^{i}$ is a term used when the *settlement amount* in row 'n' pertains to a $DA\_IOG_{k,h}$ *settlement amount* and is equal to:

$OPE_{k,h}^{i}$: that component of the congestion management *settlement* credit *settlement amount* (CMSC) for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' as defined in section 3.5.2.; or

$OPE\{adj\}_{k,h}^{i}$: that component of the congestion management *settlement* credit *settlement amount* (CMSC) for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' in which the constrained schedule is the lesser of $PDR\_DQSI_{k,h}^{i,t}$ or $DQSI_{k,h}^{i,t}$ but in all instances, greater than or equal to $MQSI_{k,h}^{i,t}$;

depending on the value prescribed in the original calculation of the $DA\_IOG_{k,h}$ *settlement amount* in section 3.8A.2A. OP(P,Q,B) is a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of offered *price-quantity pairs*:

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter 'B' this may be expressed as follows :

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s* is the highest indexed row of B such that $Q_{s^*} \le Q \le Q_n$ and where, $Q_0=0$

'P' is $EMP_h^{i,t}$: the real-time 5-minute *energy market price* at the applicable *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

'Q' is $QSI\{adj\}_{k,h}^{i,t}$ as defined above.

'B' is matrix $BE_{k,h}^{i,t}$ or $PDR\_BE_{k,h}^{i,t}$ depending on whether $QSI\{adj\}_{k,h}^{i,t}$ applies to a real-time *intertie offer* guarantee or a day-ahead *intertie offer* guarantee respectively.

3.8A.5 The cumulative $IOG_{k,h}$OFFSET *settlement amounts* received from *market participants* for each *real-time energy market billing period* shall be distributed to *market participants* in accordance with section 4.8.2.3.

3.8A.6 $IOG_{k,h}$OFFSET *settlement amounts* shall be aggregated or disaggregated on *settlement statements* in such manner as shall be determined by the *IESO*.

Day-Ahead Intertie Offer Guarantee Adjustments

3.8A.7 [Intentionally left blank - section deleted] For each *market participant* that receives a constrained schedule for an import transaction in the *pre-dispatch of record*, the *IESO* shall determine a day-ahead intertie *offer* guarantee adjustment *settlement amount* ($DA\_IOG\{adj\}_{k,h}^{i}$) for that import transaction. The day-ahead intertie offer guarantee adjustment *settlement amount* is equal to the greater of zero and:

the intertie offer guarantee floor value ($IOG\_FV_{k,h}^{i}$) determined for that import transaction, minus

the sum of the applicable *settlement amounts* determined for that import transaction.

The $DA\_IOG\{adj\}_{k,h}^{i}$ shall be formulated as follows:

$$DA\_IOG\{adj\}_{k,h}^{i} = MAX\left[0, IOG\_FV_{k,h}^{i} - NEMSC_{k,h}^{i} - MAX\left(DA\_IOG_{k,h}^{i}, RT\_IOG_{k,h}^{i}\right) - CMSC_{k,h}^{i}\right]$$

Where:

$IOG\_FV_{k,h}^{i}$ is the intertie offer guarantee floor value determined under section 3.8A.9;

$NEMSC_{k,h}^{i}$ is that portion of the net *energy market settlement* credit applicable to the import transaction for *market participant* 'k' for *settlement hour* 'h' at *intertie metering point* 'i' as determined in accordance with section 3.3.2.1;

$DA\_IOG_{k,h}^{i}$ is that portion of the day-ahead *intertie offer* guarantee *settlement* credit applicable to the import transaction for *market participant* 'k' for *settlement hour* 'h' at *intertie metering point* 'i';

$RT\_IOG_{k,h}^{i}$ is that portion of the real-time *intertie offer* guarantee *settlement* credit applicable to the import transaction for *market participant* 'k' for *settlement hour* 'h' at *intertie metering point* 'i' as determined in accordance with section 3.8A.2; and

$CMSC_{k,h}^{i}$ is that portion of the congestion management *settlement* credit applicable to the import transaction for *market participant* 'k' for *settlement hour* 'h' at *intertie metering point* 'i' as determined in accordance with section 3.5.2.1 and specifically that component applicable to a constraint on *energy* ($OPE_{k,h}^{i}$).

3.8A.8 [Intentionally left blank – section deleted] The *IESO* shall determine the *intertie offer* guarantee floor value ($IOG\_FV_{k,h}^{i}$) referred to in section 3.8A.7 from:

the day-ahead *offer prices* for the import transaction submitted by the *market participant* over the range of the *pre-dispatch of record* constrained quantity scheduled for that import transaction; and

real-time offer prices for the import transaction at the corresponding location in the corresponding *settlement hour* for any additional *energy* scheduled above and beyond the *pre-dispatch of record* constrained quantity scheduled for that import transaction:

The $IOG\_FV_{k,h}^{i}$ shall be formulated as follows:

$$IOG\_FV_{k,h}^{i} = TERM\,1 + TERM\,2$$

$$TERM\,1 = \sum^{T}\left[\sum_{n=1}^{s^*}\left[DA\_B^{t}[n,1]\cdot\left(DA\_B^{t}[n,2]-DA\_B^{t}[n-1,2]\right)\right]+\left[\left(MIN(DQSI_{k,h}^{i,t}, PDR\_DQSI_{k,h}^{i,t})-DA\_B^{t}[s^*,2]\right)\cdot DA\_B^{t}[s^*+1,1]\right]\right]$$

TERM2 is calculated for each metering interval 't' where $PDR\_DQSI_{k,h}^{i,t} < DQSI_{k,h}^{i,t}$

$$TERM\,2 = \sum^{T}\left[\begin{array}{l}\sum_{n=1}^{w^*}\left[RT\_B^{t}[n,1]\cdot\left(RT\_B^{t}[n,2]-RT\_B^{t}[n-1,2]\right)\right]+\left[\left(DQSI_{k,h}^{i,t}-RT\_B^{t}[w^*,2]\right)\cdot RT\_B^{t}[w^*+1,1]\right]- \\ \sum_{n=1}^{x^*}\left[RT\_B^{t}[n,1]\cdot\left(RT\_B^{t}[n,2]-RT\_B^{t}[n-1,2]\right)\right]-\left[\left(PDR\_DQSI_{k,h}^{i,t}-RT\_B^{t}[x^*,2]\right)\cdot RT\_B^{t}[x^*+1,1]\right]\end{array}\right]$$

Where:

"T" is the set of all *metering intervals* 't' in *settlement hour* 'h';

''DA_B' is matrix $PDR\_BE_{k,h}^{i,t}$: *energy offers* submitted into the *pre-dispatch of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2.

'RT_B^{t}' is matrix $BE_{k,h}^{i,t}$ of N *price-quantity pairs* offered by *market participant* 'k' to supply *energy* from a particular *boundary entity* associated with an *intertie metering point* 'i' in the *IESO-administered markets*, during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by offered price where offered prices are in column 1 and offered quantities are in column 2.

s* is the highest indexed row of matrix DA_B such that $DA\_B[s^*,2] \le MIN(DQSI_{k,h}^{i,t}, PDR\_DQSI_{k,h}^{i,t}) \le DA\_B[N,2]$ and where, $DA\_B[0,2] = 0$

w* is the highest indexed row of matrix RT_B^{t} such that $RT\_B^{t}[w^*,2] \le DQSI_{k,h}^{i,t} \le RT\_B^{t}[N,2]$ and where, $RT\_B^{t}[0,2] = 0$

x* is the highest indexed row of matrix RT_B^{t} such that $RT\_B^{t}[x^*,2] \le PDR\_DQSI_{k,h}^{i,t} \le RT\_B^{t}[N,2]$ and where, $RT\_B^{t}[0,2] = 0$

3.8A.9 [Intentionally left blank – section deleted] The *IESO* shall report the intertie offer guarantee adjustment *settlement amount* specified in section 3.8A.7 in a manner and at the times specified in the applicable *market manual*; distribute and recover such *settlement amounts* in a manner and at the times specified in the applicable *market manual*.

PART 5 – IESO BOARD DECISION RATIONALE

Insert Text Here

Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00349-R02			
Subject:	Enhanced Day-Ahead Commitment Process (EDAC): Settlement Guarantees			
Title:	Failure Charges			
Nature of Proposal:	☒ Alteration	☐ Deletion	☐ Addition	
Chapter:	7	Appendix:		
Sections:	3.8B, 3.8D (new), 3.8E (new), 3.8F(new)			
Sub-sections proposed for amending:	3.8B.1, 3.8B.2			

PART 2 – PROPOSAL HISTORY – PLEASE REFER TO MR-00349-R00

Version	Reason for Issuing	Version Date
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

MR-00349-R02 specifies the modifications to the Day-Ahead Import Failure Charge and introduces specifications for new charges contained within the EDAC design: the day-ahead export failure charge; the day-ahead linked wheel failure charge; and the generator withdrawal charge.

Background

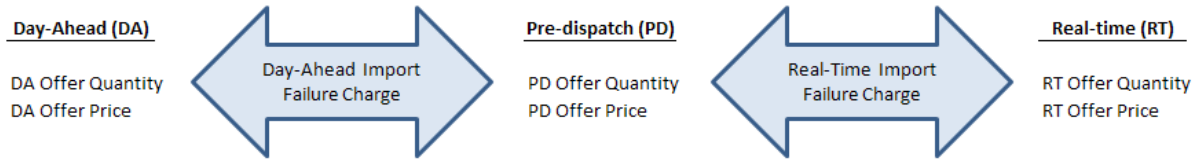
Please refer to MR-00349-R00.

