



**PROCEDURE**

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**Market Manual 1: Market Entry,  
Maintenance, and Exit**

**Part 1.2: Facility  
Registration,  
Maintenance, and  
De-registration**

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**Issue 37.0**

This document provides detailed procedures to be followed by market participants who wish to register, maintain or de-register facilities as part of their participation in the IESO-administered Physical Markets.

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## Table of Changes

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Reference	Description of Change
Section 7	Added new section to include registration requirements for Capacity Export commitments.

# Market Manuals

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The *market manuals* consolidate the market procedures and associated forms, standards, and policies that define the operation of the various areas within the *IESO-administered markets*. Market procedures provide more detailed descriptions of the requirements for various activities than are 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 are either appended to, or referenced in, the external procedures to provide a supporting framework.

## Market Procedures

The “Market Entry, Maintenance & Exit Manual” is Series 1 of the *Market Manuals*, where this document forms “Part 1.2: Facility Registration, Maintenance & De-registration”.

– End of Section –



# 1. Introduction

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## 1.1 Purpose

This procedure document is intended to provide organizations planning to register *facilities* or *boundary entities* for the *IESO-administered markets* with a description of the registration process.

The *facility* registration process described in this document is used by the *IESO* to assess whether a *market participant's facilities* or *boundary entities* meet all minimum requirements defined by the *market rules* (and certain standards and policies established by the *IESO*) for participation in the *IESO-administered markets*. The *IESO* also uses this process to ensure that the *facilities* conveying electricity into, through, or out of the *IESO-controlled grid* will not negatively impact the *reliability* of the *integrated power system*. The information collected during *facility* registration is used to model the *facility* in the tools used by the *IESO* to operate the *IESO-controlled grid* and to perform *reliability* assessments.

Work flows and procedural steps described in this document will serve as a road map for *market participants* and reflect the requirements set out in both the *market rules*, and certain standards and policies established by the *IESO*. This document also provides the procedural steps required of *market participants* when they want to either change the registration information for one or more of their *facilities*, or *boundary entities* or to de-register the *facility* or *boundary entity*.

This procedure document also provides *variable generators*<sup>1</sup> that are not *market participants* with a summary of the steps to register online with the *IESO* to provide data for centralized forecasting. The requirements set out in section 5, Appendix D and Appendix E are incremental to all other requirements in this market manual for *variable generators* that are directly connected to the *IESO-controlled grid* or registered to participate in the *IESO-administered-markets*. Distribution-connected *variable generators* that are not registering to become *market participants* may proceed directly to section 5, Appendix D and Appendix E.

**FOR SIMPLICITY AND CONVENIENCE, ANY REFERENCE IN THIS PROCEDURE TO FACILITY, OR FACILITIES, SHALL BE DEEMED TO ALSO INCLUDE BOUNDARY ENTITY, OR BOUNDARY ENTITIES, WHERE APPLICABLE.**

## 1.2 Scope

The overall “Market Entry, Maintenance & Exit” processes are comprised of three distinct activities:

- “Participant Authorization, Maintenance and Exit”,
- “Facility Registration, Maintenance and De-registration”, and
- “Identity Management Operations Guide”.

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

This document contains information concerning *facility* registration, maintenance and de-registration only. For information on the participant authorization process and identity management, see “Market Manual 1.1: Participant Authorization, Maintenance & Exit and Market Manual 1.3: Identity Management Operations Guide”. For information on Identity Management Operations Guide For information on processes relating to the registration of *meter points* and submission of *meter* totalization tables, see “Market Manual 3.0: Metering Overview”.

## 1.3 Roles and Responsibilities

Responsibility for *facility* registration, maintenance and exit activities is shared between the *market participant* and the *IESO*, as follows:

### Market Participant

- Read and comply with the *market rules* pertaining to *facility* registration,
- Submit technical informational data, supporting documentation, and supplemental information,
- Provide *facility* registration and operations contact names,
- Identify the *registered market participant (RMP)* and *metered market participant* for the each resource record created for the *facility* in the *IESO* registration system,
- The RMP shall submit and establish the person who can submit bids and offers on a resource, also known as establishing the User-Resource relationships,
- Submit *responses* to *IESO* requests for incomplete information or clarifications,
- Submit *facility* and resource information to the *IESO*,
- Review and maintain the registration information in the *IESO* registration system to ensure the accuracy of the information, and submit any corrections to the *IESO*, and
- Participate in ability testing, as scheduled together with the *IESO*.

