



PROCEDURE

Market Manual 3: Metering
Part 3.10: Transmission
Grid - High Voltage
Metering

Issue 1.0

This procedure describes the process to be followed by *market participants* when installing a single *metering installation* for more than one *connection point* or *embedded connection point*.

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This document may contain a summary of a particular *market rule*. Where provided, the summary has been used because of the length of the *market rule* itself. The reader should be aware, however, that where a *market rule* is applicable, the obligation that needs to be met is as stated in the “*Market Rules*”. To the extent of any discrepancy or inconsistency between the provisions of a particular *market rule* and the summary, the provision of the *market rule* shall govern.

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Related Documents

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MDP_PRO_0011	Market Manual 3: Metering, Part 3.5: Site Specific Loss Adjustments
MDP_PRO_0012	Market Manual 3: Metering, Part 3.6: Conceptual Drawing Review
IMP_PRO_0047	Market Manual 3: Metering, Part 3.7: Totalization Table Registration
IMP_PRO_0048	Market Manual 3: Metering, Part 3.8: Creating and Maintaining Delivery Point Relationships
IMP_PRO_0058	Market Manual 3: Metering, Part 3.9: Conformance Monitoring

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Market Manuals

The *market manuals* consolidate the market procedures and associated forms, standards, and policies that define certain elements relating to the operation of the *IESO-administered markets*. Market procedures provide more detailed descriptions of the requirements for various activities than is specified in the "*Market Rules*". Where there is a discrepancy between the requirements in a document within a *market manual* and the "*Market Rules*", the "*Market Rules*" shall prevail. Standards and policies appended to, or referenced in, these procedures provide a supporting framework.

Market Procedures

The "Metering Manual" is Volume 3 of the *market manuals*, where this document forms "Part 3.10: Transmission Grid – High Voltage Metering".

A list of the other component part of the "Metering Manual" is provided in "Part 3.0: Metering Overview", in Section 2, 'About This Manual'.

Conventions

The *market manual* standard conventions are defined in the "Market Manual Overview" document.

– End of Section –

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1. Introduction

1.1 Purpose

The *market rules* permit a *metering installation* to be associated with more than one *facility* even though the *meter point* is not located at the *defined meter points* for the *facilities*. This manual describes the implementation and registration process for transmission grid high voltage *metering installations*, which is part of the registration process for a *metering installation* in the *IESO* marketplace.

1.2 Scope

This procedure is intended to provide *market participants* with a summary of the steps and interfaces involved in the transmission grid high voltage metering registration. Steps described in this document serve as a roadmap for *market participants*, and reflect the requirements set out in the *market rules* and applicable *IESO* policies and standards.

1.3 Overview

The *market rules* require *market participants* to register their *metering installations* with the *IESO* in order to participate in the wholesale electricity market. The process of registering a *meter point* can occur in parallel with other registration procedures, as described in “Market Manual 3: Metering, Part 3.2; Meter Point Registration and Maintenance”.

Metered market participants shall submit a proposal for transmission grid high voltage metering to the *IESO* and the *transmitter* for consideration of registration in accordance with Chapter 6 of the *Market Rules*. This manual details the registration requirements where the *metering installation* is associated with more than one *connection point*, *defined meter point* or *facility*. This arrangement reduces the number of registered *metering installations* by permitting the use of a single transmission grid high voltage *metering installation* associated with multiple *connection points* or *embedded connection points*. This arrangement applies to both *energy* and *transmission settlement*.

The *IESO* shall permit a *metering installation* to be associated with more than one *facility* notwithstanding that the *meter point* is not located at the *defined meter points* for the *facilities*, provided that all transfers of *energy* at any points of supply or consumption for the *facilities* to which the *metering installation* are associated, are determined in a manner satisfactory to the *IESO*. The *IESO* shall not permit the use of the transmission grid high voltage *metering installation* for determining *settlement* unless the *metered market participant* demonstrates, to the satisfaction of the *IESO* in accordance with this *market manual*, the accuracy of the *energy* transfer measurements of the transmission grid high voltage *metering installation* relative to the existing *metering installations*. The *metering installation* can only be associated with one *metered market participant*.

This manual describes the phases of implementation and associated timelines.

The *IESO* can refuse registration of *meter points* that it deems unsuitable for registration, based on requirements stated herein.