Discussion

Modifications to Day-Ahead Import Failure Charge

Import transactions are scheduled in hour-ahead pre-dispatch using hour-ahead pre-dispatch price. Currently settlement failure charges for scheduled day-ahead import transactions that failed to get a schedule in whole or in part and then failed to flow in whole or in part in hour-ahead pre-dispatch are calculated based on real-time market clearing price (MCP). To better represent impacts to the IESO-administered markets of import failures, the day-ahead failure charges, will be modified to use the hour-ahead pre-dispatch price instead of real-time MCP in the calculation. As well, a cap will be added to limit the failure charge to the impact of offer changes between day-ahead and hour-ahead pre-dispatch. If an import fails between day-ahead and pre-dispatch, the import will be assessed a Day-Ahead Import Failure Charge. If an import fails between pre-dispatch and real-time, the import will be assessed a Real-time Import Failure Charge.

A Real-time Import Failure Charge and a Day-Ahead Import Failure Charge may be applied to the same import transaction and there will be no reversal (i.e. both charges will apply).



Each MW in the import transaction may be assessed either a Day-Ahead Import Failure Charge or a Real-Time Import Failure Charge but will not be assessed both for the same MW. For example, a transaction scheduled for 100 MW day-ahead is only scheduled in pre-dispatch for 70 MW and is scheduled in real-time for 0 MW. The 30 MW not scheduled in pre-dispatch is assessed a Day-Ahead Import Failure Charge and the 70 MW not scheduled in real-time is assessed a Real-time Import Failure Charge.

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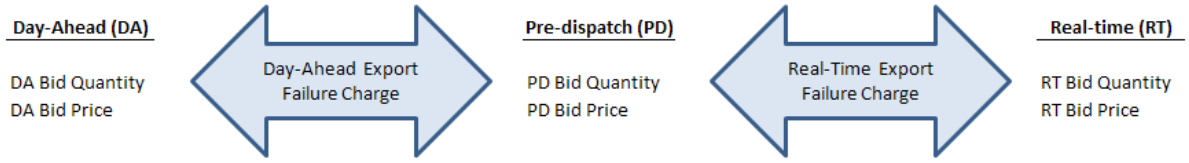
An import that is part of a day-ahead linked wheel cannot be assessed a Day-Ahead Import Failure Charge.

It is proposed to modify section 3.8B of Chapter 9 to reflect the modified day-ahead import failure charge.

Any proceeds collected under this modified Day-Ahead Import Failure Charge will be distributed back to the market through the Intertie Failure Charge Rebate.

New Day-Ahead Export Failure Charge

The day-ahead export failure charge will be closely related to the current real-time and day-ahead import transaction failure charges. The day-ahead export failure charge is assessed for exports that are scheduled day-ahead but fails to get scheduled in the hour ahead pre-dispatch. There will be retained bona fide reasons for an export to fail and provided those conditions are met no export failure charge will be applied. Similar to the day-ahead import failure charge, if there is a real-time export failure charge and a day-ahead export failure charge applied to the same export transaction, there will be no reversal (i.e. both charges will apply). If an export fails between day-ahead and pre-dispatch, the export will be assessed a Day-Ahead Export Failure Charge. If an export fails between pre-dispatch and real-time, the export will be assessed a Real-time Export Failure Charge.



Similar to the Day-Ahead Import Failure Charge, each MW in the export transaction may be assessed either a Day-Ahead Export Failure Charge or a Real-Time Export Failure Charge but will not be assessed both for the same MW.

An export that is part of a day-ahead linked wheel is not eligible for a Day-Ahead Export Failure Charge.

Any proceeds collected under this new Day-Ahead Export Failure Charge will be distributed back to the market through the Intertie Failure Charge Rebate.

It is proposed to insert a new section 3.8D in Chapter 9 of the market rules to specify the day-ahead export failure charge.

New Day-Ahead Linked Wheel Failure Charge

With the inclusion of day-ahead exports in EDAC, scheduling of linked wheels is available. As a result, a day-ahead linked wheel failure charge is introduced. This charge applies when the day-ahead linked wheel is not scheduled in the hour-ahead pre-dispatch and the trader does not have a bona-fide reason for the failure.

PART 3 – EXPLANATION FOR PROPOSED AMENDMENT

While the failure of a day-ahead linked wheel does not directly impact the energy price as do the failure of non-linked imports and export transactions, a failed linked wheel could have displaced other transactions on the interties where the wheels were scheduled a day-ahead. In other words, the failed day-ahead wheel could have created congestion that limited the scheduling of other day-ahead transactions. Thus, the day-ahead linked wheel failure charge is to be assessed based on the cost of congestion between the interties where the wheeling transactions were scheduled. This cost of congestion is calculated as the spread of the day-ahead prices and real-time prices at the interties.

When the price spread between a linked wheel's Day-Ahead intertie price and the pre-dispatch intertie price is positive, it is possible that a participant would have the incentive to allow the linked wheel transactions to fail in real-time, rather than in pre-dispatch as real-time failure charges would likely to be lower. Transactions that fail in real-time could have greater adverse impacts on reliability and the market because it is not possible to schedule other imports and exports in real-time. To remove this incentive, there will be an upper bound on the DA linked wheels failure charge to the minimum of the linked wheel failure charge and the maximum of the real-time import or export failure charge.

The formula is as follows: Min {max (0, [day-ahead price spread minus hour-ahead pre-dispatch price spread] × [MWh failure]), [real-time import failure charge plus real-time export failure charge]}

Any proceeds collected under the new Day-Ahead Linked Wheel Failure Charge will be distributed back to the market through the Intertie Failure Charge Rebate.

It is proposed to insert a new section 3.8E in Chapter 9 of the market rules to specify the day-ahead linked wheel failure charge.

New Day-Ahead Generator Withdrawal Charge

A Day-Ahead Generator Withdrawal Charge for committed non-quick starts is a new charge and will be applied when these generators withdraw their commitment. If a market participant is eligible for a DA-PCG, and withdraws from the commitment in real-time then, depending on the reasons for the withdrawal, a Day-Ahead Generator Withdrawal Charge may be assessed.

Market participants must notify the IESO of an intention to withdraw. The consequence of this action is assessed as follows for application of the withdrawal charge.

If:

- the withdrawal was within the market participant's control; and
- the withdrawal fails a price test (the results of this withdrawal did not provide a benefit to the market),

then the Day-Ahead Generator Withdrawal Charge will be assessed.

The price used in the calculation of the Day-Ahead Generator Withdrawal Charge is dependent on the time the notification of withdrawal was received by the IESO:

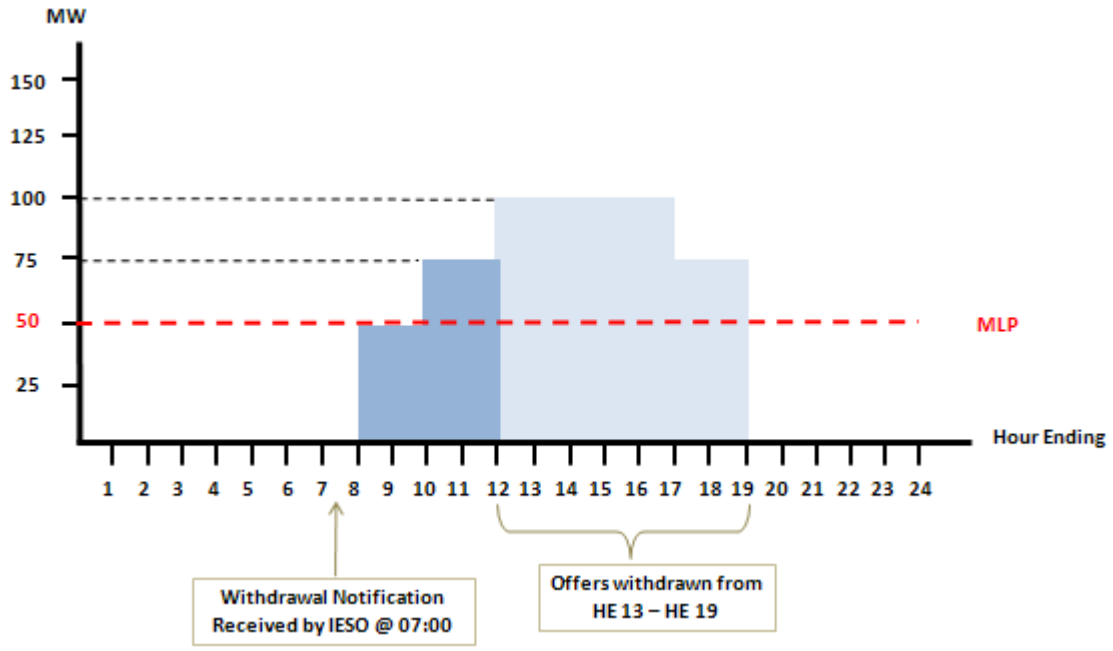
a. If withdrawal notification is received at or before 4 hours prior to the first EDAC schedule hour in real-time (PD – 4), then the lesser of the pre-dispatch Ontario market

PART 3 – EXPLANATION FOR PROPOSED AMENDMENT

clearing price and the real-time market clearing price is used for every hour withdrawn. The withdrawal has to be approved and revisions to the offers completed by the start of the pre-dispatch run for PD-4 consistent with the existing data submission process described in Market Manual 4.2.

b. If withdrawal notification is received later than PD-4, then the real-time market clearing price is used for every hour withdrawn.

For example, a generator is scheduled from HE 9 to HE 19 and notifies the IESO of their withdrawal in HE13 at 07:00. The withdrawal notification is received more than 4 hours prior to the withdrawal hour in real-time, so the lesser of the pre-dispatch Ontario market clearing price and the real-time market clearing price is used for every hour withdrawn.



In the same example, if the generator notifies the IESO of their withdrawal in HE13 at 09:00, the withdrawal notification is received less than 4 hours prior to the withdrawal hour in real-time, so the real-time market clearing price is used for every hour withdrawn.