1.4 Task Highlights

The following is a summary of tasks that are part of the transmission grid high voltage metering:

1. The *metered market participant* shall be responsible for providing a transmission grid high voltage metering proposal ensuring that the *settlements* are satisfactory to both the *IESO* and the *transmitter*. There is no guarantee, either implied or given, that the proposal will be accepted by the *IESO* or the *transmitter*. If at any time the proposal is rejected and cannot be implemented, the *metered market participant* will be required to withdraw the transmission grid high voltage metering proposal entirely.
2. The *metered market participant* shall provide and maintain all documentation for the transmission grid high voltage metering proposal.
3. The *metered market participant* shall be responsible for maintaining the system loss model used in determining the loss adjustment coefficients. The system loss model forms part of the transmission grid high voltage metering registration documentation.
4. The *IESO* must be satisfied that the transmission grid high voltage metering with loss adjustments meet the intent of the *market rules* for application of *settlement* at the *connection point*. The *IESO* needs to be satisfied that the *transmitter* agrees with the *settlement* of the transmission network and connection services. To ensure that the *settlement* meets the intent of the *market rule* for application of *settlement* at the *connection point*, the *metered market participant* shall:
 - Develop an accurate system loss model to determine loss adjustment coefficients and ensure that the *energy* consumption measured by the transmission grid high voltage metering with losses is equivalent to the sum of the individual *connection point* metering as per the transmission circuit configuration;
 - Determine a transmission network diversity adjustment to ensure that the transmission *demand* quantities as measured by the transmission grid high voltage metering with transmission network diversity adjustment is equivalent to the sum of the individual *connection point* metering as per transmission circuit configuration. The transmission network diversity adjustment must satisfy the *transmitter*;
 - Determine a transmission connection diversity adjustment to ensure that the transmission *demand* quantities as measured by the transmission grid high voltage metering with transmission connection diversity adjustment is equivalent to the sum of the individual *connection point* metering as per transmission circuit configuration. The transmission connection diversity adjustment must satisfy the *transmitter*;
 - Ensure the equivalency and validate the accuracy and effectiveness of the transmission grid high voltage metering prior to its use in *settlements* as directed by the *IESO* and the *transmitter*; and

- Sign-off on the *settlement* principles and equations prior to the registration of the transmission grid high voltage *metering installations*.

The transmission grid high voltage metering will not restrict other *market participants* from participating in the *IESO administered markets* by connecting within the boundaries of the transmission grid high voltage *metering installations*. Totalization tables will be required to be adjusted to reflect losses and connectivity of other *market participants*. The *metered market participant* for the transmission grid high voltage metering should not benefit or suffer from a reduction in the grid losses as a result of the addition or removal of a *market participant* within the boundaries of the high voltage metering.

5. The *metered market participant* shall be responsible for obtaining any and all necessary non-disclosure agreements with other *market participants* or any other affected parties to meet the requirements for confidentiality of information as prescribed by the *market rules*.
6. There is an ongoing requirement from the *transmitter* to have in place a satisfactory and sustainable means of measurement for the purpose of diversity adjustments. The *IESO* will not be satisfied unless agreement is reached between the *metered market participant* and the *transmitter* on this issue.
7. Annual true-up for *transmission service charges* with values agreed to by the *metered market participant* and the *transmitter* shall be sent to the *IESO* to produce a manual line item adjustment.

Note:

- *Settlement* outcomes shall be equivalent to and within the accuracy of the wholesale *metering installations* or as directed by the *IESO*.
- *Connection point* relates to the physical location of the existing *metering installation(s)* of a *connection facility*. The “OEB Transmission Rate Schedule” uses the term “Transmission *Delivery points* DPs” which are points used only for purposes of *settlement of transmission service charges*.

1.5 Additional Metering Installation Requirements

To increase the accuracy, *reliability* and availability of *metered data* from the transmission grid high voltage *metering installations*, additional requirements are outlined in this section. The registration process outlined in “Market Manual 3: Metering, Part 3.2; Meter Point Registration and Maintenance” will apply.

1. The transmission grid high voltage *metering installations* shall be compliant dual *main/alternate metering installations* in accordance with the “Wholesale Revenue Metering Standard – Hardware.”
2. The transmission grid high voltage *metering installation* shall consist of ANSI 0.15s high accuracy current transformers. Manufacturers’ test reports shall be submitted with the *meter point* registration documentation.

3. The dual *main/alternate metering installations* shall be protected by sufficient physical separation, blast walls, or other means acceptable to the *IESO* to limit the possibility of a single *metering installation* failure damaging both *metering installations*.

Additional requirements may be specified by the *IESO* as it deems necessary.

1.6 Implementation of High Voltage Metering and Timelines

The transmission grid high voltage metering proposal shall be implemented as outlined in the following steps of this section. The *transmitter* and the *metered market participant* shall have in place any agreements necessary to execute any of the phases and shall notify the *IESO* if at any point the agreements cannot be fulfilled by either party.

1.6.1 PHASE 1 – Transmission Grid High Voltage Metering Design, Build and Registration

Existing Metering Installations

During the design, build and registration phases of the transmission grid high voltage *metering installation*, *settlement of energy* and transmission shall continue utilizing the existing *metering installations* and *delivery points*. The existing *metering installations* and *delivery points* shall be maintained in accordance with the *market rules*.

Transmission Grid - High Voltage Metering

The *metered market participant* shall provide and maintain all documentation for the transmission grid high voltage metering which includes the following:

1. Transmission circuit configuration drawing identifying location of all *facilities*, *connection points*, *defined meter points*, *energy* and transmission *delivery points*, *meter installations* and all directly connected and *embedded market participants* within the boundaries of the transmission grid high voltage metering configuration.
2. A listing of all existing *meter installations* and *meter point* IDs. This listing will include a record of installation and the current status with respect to compliance with *IESO* and Measurement Canada requirements.
3. A system loss model methodology for *energy* loss adjustment and load diversity adjustment as agreed to by the *IESO*, *metered market participant* and *transmitter*.

Additional requirements may be specified by the *IESO* as it deems necessary.

The *metered market participant* shall register the transmission grid high voltage *metering installations* with the *IESO* following the registration process set out in “Market Manual 3: Metering, Part 3.2; Meter Point Registration and Maintenance”.

Assessment of Phase 1

This phase shall be considered complete only when the transmission grid high voltage *metering installations* are registered in the *IESO* systems, the system loss model has been developed and the loss adjustment and load diversity adjustment has been determined. Totalization tables are entered in the *IESO* systems at the summary *meter* level.

If at any time the proposal is rejected and cannot be implemented, the *metered market participant* will be required to withdraw the transmission grid high voltage metering proposal entirely.

1.6.2 PHASE 2 – Transmission Grid High Voltage Metering Data Collection and Verification of System Loss Model

Entering this phase, the transmission grid high voltage *metering installations* are registered in the *IESO settlement* systems but not used for *settlement*. Data collected from the transmission grid high voltage *metering installations* will be compared to the existing *metering installations* as per the transmission system configuration provided by the *metered market participant*. The duration of this period will be a minimum of one year as required to satisfy the *IESO* and the *transmitter*.

Existing Metering Installations

During verification of the system loss model, *settlement* of energy and transmission shall continue utilizing the existing *metering installations* and *delivery points*. The existing *metering installations* and *delivery points* shall be maintained in accordance with the *market rules*.

Transmission Grid - High Voltage Metering

The transmission grid high voltage *metering installations* are registered in the *IESO settlement* systems but not used for *settlement*. Data collected from the transmission grid high voltage *metering installations* and adjusted for losses and diversity will be compared to the existing *metering installations* as per the transmission system configuration provided by the *metered market participant*. The transmission grid high voltage *metering installations* must be maintained in accordance with the *market rules*.

The *IESO*, *transmitter* and the *metered market participant* will confirm the effectiveness of the *settlement* methodology used in developing the system loss model. Adjustments to coefficients will be based on modifications of the assumptions in the system loss model. Adjustments to coefficients will not be developed as a ratio of existing *metering installations* to the transmission grid high voltage *metering installations*. Adjustments to the system loss model and load diversity methodologies will be made by the *metered market participant* where required.

Assessment of Phase 2

This phase will continue until the *metered market participant*, *IESO* and the *transmitter* are satisfied with the verification and comparison results. If after two years the *IESO* or the *transmitter* is not satisfied with the results of the transmission grid high voltage metering proposal, the proposal will be rejected. The *metered market participant* will be required to withdraw the transmission grid high voltage metering proposal entirely.

1.6.3 PHASE 3 – Transmission Grid High Voltage Metering Settlement and Continued Verification of System Loss Model

In this phase, the transmission grid high voltage *metering installations* are registered to the *energy* and transmission *delivery points* and used for *settlement*. Changes to the system loss models are applied as required; however, the changes are not retroactive. No true-up or recalculations will be done to previous *energy settlement* as a result of changes to the system loss model. Provisions for annual true-up will be made for *transmission service charges* as agreed to by the *transmitter* and *transmission customer*. The comparison to existing *metering installations* will continue for a duration of two (2) years.

Existing Metering Installations

In this phase, the existing *delivery points* are deregistered and no longer used for *IESO settlement*. The existing *metering installations* shall continue to be registered with the *IESO* and must be maintained in accordance with the *market rules*.

Data collected from the existing *metering installations* will be compared to the transmission grid high voltage *metering installations* as per the *transmission system* configuration provided by the *metered market participant*.