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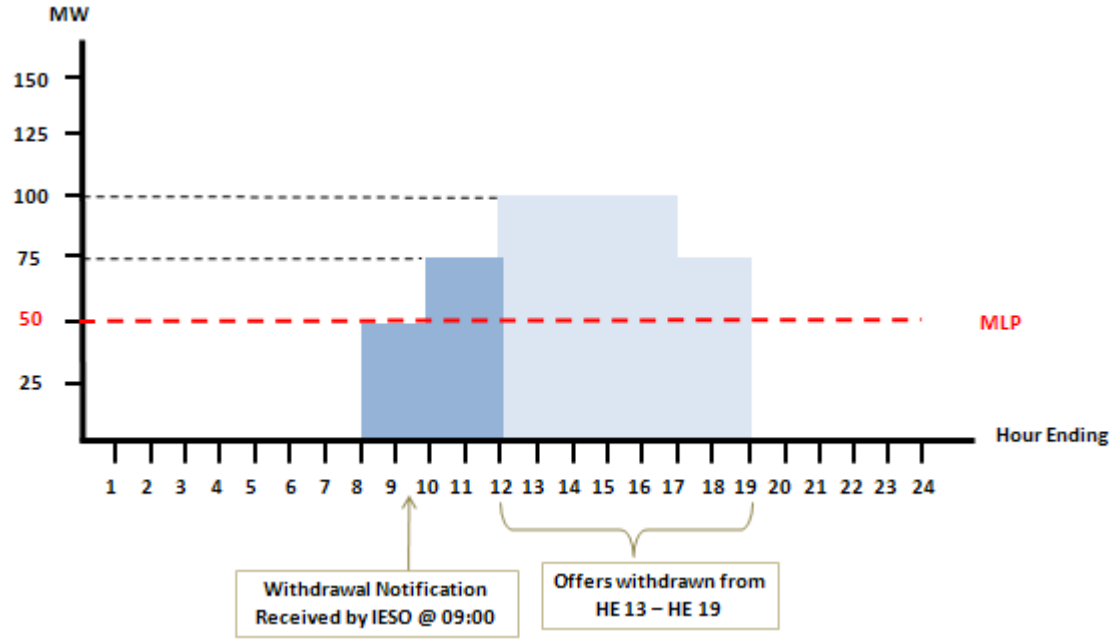

If the market participant does not notify the IESO of their intent to withdraw and does not inject for the entire day-ahead scheduled period, the Generator Withdrawal Charge is assessed using the real-time market clearing price for each hour of the scheduled period.

If the market participant withdraws completely from their day-ahead schedule and the IESO removes the constraints applied to the unit, the market participant is not eligible to receive the DA-PCG. If the market participant does not notify the IESO of their intent to withdraw and does not inject for any interval in their day-ahead scheduled period, they are not eligible to receive the DA-PCG and will be assessed the withdrawal charge.

If a market participant synchronizes to the system and subsequently requests to withdraw from its commitment before the completion of its day-ahead commitment, withdrawal charges will be assessed and applied on the scheduled hours withdrawn. Any proceeds collected under the Generator Withdrawal Charge will be distributed back to the market through the new Generator Withdrawal Rebate charge.

It is proposed to insert a new section 3.8F in Chapter 9 of the market rules to specify the generator withdrawal charge.

PART 4 – PROPOSED AMENDMENT

3.8B Day Ahead Import Failure Charge

3.8B.1 The *IESO* shall apply the day-ahead import failure charge specified in section 3.8B.2 to a *market participant* for any quantity of *energy* scheduled for injection at an

intertie metering point ~~in the constrained~~ scheduled ~~from~~ in the ~~*pre-dispatch*~~*schedule of record* where:

3.8B.1.1 the *market participant* fails either in whole or in part to schedule a *dispatch* quantity scheduled for injection in the ~~constrained *real-time*~~*pre-dispatch schedule* in the corresponding *metering interval* of the corresponding *settlement hour* at the same *intertie metering point;*

3.8B.1.2 the *IESO* has not determined, nor has the *market participant* demonstrated to the satisfaction of the *IESO,* that the failure is due to bona fide and legitimate reasons as described in chapter 7, section 7.5.8B of these *market rules*; and

3.8B.1.3 the import transaction is not part of a day-ahead linked wheel.

3.8B.2 For all import transactions scheduled in the ~~*pre-dispatch*~~*schedule of record* and meeting the criteria of section 3.8B.1, the day-ahead import failure charge shall be formulated as follows:

Let OP(P,Q,B) be a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of offered *price-quantity pairs*:

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter 'B' this may be expressed as follows :

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s* is the highest indexed row of B such that $Q_{s^*} \le Q \le Q_n$ and where, $Q_0=0$

'P' is PD_$EMP_h^{m,t}$: pre-dispatch projected *energy market price* applicable to all *delivery* points 'm' in the Ontario zone in *metering interval* 't' of *settlement hour* 'h'~~the real-time 5-minute *energy market price* in Ontario during *metering interval* 't' of *settlement hour* 'h'~~;

'Q' is DA_$ISD_{k,h}^{i,t}$ as defined below; and

'B' is ~~PDR~~DA_$BE_{k,h}^{i,t}$: energy offers submitted into the ~~pre-dispatch~~schedule of record, represented as an N by 2 matrix of price-quantity pairs for each market participant 'k' at intertie metering point 'i' during metering interval 't' of settlement hour 'h' arranged in ascending order by the offered price in each price-quantity pair where offered prices are in column 1 and offered quantities are in column 2; or

'B' is PD_$BE_{k,h}^{i,t}$: energy *offers* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending

order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2.

the *offer* matrix of *price-quantity pairs* for the applicable import transaction that was submitted by *market participant* 'k' and scheduled in the ~~*pre-dispatch*~~*schedule of record* during *metering interval* 't' for *settlement hour* 'h' of the *real-time trading day*

and,

Let $DA\_ISD_{k,h}^{i,t}$ be the day-ahead import scheduling deviation quantity calculated for *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' as determined by the formula:

DA import scheduling deviation quantity ($DA\_ISD_{k,h}^{i,t}$)	=	MAX (day-ahead import transaction quantity – ~~real-time~~ pre-dispatch import transaction quantity, 0)
$DA\_ISD_{k,h}^{i,t}$	=	MAX (~~PDR~~DA_$DQSI_{k,h}^{i,t}$ – PD_$DQSI_{k,h}^{i,t}$, 0) Where: ~~PDR~~DA_$DQSI_{k,h}^{i,t}$ is the ~~*pre-dispatch*~~*schedule of record* ~~constrained~~ quantity scheduled for injection by *market participant* 'k' for an import transaction at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'; and PD_$DQSI_{k,h}^{i,t}$ is the ~~real-time~~pre-dispatch ~~constrained~~ quantity scheduled for injection by *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

Let $XPD\_BE_{k,h}^{i,t}$ be the function which calculates the area under the curve created by an n x 2 matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=p^*}^{s^*} P_n \times (Q_n - Q_{n-1})\right] + (Q - Q_{s^*}) \times P_{s^*+1}$$

where matrix (B) is *energy offers* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

Let $XDA\_BE_{k,h}^{i,t}$ be the function which calculates the area under the curve created by an n x 2 matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=c^*}^{d^*} P_n \times (Q_n - Q_{n-1})\right] + (Q - Q_{d^*}) \times P_{d^*+1}$$

where matrix (B) is energy offers submitted in schedule of record, represented as an N by 2 matrix of price-quantity pairs for each market participant 'k' at intertie metering point 'i' during metering interval 't' of settlement hour 'h' arranged in ascending order by the offered price in each price quantity pair where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

Such that the day-ahead import failure charge for *market participant* 'k' during *settlement hour* 'h' for all *intertie metering points* 'i' may be formulated with the above components as follows:

$DA\_IFC_{k,h}$ **=** For all *intertie metering points* and all *metering intervals* during the *settlement hour*:

-1 x MINIMUM of:

[MAXIMUM of:

[[The sum of all revenues implied by each import transaction valued at the ~~*real-time*~~pre-dispatch *energy market price* in the Ontario zone ~~times~~ for the difference in quantity scheduled in pre-dispatch and the quanity scheduled in the *schedule of record*~~day-ahead import scheduling deviation quantity~~.

Minus:

Those costs represented through the *offers* for the import transaction scheduled in the ~~*pre-dispatch*~~*schedule of record*]

or zero],

~~subject to a maximum value of the:~~

[MAXIMUM of:

[the pre-dispatch *offer* to increase quantity scheduled in pre-dispatch to quantity scheduled day-ahead minus the day-ahead *offer* to increase quantity scheduled in pre-dispatch to quanity scheduled ~~day-ahead~~in the *schedule of record*]

or zero]~~; or~~

[day-ahead import scheduling deviation quantity times the MAXIMUM of (zero or the ~~real-time~~pre-dispatch *energy market price* in the Ontario zone)]]

$$DA\_IFC_{k,h} = \sum_{I,T}(-1)\times MIN\left[MAX\left[0, OP(EMP_h^{m,t}, DA\_ISD_{k,h}^{i,t}, PDR\_BE_{k,h}^{i,t})\right], \left(MAX(0, EMP_h^{m,t})\times DA\_ISD_{k,h}^{i,t}\right)\right]$$

$DA\_IFC_{k,h}$ =

$$\sum_{I,T}(-1)\times MIN\left[MAX\left(0, OP\left(PD\_EMP_h^{m,t}, DA\_DQSI_{k,h}^{i,t}, DA\_BE_{k,h}^{i,t}\right) - OP\left(PD\_EMP_h^{m,t}, PD\_DQSI_{k,h}^{i,t}, DA\_BE_{k,h}^{i,t}\right),\right.\right.$$

$$\left.\left.MAX\left(0, XPD\_BE_{k,h}^{i,t} - XDA\_BE_{k,h}^{i,t}\right), \left(MAX(0, PD\_EMP_h^{m,t})\times DA\_ISD_{k,h}^{i,t}\right)\right]\right]$$

Where:

~~PDR~~DA_$BE_{k,h}^{i,t}$ are energy *offers* submitted into the ~~pre-dispatch~~*schedule of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2;

$PD\_BE_{k,h}^{i,t}$ are energy *offers* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price-quantity pair* where offered prices are in column 1 and offered quantities are in column 2;

$PD\_EMP_h^{m,t}$~~$EMP_h^{m,t}$~~ is the *pre-dispatch* projected *energy market price* applicable to all *delivery* points 'm' in the Ontario zone in *metering interval* 't' of *settlement hour* 'h'~~real-time 5-minute *energy market price* in Ontario during *metering interval* 't' of *settlement hour* 'h'~~;

'T' is the set of all *metering intervals* 't' in *settlement hour* 'h';

'I' is the set of all *intertie metering points* 'i'.

3.8D Day Ahead Export Failure Charge

3.8D.1 The *IESO* shall apply the day-ahead export failure charge specified in section 3.8D.2 to a *market participant* for any quantity of *energy* scheduled for withdrawal at an *intertie metering point* scheduled in the *schedule of record* where:

3.8D.1.1 the *market participant* fails either in whole or in part to schedule a *dispatch* quantity scheduled for withdrawal in the *pre-dispatch schedule* in the corresponding *metering interval* of the corresponding *settlement hour* at the same *intertie metering point*; ~~and.~~

3.8D.1.2 the *IESO* has not determined, nor has the *market participant* demonstrated to the satisfaction of the *IESO*, that the failure is due to bona fide and legitimate reasons as described in chapter 7, section 7.5.8B; and

3.8D.1.3 the export transaction is not part of a day-ahead linked wheel.

3.8D.2 For all export transactions scheduled in the *schedule of record* and meeting the criteria of section 3.8D.1, the day-ahead export failure charge shall be formulated as follows:

Let OP(P,Q,B) be a profit function of Price (P), Quantity (Q) and an N by 2 matrix (B) of offered *price-quantity pairs*:

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} P_n \cdot (Q_n - Q_{n-1}) - (Q - Q_{s^*}) \cdot P_{s^*+1}$$

Using matrix notation for parameter 'B' this may be expressed as follows :

$$OP(P,Q,B) = P \cdot Q - \sum_{n=1}^{s^*} [B[n,1] \cdot (B[n,2] - B[n-1,2])] - [(Q - B[s^*,2]) \cdot B[s^*+1,1]]$$

Where:

s* is the highest indexed row of B such that $Q_{s^*} \leq Q \leq Q_n$ and where, $Q_0=0$

'P' is $PD\_EMP_h^{m,t}$: *pre-dispatch* projected *energy market price* applicable to all *delivery* points 'm' in the Ontario zone in *metering interval* 't' of *settlement hour* 'h';

'Q' is $DA\_ESD_{k,h}^{i,t}$ as defined below; and

'B' is $DA\_BL_{k,h}^{i,t}$: energy bids submitted into the schedule of record, represented as an N by 2 matrix of price-quantity pairs for each market participant 'k' at intertie metering point 'i' during metering interval 't' of settlement hour 'h' arranged in ascending order by the offered price in each price quantity pair where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2; or

'B' is $PD\_BL_{k,h}^{i,t}$: *energy bids* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *delivery point* 'm' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered *price in each price quantity pair* where offered prices *'P' are* in column 1 and offered quantities 'Q' are in column 2.

the *offer* matrix of *price-quantity pairs* for the applicable export transaction that was submitted by *market participant* 'k' and scheduled in the *schedule of record* during *metering interval* 't' for *settlement hour* 'h' of the *real-time trading day*

and,

Let $XDA\_BL_{k,h}^{i,t}$ be the function which calculates the area under the curve created by an n x 2 matrix (B) of offered *price-quantity pairs*:

$$\sum_{n=c^*}^{d^*} P_n \times (Q_n - Q_{n-1}) + (Q - Q_{d^*}) \times P_{d^*+1}$$

where matrix (B) is energy bids submitted into the schedule of record, represented as an N by 2 matrix of price-quantity pairs for each market participant 'k' at intertie metering point 'i' during metering interval 't' of settlement hour 'h' arranged in ascending order by the offered price in each price quantity pair where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

Let $XPD\_BL_{k,h}^{i,t}$ be the function which calculates the area under the curve created by an n x 2 matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=p^*}^{s^*} P_i \times (Q_n - Q_{n-1})\right] + (Q - Q_{s^*}) \times P_{s^*+1}$$

where matrix (B) *energy bids* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

Such that the day-ahead export failure charge for *market participant* 'k' during *settlement hour* 'h' for all *intertie metering points* 'i' may be formulated with the above components as follows:

$DA\_EFC_{k,h}$ = For all *intertie metering points* and all *metering intervals* during the *settlement hour*:

-1 x MINIMUM of:

[MAXIMUM of:

[-1 x [The sum of all revenues implied by each export transaction valued at the *pre-dispatch energy market price* in the Ontario zone ~~times the day-ahead export scheduling deviation quantity~~ for the difference in quantity scheduled in pre-dispatch and the quanity scheduled in the *schedule of record*.

Minus:

Those costs represented through the *offers* for the export transaction scheduled in the *schedule of record*]

or zero],

~~subject to a maximum value of the:~~

[MAXIMUM of:

[the day-ahead *bid* to increase quantity scheduled in pre-dispatch to quantity scheduled day-ahead minus the pre-dispatch ~~*offer*~~*bid* to increase quantity scheduled in pre-dispatch to quantity scheduled in the *schedule of record*~~day-ahead~~]

or zero]~~; or~~

MAXIMUM of (zero or the day-ahead *bid* to increase quantity scheduled in pre-dispatch to quantity scheduled ~~day-ahead~~in the *schedule of record*)]

$DA\_EFC_{k,h}$ =

$$\sum_{I,T}(-1)\times \text{MIN}\left[\text{MAX}\left(0,(-1)\times \text{OP}\left(\text{PD\_EMP}_{h}^{m,t},\text{DA\_DQSW}_{k,h}^{i,t},\text{DA\_BL}_{k,h}^{i,t}\right)-(-1)\times \text{OP}\left(\text{PD\_EMP}_{h}^{m,t},\text{PD\_DQSW}_{k,h}^{i,t},\text{DA\_BL}_{k,h}^{i,t}\right)\right),\text{MAX}\left(0,\text{XDA\_BL}_{k,h}^{i,t}-\text{XPD\_BL}_{k,h}^{i,t}\right),\text{MAX}\left(0,\text{XDA\_BL}_{k,h}^{i,t}\right)\right]$$

$$\sum_{I,T}(-1)\times \text{MIN}\left[\text{MAX}\left(0,\text{OP}\left(\text{PD\_EMP}_{h}^{m,t},\text{DA\_DQSW}_{k,h}^{i,t},\text{DA\_BL}_{k,h}^{i,t}\right)-\text{OP}\left(\text{PD\_EMP}_{h}^{m,t},\text{PD\_DQSW}_{k,h}^{i,t},\text{DA\_BL}_{k,h}^{i,t}\right)\right),\text{MAX}\left(0,\text{XDA\_BL}_{k,h}^{i,t}-\text{XPD\_BL}_{k,h}^{i,t}\right),\text{MAX}\left(0,\text{XDA\_BL}_{k,h}^{i,t}\right)\right]$$

Where:

$DA\_BL_{k,h}^{i,t}$ are energy bids submitted into the *schedule of record*, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered *price in* each *price quantity pair* where offered prices *'P' are in* column 1 and offered quantities 'Q' are in column 2;

$PD\_BL_{k,h}^{i,t}$ are *energy* bids submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered *price in* each *price quantity pair* where offered prices *'P' are in* column 1 and offered quantities 'Q' are in column 2;

$PD\_EMP_{h}^{m,t}$ is the *pre-dispatch* projected *energy market price* applicable to all *delivery* points 'm' in the Ontario zone in *metering interval* 't' of *settlement hour* 'h';

'T' is the set of all *metering intervals* 't' in *settlement hour* 'h';

'I' is the set of all *intertie metering points* 'i'.

3.8E Day Ahead Linked Wheel Failure Charge

3.8E.1 The *IESO* shall apply the day-ahead linked wheel failure charge specified in section 3.8E.2 to a *market participant* for any quantity of *energy* scheduled for a linked wheel at an *intertie metering point* scheduled in the *schedule of record* where:

3.8E.1.1 the *market participant* fails either in whole or in part to schedule a *dispatch* quantity scheduled for a linked wheel in the *pre-dispatch schedule* in the corresponding *metering interval* of the corresponding *settlement hour* at the same *intertie metering point;* and,

3.8E.1.2 the *IESO* has not determined, nor has the *market participant* demonstrated to the satisfaction of the *IESO*, that the failure is due to bona fide and legitimate reasons as described in chapter 7, section 7.5.8B.