Transmission Grid - High Voltage Metering

The totalization tables for the transmission grid high voltage *metering installation* are completed to the *delivery point*. This applies to both *energy* and transmission *delivery points*. In this phase, *delivery point* registration is complete and used for *IESO settlement*.

There is an ongoing requirement from the *transmitter* to have in place a satisfactory and sustainable means of measurement at the existing *connection points*. The *IESO* must also be satisfied that an agreement has been reached between the *metered market participant* and *transmitter* on this issue.

The *IESO* will implement ongoing refinements made to system loss model coefficients if required. Annual true-ups for *transmission service charges* only as agreed to by the *metered market participant* and the *transmitter*, will be applied by the *IESO*.

Assessment of Phase 3

If after two years the *IESO*, *metered market participant* and *transmitter* are not satisfied with the verification and comparison results, Phase 3 will be discontinued and the registration revoked and no longer used for settlement purposes.

1.6.4 PHASE 4 – Transmission Grid High Voltage Metering Settlement

In this phase the transmission grid high voltage *metering installation* enters the enduring phase for *settlement* in the wholesale electricity market.

Existing Metering Installation

The *IESO* no longer requires the existing *metering installations*, and they can be deregistered from the *IESO* systems.

Transmission Grid - High Voltage Metering

At this point the implementation of the transmission grid high voltage metering is complete. The *delivery points* for transmission grid high voltage metering will continue to be used for *settlement*.

The *metered market participant* shall make changes to the system loss model (loss adjustment and load diversity adjustment) at the time of a material change (refer to Section 1.7.1) and register the changes with the *IESO*. The *IESO* will implement ongoing refinements made to adjustment factors, if required. Annual true-ups will be made for *transmission service charges* only as agreed to by the *metered market participant* and the *transmitter*.

1.7 Settlement Details

1.7.1 Energy Settlement – Details

Energy settlement is to be carried out according to the following requirements in a manner satisfactory to the *IESO*:

1. The *energy* readings from the transmission grid high voltage *metering installation* shall be adjusted to reflect the losses between the transmission grid high voltage *metering installation* and all *connection points* within the transmission line segment. Adjustments will be made to active *energy* readings (kWh) using the site specific loss adjustment (SSLA) coefficients calculated based on the system loss model. The *metered market participant* must demonstrate to the satisfaction of the *IESO* and the *transmitter* that the adjustments accurately and effectively reflect the losses within the transmission line segment to the equivalent *delivery points*.
2. Losses will be applied using either Method 1 or Method 2 SSLA. To achieve acceptable loss representation, variations of these methods may be considered and is subject to *IESO* approval. The *metered market participant* shall implement the SSLA method approved by the *IESO*.
3. It is the responsibility of the *metered market participant* to validate the loss adjustment methodology on a semi-annual basis during Phases 2 and 3 of the implementation process. This will be done by comparing the SSLA adjusted transmission grid high voltage *metered data* to the *metered data* from the existing *metering installations* located at the *connection point* of the *connection facilities*. The *metered data* used to perform this comparison shall be provided by the *IESO*.
4. The *metered market participant* shall develop and maintain a system loss model which is used to determine the SSLA coefficients for each transmission line segment. The system loss model shall include but not be limited to:

- Load-flow studies shall be executed using the last two years of historical *IESO* interval *metering data*. The historical interval *metering data* shall include all losses and represent *energy flows* at the *connection point* of the *connection facility*;
 - Where applicable, transmission line segment impedances shall be the same as those used in the *IESO* Base Case Load Flow Model, and where appropriate shall include information from the Transmitters Power System Data Base;
 - The normal (least loss) operating configuration shall be assumed for the transmission lines within the boundaries of the transmission grid high voltage *metering installations*. The *transmission system* operating configuration (open/closed status of breakers and switches) shall be provided by the *transmitter* or the *IESO*; and
 - All assumptions used in developing the system loss model shall be identified and must be reasonable for the disposition of load or generation.
5. The *metered market participant* shall provide the system loss model information to the *IESO* and the *transmitter* electronically and shall be compatible with both the *IESO* and *transmitters'* power system analysis tool. The *IESO* uses "Siemens PSSTME-Power System Simulator for Engineers".
 6. Any planned changes by the *transmitter* to the operating configuration of the *transmission system* must be communicated by the *transmitter* to the *metered market participant* at least 60 days in advance of the changes coming into effect. Temporary changes of minimal significance to the *transmission system* operating configuration (i.e., for maintenance and *emergencies*) do not need to be communicated to the *metered market participant* or the *IESO*.
 7. The *metered market participant* shall ensure that any changes to the *transmission system* configuration resulting in a change to the loss parameters are identified and registered within a timely manner as reasonably determined by the *IESO*. The *metered market participant* is responsible for all losses that may occur due to normal and non-optimal *transmission system* configurations.
 8. The *metered market participant* shall compare the summed total of SSLA losses (in kWh) for each data interval to the summed total of the *energy* (in kWh) metered by the transmission grid high voltage metering which supply those transmission segments. Using *IESO* SSLA methodology, for example Method #2, the data (kWh losses vs. kWh load) is recorded, and a second order polynomial trend line is fitted to the data. The resulting equation from the trend line provides the K1, K2, and K3 SSLA coefficients to be incorporated into the totalization tables. Each data point shall represent a 15-minute data interval and a minimum of 24 month rolling set of data shall be used to derive the SSLA coefficients.
 9. The *metered market participant* shall be responsible for signing off the SSLA register and loss adjustment methodology.

1.7.2 Transmission Tariff Settlement – Details

Transmission tariff settlement shall be carried out in a manner satisfactory to the *transmitter* and shall be consistent with the “OEB Transmission Rate Schedule”. The following is an example of how the *transmission service charges* may be settled:

1. The *demand* values from the transmission grid high voltage *metering installations* shall be adjusted to compensate for load diversity. Adjustments will be made to the active *demand* readings (kW) using the SSLA coefficients which were calculated based on the load diversity model. The *metered market participant* must demonstrate to the satisfaction of the *transmitter* that the *demand* values adjusted for load diversity is equivalent to the sum of the existing transmission *delivery points* for the transmission line segment.
2. Load diversity adjustments will be applied using either Method 1 or Method 2 SSLA. To achieve acceptable diversity results, variations of these methods may be considered and is subject to *transmitter* approval. The *meter market participant* shall implement the SSLA method approved by the *transmitter*.
3. It is the responsibility of the *metered market participant* to validate the load diversity methodology on a periodic basis by comparing the results to known *metered data* in accordance with the requirements of the *transmitter*.
4. Calculation of the Transmission Network load diversity adjustment coefficient:
 - The load diversity adjustment factor for *network services* shall be derived by comparing the monthly sum of *IESO* invoiced peak *demands* for the existing transmission network *delivery points* supplied from transmission line segment, to the monthly peak *demand* that would have been recorded at the transmission grid high voltage *metering installation* adjusted for losses, as per the “OEB Transmission Rate Schedule”;
 - Using *IESO* SSLA methodology, for example SSLA Method 2, the data (total transmission grid high voltage metered monthly coincident peak *demand* vs. sum of individual monthly non-coincident peak *demand*) is recorded and a second order polynomial trend line fitted to the data. The resulting equation from the trend line provides the K1, K2, and K3 SSLA coefficients which will be incorporated into the totalization tables; and
 - The K1, K2, and K3 SSLA coefficients provide the degree of "gross up" that must be applied to the transmission grid high voltage *metering installation demand* reading in order to provide the equivalent of the sum of the transmission network *delivery point* non-coincident peak *demand* readings.
5. Calculation of the Transmission Connection load diversity adjustment coefficient:
 - The load diversity adjustment factor for connection services shall be derived by comparing the monthly sum of *IESO* invoiced non-coincidental peaks of the existing transmission connection *delivery points* supplied from the transmission line segment, to the monthly coincident peak *demand* that would have been recorded by the transmission grid high

voltage *metering installation* adjusted for losses, as per the “OEB Transmission Rate Schedule”;

- Using *IESO* SSLA methodology, for example SSLA Method 2, the data (total transmission grid high voltage metered monthly coincident peak *demand* vs. sum of individual monthly non-coincident peak *demand*) is recorded and a second order polynomial trend line fitted to the data. The resulting equation from the trend line provides the K1, K2, K3 SSLA coefficients which will be incorporated into the totalization tables; and
 - The K1, K2, and K3 coefficients provide the degree of "gross up" that must be applied to the transmission grid high voltage *metering installation demand* reading in order to provide the equivalent of the sum of the transmission connection *delivery point* non-coincident *demand* readings.
6. A minimum data set of a rolling 24 months of data shall be used to derive the load diversity adjustment factors with each data point representing a monthly *demand* reading.