3.8E.2 For all linked wheel transactions scheduled in the *schedule of record* and meeting the criteria of section 3.8E.1, the day-ahead linked wheel failure charge shall be formulated as follows:

Day-ahead linked wheel scheduling deviation ($DA\_LWSD_{k,h}^{i,t}$)	=	MAX[(day-ahead import – hour-ahead pre-dispatch import), (day-ahead export – hour-ahead pre-dispatch export)]
$DA\_LWSD_{k,h}^{i,t}$	=	$MAX[(DA\_DQSI_{k,h}^{i,t} - PD\_DQSI_{k,h}^{i,t}), (DA\_DQSW_{k,h}^{i,t} - PD\_DQSW_{k,h}^{i,t})]$ Where: $DA\_DQSI_{k,h}^{i,t}$ is *schedule of record* quantity scheduled for injection by *market participant* 'k' at *delivery point* 'm' during *metering interval* 't' of *settlement hour* 'h'; $PD\_DQSI_{k,h}^{i,t}$ is the *pre-dispatch* constrained quantity scheduled for injection by *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'; $DA\_DQSW_{k,h}^{i,t}$ is the *schedule of record* quantity scheduled for withdrawal by *market participant* 'k' at *delivery point* 'm' during *metering interval* 't' of *settlement hour* 'h'; and $PD\_DQSW_{k,h}^{i,t}$ is the *pre-dispatch* constrained quantity scheduled for withdrawal by *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h'

Day-ahead price spread ($DA\_PS_{k,h}^{i,t}$)	=	day-ahead constrained schedule *intertie* price of the sink for the export transaction minus day-ahead constrained *intertie* price of the source for the import transaction
$DA\_PS_{k,h}^{i,t}$	=	$DA\_ELMP_{k,h}^{m,t} – DA\_ILMP_{k,h}^{m,t}$ Where: $DA\_ELMP_{h}^{i,t}$ is the day-ahead constrained schedule *intertie* price at the *intertie metering point* 'i' ~~*delivery point* 'm'~~ of the sink for the export transaction during *metering interval* 't' of *settlement hour* 'h'; and $DA\_ILMP_{h}^{i,t}$ is the day-ahead constrained *intertie* price at the *intertie metering point* 'i' ~~*delivery point* 'm'~~ of the source for the import transaction during *metering interval* 't' of *settlement hour* 'h'
Pre-dispatch price spread ($PD\_PS_{k,h}^{i,t}$)	=	pre-dispatch constrained schedule *intertie* price of the sink for the export transaction – pre-dispatch constrained *intertie* price of the source for the import transaction
$PD\_PS_{k,h}^{i,t}$	=	$PD\_ELMP_{h}^{m,t} – PD\_ILMP_{h}^{m,t}$ Where: $PD\_ELMP_{h}^{i,t}$ is the *pre-dispatch* constrained schedule intertie price at the *intertie metering point* 'i' ~~*delivery point* 'm'~~ of the sink for the export transaction during *metering interval* 't' of *settlement hour* 'h'; and $PD\_ILMP_{h}^{i,t}$ is the *pre-dispatch* constrained intertie price at the *intertie metering point* 'i' ~~*delivery point* 'm'~~ of the source for the import transaction during *metering interval* 't' of *settlement hour* 'h'

Such that the day-ahead linked wheel failure charge for *market participant* 'k' during *settlement hour* 'h' for all *intertie metering points* 'i' may be formulated with the above components as follows:

$DA\_LWFC_{k,h}$	=	For all *intertie metering points* and all *metering intervals* during the *settlement hour*: -1 x [The day-ahead linked wheel scheduling deviation quantity.

Multiplied by:

MAXIMUM of:

The day-ahead price spread less the pre-dispatch price spread or zero],

$$DA\_LWFC_{k,h} =$$

$$\sum_{I,T} (-1) \times \left[\left(DA\_LWSD_{k,h}^{i,t} \right) \times MAX\left[0, \left(DA\_PS_{k,h}^{i,t} - PD\_PS_{k,h}^{i,t} \right) \right] \right]$$

Where:

'T' is the set of all *metering intervals* 't' in *settlement hour* 'h';

'I' is the set of all *intertie metering points* 'i'.

3.8E.3 If a day-ahead linked wheel failure charge specified in section 3.8E.2 applies to a linked wheel where a real-time import failure charge specified in section 3.8C.3 and/or a real-time export for charge specified in section 3.8C.5 applies to the same linked wheel, the lesser of the day-ahead linked wheel failure charge and the sum of the real-time import failure charge and the export failure charge shall apply to the *market participant*.

3.8F Day-Ahead Generator Withdrawal Charge

3.8F.1 The *IESO* shall apply the day-ahead *generator* withdrawal charge specified in section 3.8F.2 to a *market participant* who was deemed to have accepted the day-ahead production cost guarantee in accordance with Section 5.8.4 of Chapter 7 for any quantity of *energy* scheduled for injection at a *metering point* scheduled in the *schedule of record* where:

3.8F.1.1 the *market participant* withdraws their commitment scheduled in the *schedule of record* in the corresponding *metering interval* of the corresponding *settlement hour* at the same *metering point;* and,

3.8F.1.2 the *IESO* has not determined, nor has the *market participant* demonstrated to the satisfaction of the *IESO*, that the failure is due to bona fide and legitimate reasons as described in chapter 7, section 7.5.8B.

3.8F.2 The day-ahead *generator* withdrawal charge shall be formulated as follows:

If withdrawal notification is received at or 4 hours prior to the first withdrawal hour in real time (PD – 4), then the Withdrawal Charge is calculated as follows:

$$DA\_GWC_{k,h}^{start\ event} = MIN\left(0, \sum_{i=1}^{n}(-1)\times OP\left(MIN\left(PD\_EMP_{h}^{m,t}, EMP_{h}^{m,t}\right), MLP_{k,h}^{m,t}, DA\_BE_{k,h}^{m,t}\right)\right)$$

Where:

n = the set of all *metering intervals* 't' in *settlement hour* 'h' for the total number of hours with a *schedule of record* that are withdrawn

start event = the set of hours with a contiguous *schedule of record*

If withdrawal notification is received later than PD-4 or if the *market participant* does not notify the IESO of their intent to withdraw and does not inject for the hours committed in the *schedule of record*, then the withdrawal charge is calculated as follows:

$$DA\_GWC_{k,h}^{start\ event} = MIN\left(0, \sum_{i=1}^{n}(-1)\times OP\left(EMP_{h}^{m,t}, MLP_{k,h}^{m,t}, DA\_BE_{k,h}^{m,t}\right)\right)$$

Where:

n = the set of all *metering intervals* 't' in *settlement hour* 'h' for the total number of hours with a *schedule of record* for the start event that are withdrawn

start event = the set of hours with a contiguous *schedule of record*

PART 5 – IESO BOARD DECISION RATIONALE

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Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00349-R03			
Subject:	Enhanced Day-Ahead Commitment Process (EDAC): Settlement Guarantees			
Title:	Settlement Uplifts			
Nature of Proposal:	☒ Alteration	☐ Deletion	☐ Addition	
Chapter:	9	Appendix:		
Sections:	3.9, 4.8			
Sub-sections proposed for amending:	3.9.1, 4.8.1.14, 4.8.2.14 (deleted), 4.8.2.14 (new)			

PART 2 – PROPOSAL HISTORY – PLEASE REFER TO MR-00349-R00

Version	Reason for Issuing	Version Date
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

This amendment specifies the new and modified settlement amounts (charge types) in sections 3.9 and 4.8 of Chapter 7 resulting from the EDAC design.

Background

Please refer to MR-00349-R00.

Discussion

Settlement charges, including many settlement charges introduced to market participants in June 2006 for DACP, will be affected by the implementation of EDAC. While many of those charge types will remain, there will be a need to modify some of them and add new ones.

Specifically in section 3.9.1 there is a need to include the formulae for the following Hourly Settlement Uplifts: the Day-Ahead Export Failure Charge; and, the Day-Ahead Linked Wheel Failure Charge.

Additionally in section 4.8.2 there is a need to include the redistribution of any proceeds from the application of the Generator Withdrawal Charge.

Part 4 – Proposed Amendment

3.9 Hourly Uplift Settlement Amounts

3.9.1 The hourly *settlement amounts* defined by the preceding provisions of this section 3 will result in an hourly *settlement* deficit that shall be recovered from *market participants* as a whole through the *hourly uplift*. The total *hourly uplift settlement amount* for *settlement hour* 'h' ("$HUSA_h$") shall be determined according to the following equation:

$$HUSA_h = \Sigma_K (NEMSC_{k,h} + ORSC_{k,h} + CAPRSC_{k,h} + CMSC_{k,h} + TRSC_{k,h} + ~~RT\_IOG_{k,h} + DA\_IOG_{k,h}~~ IOG_{k,h}) + TCRF_h - \Sigma_K (CRSSD_{k,h} + \Sigma_R ORSSD_{k,r,h} + DA\_IFC_{k,h} + RT\_IFC_{k,h} + DA\_EFC_{k,h} + RT\_EFC_{k,h} + DA\_LWFC_{k,h})$$

over all 'k' *market participants*

……..

~~$RT\_IOG_{k,h}$ = real-time intertie offer guarantee settlement credit for the *market participant* associated with that *boundary entity* 'k' in *settlement hour* 'h'~~

~~$DA\_IOG_{k,h}$ = day-ahead intertie offer guarantee settlement credit for the *market participant* 'k' in *settlement hour* 'h'~~

$IOG_{k,h}$ = intertie offer guarantee settlement credit for the *market participant* 'k' in *settlement hour* 'h'

$DA\_IFC_{k,h}$ = day-ahead import failure charge for the *market participant* 'k' in *settlement hour* 'h'

$RT\_IFC_{k,h}$ = real-time import failure charge for the *market participant* 'k' in *settlement hour* 'h'

$DA\_EFC_{k,h}$= day-ahead export failure charge for the *market participant* 'k' in *settlement hour* 'h'

$RT\_EFC_{k,h}$= real-time export failure charge for the *market participant* 'k' in *settlement hour* 'h'

$DA\_LWFC_{k,h}$= day-ahead linked wheel failure charge for the *market participant* 'k' in *settlement hour* 'h'

$TCRF_h$ = transmission charge reduction fund contribution in *settlement hour* 'h'

$CRSSD_{k,h}$ = *capacity reserve settlement* debit for *operating deviations* for *market participant* 'k' in *settlement hour* 'h'

$ORSSD_{k,r,h}$ = *operating reserve settlement* debit for *operating deviations* for *class r reserve* for *market participant* 'k' in *settlement hour* 'h'

Where:

'K' is the set of all *market participants* 'k'

'R' is the set of each class r of *operating reserve*

4.8 Additional Non-Hourly Settlement Amounts

4.8.1 The *IESO* shall, at the end of each *energy market billing period,* recover from *market participants,* on a pro-rata basis across all allocated quantities of *energy* withdrawn at

all *RWMs* and *intertie metering points* during all *metering intervals* and *settlement hours* within that *energy market billing period*, the following amounts:

4.8.1.1 any compensation paid in that *energy market billing period* by the *IESO* pursuant to section 5.3.4 of Chapter 4;

4.8.1.2 any compensation paid in that *energy market billing period* by the *IESO* pursuant to section 5.3.4 of Chapter 5;

4.8.1.3 any out-of-pocket expenses paid in that *energy market billing period* by the *IESO* pursuant to section 6.7.4 of Chapter 5;

4.8.1.4 any compensation paid in that *energy market billing period* by the *IESO* pursuant to section 8.4A.9 of Chapter 7;

4.8.1.5 any costs incurred in that *energy market billing period* by the *IESO* to acquire *emergency energy* pursuant to section 2.3.3A of Chapter 5; ~~and~~

4.8.1.6 any reimbursement paid in that *energy market billing period* by the *IESO* pursuant to section 2.1A.12.2(a);

4.8.1.7 any funds borrowed by the *IESO* and any associated interest costs incurred by the *IESO* in the preceding *energy market billing period* pursuant to section 6.14.5.2;

4.8.1.8 [Intentionally left blank – section deleted]

4.8.1.9 any compensation paid in that *energy market billing period* by the *IESO* pursuant to section 4.7B.3;

4.8.1.10 any compensation paid in that *energy market billing period* by the *IESO* pursuant to section 4.7C;

4.8.1.11 any compensation paid in that *energy market billing period* by the *IESO* pursuant to section 8.2.6 of Chapter 5;

4.8.1.12 any compensation paid in that *energy market billing period* by the *IESO* under section 4.7D;

4.8.1.13 any compensation paid in that *energy market billing period* by the *IESO* under section 4.7E; and

4.8.1.14 ~~any day-ahead *intertie offer* guarantee costs that are not recovered as a component of *hourly uplift* under section 3.9.4; and~~[Intentionally left blank – section deleted]

4.8.1.15 any compensation for Emergency Load Reduction Program participants paid in that *energy market billing* period by the *IESO* pursuant to section 4.7F.

4.8.2 The *IESO* shall, at the end of each *energy market billing period*, distribute to *market participants*, on a pro-rata basis across all allocated quantities of *energy* withdrawn at all *RWMs* and *intertie metering points* during all *metering intervals* and *settlement hours* within that *energy market billing period*, the following amounts:

4.8.2.1 any compensation received by the *IESO* for the provision of *emergency energy* pursuant to section 4.4A.1 of Chapter 5;

4.8.2.2 any compensation received by the *IESO* as a result of a local market power investigation as set out in sections 1.7.1 and 1.7.2 of Appendix 7.6;

4.8.2.3 ~~any adjustments to *intertie offer* guarantee *settlement* credits for wheeling through transactions, in accordance with section 3.5.8.1 of Chapter 7, calculated pursuant to section 3.8A.3;~~[Intentionally left blank – section deleted]

4.8.2.4 [Intentionally left blank – section deleted]

4.8.2.5 any payments recovered by the *IESO* in accordance with section 3.5.1A of chapter 9;

4.8.2.6 any adjustments made by the *IESO* in accordance with section 3.5.7 of Chapter 9;

4.8.2.7 any adjustments to Transitional Demand Response Program payments pursuant to section 4.7C;

4.8.2.8 any proceeds from the day-ahead import failure charge that are not distributed as a component of *hourly uplift* under section 3.9.4;

4.8.2.9 any proceeds from the real-time import failure charge or the real- time export failure charge that in accordance with section 3.9.5 are not distributed as a component of *hourly uplift*;

4.8.2.10 any proceeds from the recovery of congestion management *settlement* credits or other *settlement amounts* in accordance with section 6.6.10A.2 of Chapter 3, excluding any payments recovered under section 4.18.1.6 of Chapter 8;

4.8.2.11 any recovery of day-ahead *intertie offer* guarantee payments pursuant to section 3.3A.13 of Chapter 7;

4.8.2.12 any adjustments to Emergency Load Reduction Program payments pursuant to section 4.7F; ~~and~~

4.8.2.13 any recovery of payments made by the *IESO* under section 3.5.9; and

4.8.2.14 any proceeds from the day-ahead generator withdrawal charge under section 3.8F.

PART 5 – IESO BOARD DECISION RATIONALE

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Market Rule Amendment Proposal

PART 1 – MARKET RULE INFORMATION

Identification No.:	MR-00349-R04			
Subject:	Enhanced Day-Ahead Commitment Process (EDAC): Settlement Guarantees			
Title:				
Nature of Proposal:	☒ Alteration	☐ Deletion	☐ Addition	
Chapter:	9			
Sections:	4.7D, 4.7E			
Sub-sections proposed for amending:	various			

PART 2 – PROPOSAL HISTORY – PLEASE REFER TO MR-00349-R00

Version	Reason for Issuing	Version Date
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

MR-00349-R04 proposes to specify the settlement of the Day-Ahead Production Cost Guarantee Settlement Amounts.

Background

Please refer to MR-00349-R00.

Discussion

Please refer to MR-00349-R00, Part 3.

PART 4 – PROPOSED AMENDMENT

4.7D Day-Ahead ~~Generation~~ Production Cost Guarantee Payments

4.7D.1 The *IESO* shall determine on a *per-start* basis, for each *generation facility* that has met the criteria set out in chapter 7, sections ~~2.2C and 6.3B~~5.8.4, a day-ahead ~~generation~~ production cost~~s~~ guarantee consisting of the following ~~on the basis of the following~~ components:

4.7D.1.1

a. Component 1 is any shortfall in payment on the delivered real-time *dispatch* of the *schedule of record* and will be based upon the real-time revenue received for that amount of *energy* in comparison with the value as represented in the *generator's* day-ahead *offer* for incremental *energy* and *speed-no-load costs*;

b. Component 2 is the value of arranging the delivery (where the real-time *offer* is less than the day-ahead *offer*), or any gain (where the real-time *offer* is greater than the day-ahead *offer*)[3] for the portion of *schedule of record* quantity that is not implemented in the real-time *dispatch* schedule;

c. Component 3 is any income from real-time *energy* congestion management settlement credit (CMSC) included in a *generator's schedule of record* delivered in real-time and will be used to reduce the day-ahead production cost guarantee payment;

d. Component 4 is any income from real-time *operating reserve* in a *generator's schedule of record* that was not dispatched in real-time and will be used to reduce the day-ahead production cost guarantee payment; and

e. Component 5 is the as-offered *start-up cost* (as-offered value of bringing an off-line *generator* on-line to *minimum loading point*).

4.7D.2 The *IESO* shall determine the type of schedule and which components described in Section 4.7D.1 are included in the day-ahead production cost guarantee, for each *generation facility*, as follows:

4.7D.2.1

a. Variant 1: If the *generation unit* is not operating from the previous *dispatch day* into the current *dispatch day*, the day-ahead production costs guarantee calculation for the current *dispatch day* includes Components 1 through 5. Variant 1 occurs when:

- the *generation unit* is not operating at the end of the previous EDAC dispatch day (Day-1 HE 24 indicates off-line status); or
- the *generation unit* is operating at the end of the previous EDAC dispatch day (Day-1, HE 24 indicates on-line status) but it is not operating into the current EDAC dispatch day (Day 0, HE 1 indicates off-line status); or
- the *generation unit* is scheduled to start later in the current EDAC dispatch day.~~;~~

b. Variant 2: If the *generation unit* is operating from the previous *dispatch day* into the current *dispatch day*, to complete its *minimum generation block run-time* the day-ahead production costs guarantee calculation for the current *dispatch day* includes Components 1 through 4 but does not include Component 5. The

[3] Where the real-time *offer* is equal to the day-ahead *offer*, the value/gain is equal to zero (0).

day-ahead production costs guarantee calculation also includes a clawback for Component 1 and Component 3

c. Variant 3: If a *generation unit* is operating from the previous *dispatch day* into the current *dispatch day* and has completed its *minimum generation block run-time* in the previous *dispatch day*, the day-ahead production costs guarantee calculation for the current *dispatch day* includes Components 1 through 4 but does not include Component 5. Variant 3 occurs when:

- the generation unit is operating from the previous EDAC dispatch day (Day-1, HE 24 indicates on-line status) into the current EDAC dispatch day (Day 0, HE 1 indicates on-line status) and has completed its MGBRT in the previous EDAC dispatch day; or
- the *generation unit* is operating from the previous EDAC dispatch day (Day-1, HE 24 indicates on-line status) into the current EDAC dispatch day, (Day 0, HE 1 indicates on-line status) and has not completed its MGBRT and is scheduled in the current EDAC dispatch day for hours in excess of completing its MGBRT from the previous EDAC dispatch day. Variant 3 in the current EDAC dispatch day is only for the hours in excess of completing the MGBRT hours for the start from the previous EDAC dispatch day.

4.7D.1.1 the sum of the following revenues earned in each *dispatch interval* during the period from synchronisation to the end of the *minimum run-time*:

a. *energy market prices* multiplied by the sum of the applicable AQEI and any applicable *physical allocation data*, for *energy* injected up to and including the *minimum loading point*;

b. hourly *settlement amounts* for *operating reserve*; and

c. any congestion management *settlement* credit payments resulting from the *facility* being constrained on in order to meet its *minimum loading point*; and

4.7D.1.2 the applicable day-ahead *combined guaranteed costs* and other costs specified in this section submitted by the *market participant* for the specified *generation facility* for the start to which the revenues determined in accordance with 4.7D.1.1 apply. The other costs that are to be considered in addition to those specified in the definition of *combined guaranteed cost*, day-ahead *combined guaranteed* costs are:

a. incremental variable operating costs; and

b. incremental variable maintenance costs;

where both of these additional cost components have, in the opinion of the *IESO*, a reasonable and demonstrable link with the day-ahead

~~commitment to which they pertain and are reported to the *IESO* in the manner specified in the applicable *market manual*.~~

4.7D.3 The IESO shall calculate the day-ahead production cost guarantee components 1 through 4 for each interval in the *schedule of record* where the *generator* is injecting into the *IESO-controlled grid*.