1.7.3 Procedure for the Application of the Loss Adjustment and Load Diversity Factors

1. During Phase 1 of implementation, the *metered market participant* calculates the loss adjustment and load diversity adjustment factors using the prescribed methodology. These factors shall be submitted to the *transmitter* (copy to the *IESO*) for their review and approval.
2. The *transmitter* shall notify the *metered market participant* and the *IESO* if the loss adjustment and load diversity adjustment factors are found to be acceptable. If they are not acceptable the *transmitter* must provide reasons and direction for the *metered market participant* to review the analysis and determination of adjustment factors.
3. The *transmitter* will communicate with the other Ontario transmission system owners to keep them informed on the status of *metered market participant's* load diversity adjustment factors.
4. Once the *metered market participant* has received and *transmitter's* approval, the *metered market participant* will formally submit the loss adjustment and load diversity adjustment factors to the *IESO* with a copy to the *transmitter*. This will be done using *IESO* FORM 1040 “Site Specific Loss Adjustment Register”.
5. The *IESO* will review the loss adjustment factors for reasonableness. Where the loss adjustment factors are found to be satisfactory, the *IESO* shall notify the *metered market participant* and the *transmitter*. If the loss factors are found to be unsatisfactory, the *IESO* will notify the *metered market participant* and the *transmitter*, and provide reasons and direction for the *metered market participant* to review the analysis and determination of the adjustment factors.
6. Once accepted, the *metered market participant* will sign-off the system loss model, the loss adjustment factors and the load diversity factors certifying that it wishes to be settled in this manner.

7. The loss adjustments and load diversity factors will be registered into the *IESO* systems as part of the totalization table registration process.
8. The *metered market participant* and *transmitter* shall sign-off on the “Site Registration Report” (SRR) prior to the effective date of the totalization tables as per standard registration procedures.
9. On the annual review date (i.e. within 30 days after the availability of final *IESO* interval *meter data*), or when aware of a material change to the *transmission system*, the *metered market participant* shall conduct a review of the Load Diversity Adjustment Factors in a timely manner and submit the findings to the *transmitter* for review.
10. The source of the data used to derive the transmission grid high voltage metering loss adjustment and load diversity adjustment factors is the final *IESO* interval *meter data* from the existing *metering installations*. The interval *meter data* is obtained from the *IESO* portal.

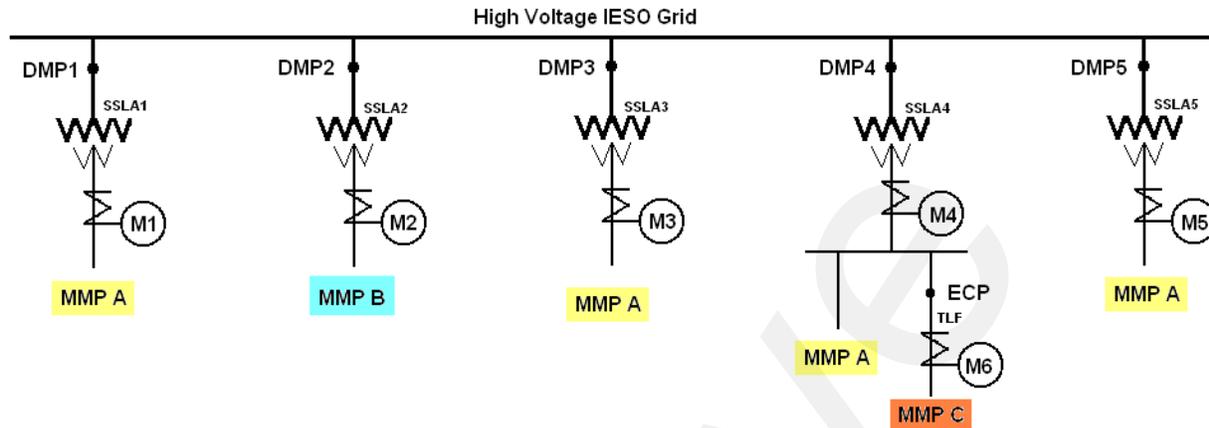
1.7.4 Changes Requiring Review of Adjustment Factors

1. The *metered market participant* shall review the loss adjustment and load diversity adjustment factors on an annual basis and whenever there is a change within the transmission grid high voltage metering boundaries that in the opinion of the *IESO* is material. A change that causes a $\pm 0.5\%$ change or more in the *energy* consumed, in the non-coincident or coincident *demand* change shall be considered to be material. The *metered market participant* shall register all material changes in a timely manner as reasonably determined by the *IESO*.
2. List of reviewable changes include but are not limited to:
 - the addition of a wholesale directly connected or *embedded market participant* - load or *generator*;
 - the addition to the transmission configuration or transmission line segments;
 - the addition or changes to the configuration of transformer stations connected to the *transmission system*;
 - re-conductoring of an existing transmission line;
 - changes to the grid operation such as moving the grid open points;
 - upgrading capacity of any transformer station power transformer; and
 - load transfers outside the transmission grid high voltage metering area.

1.8 Settlement Principles and Equations

This section provides an example of the application of principles utilized by the *IESO* in settling the wholesale electricity market using transmission grid high voltage metering. This example is not intended to be an exhaustive assessment of the various circumstances that may arise. If the *metered market participant* has particular requirements or encounters circumstances different from the example, or if *metered market participants* believe the examples are not appropriate, they should contact the *IESO* prior to submission of the transmission grid high voltage metering proposal. *Metered market participants* and their *metering service providers* are responsible for ensuring that the application of the principles are appropriate to their situation.

Figure 1: Existing Metering Configuration and Settlement Equations Prior to Transmission Grid High Voltage Metering Implementation



MMP_A

$$\text{Energy DP}_1 = M_1 + \text{SSLA}_1$$

$$\text{Network DP}_1 = M_1 + \text{SSLA}_1$$

$$\text{Connection DP}_1 = M_1 + \text{SSLA}_1$$

$$\text{Energy DP}_3 = M_3 + \text{SSLA}_3$$

$$\text{Network DP}_3 = M_3 + \text{SSLA}_3$$

$$\text{Connection DP}_3 = M_3 + \text{SSLA}_3$$

$$\text{Energy DP}_4 = (M_4 + \text{SSLA}_4) - (M_6 * \text{TLF})$$

$$\text{Network DP}_4 = M_4 + \text{SSLA}_4$$

$$\text{Connection DP}_4 = M_4 + \text{SSLA}_4$$

$$\text{Energy DP}_5 = M_5 + \text{SSLA}_5$$

$$\text{Network DP}_5 = M_5 + \text{SSLA}_5$$

$$\text{Connection DP}_5 = M_5 + \text{SSLA}_5$$

MMP_B

$$\text{Energy DP}_2 = M_2 + \text{SSLA}_2$$

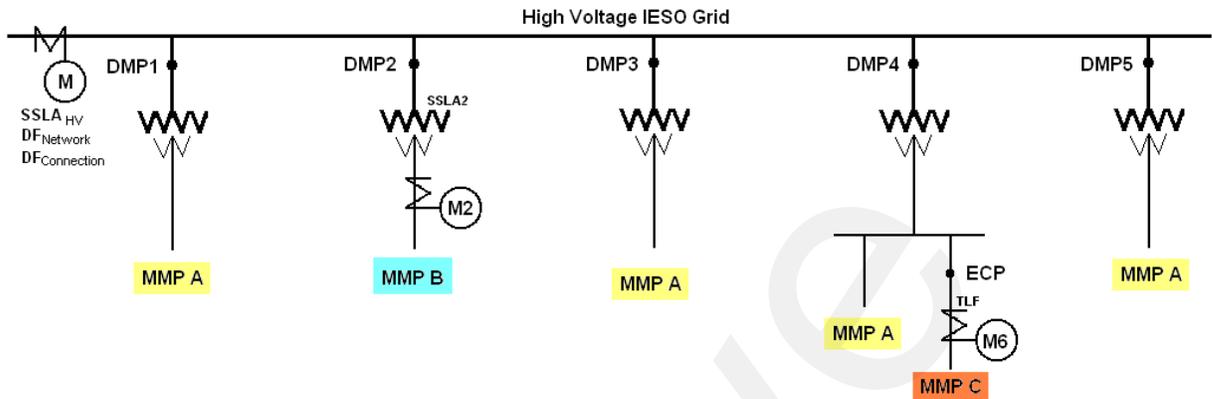
$$\text{Network DP}_2 = M_2 + \text{SSLA}_2$$

$$\text{Connection DP}_2 = M_2 + \text{SSLA}_2$$

MMP_C

$$\text{Energy DP}_6 = M_6 * \text{TLF}$$

Figure 2: Transmission Grid High Voltage Metering Configuration and Settlement Equations



NOTE:

DF_{Network} is the load diversity factor for transmission *network services*

DF_{Connection} is the load diversity factor for transmission *connection services*

MMP_A

$$\text{Energy DP}_{HV} = (M_{HV} + SSLA_{HV}) - \text{Energy DP}_2 - \text{Energy DP}_6$$

$$\text{Network DP}_{HV} = ((M_{HV} + SSLA_{HV}) + DF_{Network}) - \text{Network DP}_2$$

$$\text{Connection DP}_{HV} = ((M_{HV} + SSLA_{HV}) + DF_{Connection}) - \text{Connection DP}_2$$

MMP_B

$$\text{Energy DP}_2 = M_2 + SSLA_2$$

$$\text{Network DP}_2 = M_2 + SSLA_2$$

$$\text{Connection DP}_2 = M_2 + SSLA_2$$

MMP_C

$$\text{Energy DP}_6 = M_6 * TLF$$

1.9 Roles and Responsibilities

The following section describes the roles and responsibilities of the *IESO*, *metered market participants* and *transmitter* during the registration of transmission grid high voltage *metering installations*. Additional responsibilities are outlined in “Market Manual 3: Metering, Part 3.2; Meter Point Registration and Maintenance”.