4.7D.4 The IESO shall calculate the day-ahead production cost guarantee components based on the type of schedule described in Section 4.7D.2.1 as follows:

Component 1 – Variants 1, 2 and 3

Component 1 includes any shortfall in payment for the minimum of the *generator's schedule of record*, real-time constrained schedule and the allocated quantity of *energy* injected based upon the real-time revenue received for that amount of *energy* in comparison with the costs as represented in the *generator's* day-ahead *offer*. Component 1 is calculated as follows:

$PCG\_COMP1_{k,h}^{m,t}$ = All day-ahead costs excluding as-offered *start-up costs* for the minimum of the *generator's schedule of record*, real-time constrained scheduled and the allocated quantity of *energy* injected over the interval minus all real-time revenue received over the interval for that amount of *energy*

$$PCG\_COMP1_{k,h}^{m,t} = (-1)\times OP\left(EMP_{h}^{m,t}, MIN\left(DA\_DQSI_{k,h}^{m,t}, DQSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t}\right), DA\_BE_{k,h}^{m,t}\right) + \frac{DA\_SNLC_{k,h}^{m}}{12}$$

Component 1 Clawback – Variant 2

Component 1 Clawback recovers the day-ahead production cost guarantee Component 1 paid up to the *minimum loading point* for the remaining hours of *MGBRT*. Component 1 Clawback– Variant 2 is calculated as follows:

$PCG\_COMP1\_CB_{k,h}^{m,t}$ = All day-ahead costs excluding as-offered *start-up costs* up to the minimum of the *generation facility's minimum loading point* and the allocated quantity of energy injected over the interval minus all real-time revenue received over the interval for that amount of *energy*

$$PCG\_COMP1\_CB_{k,h}^{m,t} = (-1)\times OP\left(EMP_{h}^{m,t}, MIN\left(AQEI_{k,h}^{m,t}, MLP_{k,h}^{m,t}\right), DA\_BE^{im,t}\right) + \frac{DA\_SNLC_{k,h}^{m}}{12}$$

Component 2 – Variants 1, 2 and 3

If, as a result of economic selection, a portion of the *schedule of record* is not implemented in the real-time *dispatch* schedule, the day-ahead production cost guarantee:

- Guarantees the cost of arranging the delivery if the real-time *offer price* is less than the day-ahead *offer price*; or
- Subtracts any gain where the real-time *offer price* is greater than the day-ahead *offer price*.

In the absence of a forced de-rating or a scheduled de-rating, if there are no real-time *energy offers* for any portion of the day-ahead constrained schedule, the real-time *energy offers* for that portion of *energy* will be set to MMCP (*Maximum Market Clearing Price*) for the purposes of calculating Component 2.

If the real-time *energy offers* for any portion of the day-ahead constrained schedule is below $0.00 $/MWh (i.e. negative), the real-time *energy offers* for that portion of *energy* will be set to $0.00 $/MWh for the purposes of calculating Component 2.

Component 2 is calculated as follows:

$PCG\_COMP2_{k,h}^{m,t}$ = As-offered day-ahead costs excluding as-offered *start-up costs* for the difference between:

- the minimum of the *generator's schedule of record*, the de-rated value of the *generation facility* or the maximum of the real-time constrained schedule and the allocated quantity of *energy* injected; and
- the minimum of the *generator's schedule of record* and the de-rated value of the *generation facility*

over the interval minus all real-time *energy offers* (with a minimum limit of zero) over the interval for that amount of *energy*

$$PCG\_COMP2_{k,h}^{m,t} = XDA\_BE_{k,h}^{m,t} - MAX\left(0, XBE_{k,h}^{m,t}\right)$$

Where:

Let $XBE_{k,h}^{m,t}$ be the function which calculates the area under the curve created by an n x matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=p^*}^{s^*} P_n \times (Q_n - Q_{n-1})\right] + (Q - Q_{s^*}) \times P_{s^*+1}$$

where matrix (B) is *energy offers* submitted in real-time, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *metering point* 'm' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

Let $XDA\_BE_{k,h}^{m,t}$ be the function which calculates the area under the curve created by an n x 2 matrix (B) of offered *price-quantity pairs*:

$$\left[\sum_{n=c^*}^{d^*} P_n \times (Q_n - Q_{n-1})\right] + (Q - Q_{d^*}) \times P_{d^*+1}$$

where matrix (B) is *energy offers* submitted in pre-dispatch, represented as an N by 2 matrix of *price-quantity pairs* for each *market participant* 'k' at *metering point* 'm' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the offered price in each *price quantity pair* where offered prices 'P' are in column 1 and offered quantities 'Q' are in column 2

c^* = the highest indexed row of matrix $XDA\_BE_{k,h}^{m,t}$ such that $Q_{c^*} \leq \min[DA\_DQSI_{k,h}^{m,t}, OPCAP_{k,h}^{m,t}, \max(DQSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t})] \leq Q_n$ and where $Q_{c^*-1} = \min[DA\_DQSI_{k,h}^{m,t}, OPCAP_{k,h}^{m,t}, \max(DQSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t})]$ and where if $Q_{c^*} < Q_{c^*-1}$, let $Q_{c^*} = Q_{c^*-1}$

d^* = the highest indexed row of matrix $XDA\_BE_{k,h}^{m,t}$ such that $Q_{d^*} \leq \min[DA\_DQSI_{k,h}^{m,t}, OPCAP_{k,h}^{m,t}] \leq Q_n$

p^* = the highest indexed row of matrix $XBE_{k,h}^{m,t}$ such that $Q_{p^*} \leq \min[DA\_DQSI_{k,h}^{m,t}, OPCAP_{k,h}^{m,t}, \max(DQSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t})] \leq Q_n$ and where $Q_{p^*-1} = \min[DA\_DQSI_{k,h}^{m,t}, OPCAP_{k,h}^{m,t}, \max(DQSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t})]$ and where if $Q_{p^*} < Q_{p^*-1}$, let $Q_{p^*} = Q_{p^*-1}$

s^* = the highest indexed row of matrix $XBE_{k,h}^{m,t}$ such that $Q_{s^*} \leq \min[DA\_DQSI_{k,h}^{m,t}, OPCAP_{k,h}^{m,t}] \leq Q_n$

Component 3 – Variants 1, 2 and 3

- The day-ahead production cost guarantee payment for a *generator* will be reduced by the income received from real time congestion management settlement credits (CMSC) for the *generator's schedule of record* delivered in real-time.

- The *generator's schedule of record* will be measured against both the real-time constrained schedule and the real-time unconstrained schedule to determine the amount of revenue from congestion management settlement credits that should be included in the day-ahead production cost guarantee calculation.
- For any interval, there are six possible orderings of the amount of a *generation facility's* capacity that may be included in the *schedule of record*, the real-time constrained schedule and the real-time unconstrained schedule. The table below summarizes the six possible orderings and the inclusion of Component 3 in the day-ahead production cost guarantee calculation.

For the purposes of determining the applicable CMSC in Component 3, the o*ffer price* is subject to Section 3.5.6.

Table: Ordering of Generator's Capacity and Day-Ahead Production Cost Guarantee Component 3

Scenario	Ordering	Component 3 - CMSC Included?
1	DQSI >= MQSI >= DA_DQSI	N
2	MQSI >= DQSI >= DA_DQSI	N
3	DQSI > DA_DQSI > MQSI	Y (Partial CMSC)
4	MQSI > DA_DQSI > DQSI	Y (Partial CMSC)
5	DA_DQSI >= DQSI > MQSI	Y (All CMSC)
6	DA_DQSI >= MQSI > DQSI	Y (All CMSC)

Component 3 is calculated as follows :

$PCG\_COMP3_{k,h}^{m,t}$ = Income received from real time congestion management settlement credits (CMSC) for the *generator's* *schedule of record* delivered in real-time over the interval

Component 3 is only calculated when:

- the real-time CMSC ($TD_{k,h,105}^{m,t}$) for the same interval is a value other than zero; and
- the mathematical sign of (DQSI-MQSI) is equal to the mathematical sign of (AQEI-MQSI).

Scenario 1

$PCG\_COMP3_{k,h}^{m,t} = 0$

Scenario 2

$PCG\_COMP3_{k,h}^{m,t} = 0$

Scenario 3

$$PCG\_COMP3_{k,h}^{m,t} = OP(EMP_h^{m,t}, MQSI_{k,h}^{m,t}, BE_{k,h}^{m,t}) - MAX\left(OP(EMP_h^{m,t}, DA\_DQSI_{k,h}^{m,t}, BE_{k,h}^{m,t}), OP(EMP_h^{m,t}, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t})\right)$$

Scenario 4

$$PCG\_COMP3_{k,h}^{m,t} = OP(EMP_h^{m,t}, DA\_DQSI_{k,h}^{m,t}, BE_{k,h}^{m,t}) - MAX\left(OP(EMP_h^{m,t}, DQSI_{k,h}^{m,t}, BE_{k,h}^{m,t}), OP(EMP_h^{m,t}, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t})\right)$$

Scenario 5

$PCG\_COMP3_{k,h}^{m,t}$ = Congestion management settlement credit calculated as per Section 3.5.

Scenario 6

$PCG\_COMP3_{k,h}^{m,t}$ = Congestion management settlement credit calculated as per Section 3.5.