Metered market participant is responsible for:

- submitting the transmission grid high voltage metering proposal to the *IESO* and *transmitter* for review;
- obtaining any and all necessary non-disclosure agreements with other *market participants* or affected parties;
- providing and maintaining all registration documentation including the system loss model used in determining the loss adjustment coefficients and load diversity adjustments;
- verifying and validating the loss adjustment methodology and load diversity methodology;
- obtaining all necessary agreements with the *transmitter*;
- signing off on the Site-Specific Loss Adjustments (SSLA) register and loss adjustment methodology;
- signing-off on the *settlement* equations prior to the registration of the transmission grid high voltage *metering installations*;
- signing-off on the Site Registration Report (SRR);
- providing the *transmitter* with the *meter point* documentation on completion of the registration procedure or changes to the registration procedure;
- providing annual true-up for *transmission service charges* with values agreed by the *transmitter* to the *IESO* to produce a manual line item;
- ensuring that any changes to the *transmission system* configuration resulting in a change to the loss parameters are identified and registered within a timely manner as reasonably determined by the *IESO*; and
- withdrawing the transmission grid high voltage metering proposal entirely if the proposal is rejected and cannot be implemented.

The *IESO* is responsible for:

- reviewing the transmission grid high voltage metering proposal submitted by the *metered market participant*;
- being satisfied that the adjustments accurately and effectively reflect the losses with the transmission line segment to the equivalent *delivery points*;
- registering loss adjustments and diversity factors into *IESO* systems as part of totalization table registration process;
- ensuring all transfers of *energy* at any points of supply or consumption for the *facilities* to which the *metering installation* are associated, are determined in a manner satisfactory to the *IESO*;
- being satisfied that agreement between *transmitter* and *metered market participant* is in place for sustainable means of measurement at the existing *connection points* to ensure system loss model factors are verified;
- informing the *metered market participant* and *transmitter* of the acceptance or rejection of submitted system loss models; and
- informing the *metered market participant* and *transmitter* if the proposal is rejected and cannot be implemented.

Transmitter is responsible for:

- reviewing the transmission grid high voltage metering proposal submitted by the *metered market participant*;
- reviewing submitted system loss model loss adjustment factors for reasonableness;
- obtaining all necessary agreements with *metered market participant*;
- ensuring transmission *settlement* is in accordance “OEB Transmission Rate Schedule”;
- ensuring the agreement with the *metered market participant* is in place for sustainable means of measurement at the existing *connection points* to ensure system loss model factors are verified;
- signing-off on the Site Registration Report (SRR) prior to the effective date of the totalization tables as per standard registration procedures;
- notifying the *metered market participant* and *IESO* of any planned changes to the operating configuration of the transmission system at least 60 days in advance of the changes coming into effect;
- providing annual true-up for *transmission service charges* with values agreed by the *metered market participant* to the *IESO* to produce a manual line item;
- being satisfied that the transmission grid high voltage metering *demand* values adjusted for load diversity is equivalent to the sum of the existing transmission *delivery points*; and
- communicating with the other Ontario transmission system owners keeping them informed on the status of *metered market participant’s* load diversity adjustment factors.

1.10 Contact Information

If the *market participant* wishes to contact the *IESO*, the *market participant* can contact *IESO* Customer Relations via email at customer.relations@ieso.ca or via telephone, mail or courier to the numbers and addresses given on the *IESO’s* Web site (www.ieso.ca - or click on 'Have a question?' to go to the 'Contacting the *IESO*' page). If *IESO* Customer Relations is closed, telephone messages or emails may be left in relevant voice or electronic *IESO* mail boxes, which will be answered as soon as possible by Customer Relations staff.

– End of Section –

References

Document Name	Document ID
Market Rules for the Ontario Electricity Market	MDP_RUL_0002
Market Manual 3: Metering, Part 3.0 Metering Overview	MDP_MAN_0003
Market Manual 3: Metering, Part 3.2 Meter Point Registration and Maintenance	MDP_PRO_0013
Wholesale Revenue Metering Standard - Hardware	MDP_STD_0004

– End of Document –