Component 3 Clawback – Variant 2

- Component 3 Clawback – Variant 2 recovers the congestion management settlement credits (CMSC) paid up to the *minimum loading point* for the remaining hours of MGBRT. Component 3 Clawback – Variant 2 is calculated as follows :

$PCG\_COMP3\_CB_{k,h}^{m,t}$ = Income received from real time congestion management settlement credits (CMSC) from the minimum of *generation facility's minimum loading point* and the allocated quantity of energy injected to the *generator's* real-time unconstrained schedule over the interval

Component 3 Clawback - Variant 2 is only calculated when:

- the day-ahead schedule is not less than both the real-time constrained schedule and the real-time unconstrained schedule and the event is a constrained-on event (i.e. Scenarios 3 and 5);
- the *minimum loading point* is greater than the real-time unconstrained schedule; and
- Component 3 ($PCG\_COMP3_{k,h}^{m,t}$) for the same interval is a value other than zero.

Scenario 1

$PCG\_COMP3\_CB_{k,h}^{m,t} = 0$

Scenario 2

$PCG\_COMP3\_CB_{k,h}^{m,t} = 0$

Scenario 3

In Scenario 3, the clawback ($PCG\_COMP3\_CB_{k,h}^{m,t}$) is only calculated when the *minimum loading point* is greater than the real-time unconstrained schedule.

$$PCG\_COMP3\_CB_{k,h}^{m,t} = \begin{aligned} &MAX\left(OP\left(EMP_h^{m,t}, MLP_{k,h}^{m,t}, BE_{k,h}^{m,t}\right), OP\left(EMP_h^{m,t}, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right)\right) \\ &- OP\left(EMP_h^{m,t}, MQSI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right) \end{aligned}$$

Scenario 4

$PCG\_COMP3\_CB_{k,h}^{m,t} = 0$

Scenario 5

In Scenario 5, the clawback ($PCG\_COMP3\_CB_{k,h}^{m,t}$) is only calculated when the *minimum loading point* is greater than the real-time unconstrained schedule.

$$PCG\_COMP3\_CB_{k,h}^{m,t} = \begin{aligned} &MAX\left(OP\left(EMP_h^{m,t}, MLP_{k,h}^{m,t}, BE_{k,h}^{m,t}\right), OP\left(EMP_h^{m,t}, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right)\right) \\ &- OP\left(EMP_h^{m,t}, MQSI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right) \end{aligned}$$

Scenario 6

$PCG\_COMP3\_CB_{k,h}^{m,t} = 0$

Component 4 – Variants 1, 2 and 3

The day-ahead production cost guarantee payment for a *generator* will be reduced by the income received from real-time *operating reserve* for the *generator's schedule of record* not dispatched in real-time.

Component 4 is calculated as follows:

$PCG\_COMP4_{k,h}^{m,t}$ = net income received from real-time *operating reserve* over the interval for the *generator's schedule of record* not dispatched in real-time

$$PCG\_COMP4_{k,h}^{m,t} = OP\left(PROR_{r1,h}^{m,t}, 30R\_SQROR_{r1,k,h}^{m,t}, BR_{k,h}^{m,t}\right) + OP\left(PROR_{r2,h}^{m,t}, 10NS\_SQROR_{r2,k,h}^{m,t}, BR_{k,h}^{m,t}\right) + OP\left(PROR_{r3,h}^{m,t}, 10S\_SQROR_{r3,k,h}^{m,t}, BR_{k,h}^{m,t}\right)$$

Where:

r1 = *30-minute operating reserve*

r2 = 10-minute non-spinning operating reserve

r3 = 10-minute spinning operating reserve

$$30R\_SQROR_{r1,k,h}^{m,t} = MAX\left[0, MIN\left(DA\_DQSI_{k,h}^{m,t} - MQSI_{k,h}^{m,t}, SQROR_{r1,k,h}^{m,t}\right)\right]$$

$$10NS\_SQROR_{r2,k,h}^{m,t} = MAX\left[0, MIN\left(DA\_DQSI_{k,h}^{m,t} - MQSI_{k,h}^{m,t} - 30R\_SQROR_{r1,k,h}^{m,t}, SQROR_{r2,k,h}^{m,t}\right)\right]$$

$$10S\_SQROR_{r3,k,h}^{m,t} = MAX\left[0, MIN\left(DA\_DQSI_{k,h}^{m,t} - MQSI_{k,h}^{m,t} - 30R\_SQROR_{r1,k,h}^{m,t} - 10NS\_SQROR_{r2,k,h}^{m,t}, SQROR_{r3,k,h}^{m,t}\right)\right]$$

x* = the highest indexed row of matrix $BR_{r1,k,h}^{m,t}$, such that $QR_{x^*} \leq \max[0, \min(DA\_DQSI_{k,h}^{m,t} - MQSI_{k,h}^{m,t}, SQROR_{r1,k,h}^{m,t})] \leq QR_n$ and where $QR_0 = 0$

y* = the highest indexed row of matrix $BR_{r2,k,h}^{m,t}$ such that $QR_{y^*} \leq \max[0, \min(DA\_DQSI_{k,h}^{m,t} - MQSI_{k,h}^{m,t} - 30R\_SQROR_{r1,k,h}^{m,t}, SQROR_{r2,k,h}^{m,t})] \leq QR_n$ and where $QR_0 = 0$

z* = the highest indexed row of matrix $BR_{r3,k,h}^{m,t}$, such that $QR_{z^*} \leq \max[0, \min(DA\_DQSI_{k,h}^{m,t} - MQSI_{k,h}^{m,t} - 30R\_SQROR_{r1,k,h}^{m,t} - 10NS\_SQROR_{r1,k,h}^{m,t}, SQROR_{r3,k,h}^{m,t})] \leq QR_n$ and where $QR_0 = 0$

Component 5 – Variant 1

Component 5 is the as-offered *start-up cost* incurred to bring an off-line *generation facility* through all the unit specific start-up procedures, including synchronization and ramp up to *minimum loading point*. Component 5 is calculated as follows:

$PCG\_COMP5_{k,h}^{m,t}$ = As-offered *start-up cost* submitted by the *market participant* for the EDAC start event.

The rules for calculating Component 5 are as follows:

- **Scenario 1:** If the *market participant* achieves *minimum loading point* within the first 6 intervals[4] of the start of the EDAC scheduled period, the full as-offered *start-up cost* is considered.
- **Scenario 2:** If the *market participant* achieves *minimum loading point* between the start of the 7th interval and before the start of the 18th interval of the start of the EDAC scheduled period, the as-offered *start-up cost* is calculated on a fractional basis. The as-offered *start-up cost* is calculated based on the number of 5-minute intervals the resource takes to achieve *minimum loading point* between the start of the 7th interval and before the start of the 18th interval.
- **Scenario 3:** If the *market participant* achieves *minimum loading point* after the 17th interval of the start of the EDAC scheduled period (i.e. 18th interval and onwards), the as-offered *start-up cost* is not considered.

Scenario 1

$$PCG\_COMP5_{k,h}^{m,t} = DA\_SUC_{k,h}^{m}$$

Scenario 2

$$PCG\_COMP5_{k,h}^{m,t} = DA\_SUC_{k,h}^{m} - \left(DA\_SUC_{k,h}^{m} \times \frac{1}{DA\_INT} \times SUC\_INT\right)$$

Where

DA_INT = 12

SUC_INT = number of 5-minute intervals between Interval 7 and 18 the *market participant* takes to achieve *minimum loading point*.

[4] The duration of an interval is 5 minutes.

Scenario 3

$PCG\_COMP5_{k,h}^{m,t} = 0$

Component 5 – Variants 2 and 3

Component 5 is not calculated for Variants 2 and 3.

4.7D.5 If for each EDAC start event for each eligible *generation facility* the sum of the revenues referred to in section 4.7D.3 ~~calculated pursuant to section 4.7D.1.1~~ is greater than or equal to the sum of the costs referred to in section 4.7D.3~~4.7D.1.2~~, then the IESO shall make no additional payments in respect of the eligible *generation facility*.

4.7D.6 If for each EDAC start event for each eligible *generation facility* the sum of the revenues referred to in section 4.7D.3~~calculated pursuant to section 4.7D.1.1~~ is less than the sum of the costs referred to in section 4.7D.3~~4.7D.1.2~~, then the *IESO* ~~shall calculate that difference and~~ shall include that amount in the form of additional payments made in respect of the eligible *generation facility*.

4.7E Day-Ahead Fuel Cost Compensation Settlement Amount

4.7E.1 In the event that the *IESO*, in order to maintain reliable operation of the *IESO-controlled grid* requires a *generation facility*:

- that was included in the ~~constrained schedule from the~~ ~~*pre-dispatch*~~*schedule of record*; and
- for which the *registered market participant* for the *generation facility* who is deemed to have accepted the day-ahead ~~generation~~ production cost guarantee in accordance with Section 5.8.4 of Chapter 7;

  ~~to~~ either to desynchronize from the *IESO-controlled grid* prior to the end of its ~~*minimum run-time*~~commitment scheduled in the *schedule of record* or not to ~~not~~ synchronize to the *IESO-controlled grid*, the *market participant* may, in accordance with chapter 7 section 6.3B, claim, in the manner specified in the applicable *market manual*, reimbursement of financial losses related to the procurement of fuel for operation at its *minimum loading point* for its ~~minimum run-time~~commitment scheduled in the *schedule of record* and which was not ultimately utilized by that *generation facility*.

4.7E.2 Where the *IESO* determines that claims made under section 4.7E.1 are valid, such compensation claims will be applied to the *market participant's settlement statement* for the last *trading day* of each *real-time market billing period* after the determination has been made.

4.7E.3 All claims made to the *IESO* pursuant to section 4.7E.1 may be subject to audit by the *IESO* which may obligate the *market participant* to demonstrate or otherwise make a binding declaration that the financial loss being claimed was not mitigated through the actions of:

- the market participant;
- an *affiliate* or subsidiary of the *market participant*; or
- any other party that may have a commercial relationship with the *market participant* where that commercial relationship involves compensation of any kind that is directly related to the mitigation of the financial loss being claimed.

4.7E.4 The cumulative *settlement amounts* payable to *market participants* for each real-time *energy market billing period* under the provisions of section 4.7E.2 shall be recovered from *market participants* in accordance with section 4.8.1.12.