### IESO

- Acknowledge and process *market participant* submissions,
- Maintain *IESO* registration system records and availability,
- Issue requests for incomplete information or clarifications,
- Assess the *facility* seeking to be registered for impact on the *IESO-controlled grid* and for ability to deliver the services for which it is seeking to be registered,
- Based on the *market participant's* direction, create appropriate setup of resources and associated *facilities* to enable bidding, dispatching, metering and *settlement*,
- Agree with the *market participant* on a schedule and participate in ability testing of the Operational Network (See the “Participant Technical Reference Manual”),
- Validate a *facility's* compliance with data monitoring, telecommunication and voice communication requirements as defined in the *market rules* and applicable standards and policies established by the *IESO*,
- Provide the *market participant* with appropriate operational *IESO* contacts, and

- Issue the appropriate approval documentation to the *market participant*.

## 1.4 Contact Information

Changes to this *market manual* are managed via the [IESO Change Management process](#). Stakeholders are encouraged to participate in the evolution of this *market manual* via this process.

To contact the *IESO*, you can email IESO Customer Relations at [customer.relations@ieso.ca](mailto:customer.relations@ieso.ca) or use telephone or mail. Telephone numbers and the mailing address can be found on the IESO website (<http://www.ieso.ca/corporate-ieso/contact>). IESO Customer Relations staff will respond as soon as possible.

– End of Section –

## 2. Facility Registration

### 2.1 Overview

The *IESO* uses the *facility* registration process to assess whether *market participant's facilities* or *boundary entities* meet all minimum requirements defined by the *market rules* and to ensure that the *facilities* will not negatively impact the *reliability* of the *integrated power system*.

Except for certain limited circumstances<sup>2</sup>, all *market participants* who wish to:

- Participate in the *IESO's physical market*, or
- Cause or permit electricity or any *physical service* to be conveyed into, through or out of the *integrated power system*,

must register with the *IESO* any *facility* or *boundary entity* to or from which the electricity or *physical service* will be conveyed.

*Facility* registration is one of a number of activities that forms part of the Market Registration process. In order to initiate registration of a *facility*, or *boundary entity*, an organization must first initiate the Participant Authorization process. The *facility* registration process cannot be completed until the organization has been authorized as a *market participant*. In addition, the *IESO* must approve the *metered market participant* for each resource established for the *facility*, as identified by the *market participant*, before the *facility* registration process can be completed - see Section 2.6.

There are five roles related to the running of a *facility* that are of interest to the *IESO* for the purposes of *facility* registration. One or as many as five entities, depending on their qualifications and responsibilities can fill these five roles, as described in the following table:

**Table 2-1: Roles and Responsibilities**

Role	Responsibility
<i>Market Participant</i>	The entity responsible for registering the <i>facility</i> . The <i>market participant</i> is the owner of the <i>facility</i> and is responsible for assigning the <i>registered market participant</i> , <i>metered market participant</i> and Operator relationships to their resources and equipment if applicable.
<i>Registered Market Participant (RMP)</i>	Uniquely designated for a <i>facility</i> , it is the only entity authorized for submitting <i>dispatch data</i> with respect to that particular <i>facility</i> . The <i>registered market participant</i> will submit <i>dispatch data</i> for an applicable resource it has been assigned to.

<sup>2</sup> See Section 2.5.

Role	Responsibility
<i>Metered Market Participant (MMP)</i>	The entity responsible for the financial <i>settlement</i> with the <i>IESO</i> of all quantities of <i>physical services</i> (including <i>energy</i> and <i>Operating Reserve</i> ) relating to the <i>facility</i> as part of the <i>IESO's settlement process</i> . The <i>metered market participant</i> will assign any <i>Metering Service Provider</i> relationships to the resource.
Owner	Owns and maintains the <i>facility</i>
Operator	Operates the <i>facility</i> . The responsible entity will also need to be authorized as a <i>market participant</i> .

For a *boundary entity*, the Owner and Operator shall be the *market participant* responsible for transactions at the *interties*.

The registration procedure for a *facility* or *boundary entity* is designed to assist the *IESO* in:

- Recording the identity of the Owner, Operator, *market participant*, *registered market participant* and *metered market participant* relating to the *facility* or *boundary entity*,
- Recording the location of the *facility* or *boundary entity*,
- Assessing whether the *facility* or *boundary entity* conforms to all applicable *reliability standards*,
- Ensuring that the physical characteristics of the *facility* are known and maintained within the *IESO's* information management systems for planning, forecasting, and *reliability* purposes, and
- Assessing whether the *facility* or *boundary entity* complies with all applicable data monitoring, telecommunications and voice communication requirements.

In addition, the *facility* registration process cannot be completed until the relevant metering requirements relating to the *facility* have been completed, such that the *settlement of physical services* relating to the *facility* can be undertaken by the *IESO*. These metering requirements are set out in “Market Manual 3: Metering” and are the responsibility of the *metered market participant* relating to the *facility*, as identified by the *market participant* who is registering the *facility*. See Section 2.6 for further information.

For *variable generators* that are not *market participants*, the registration process involves completing the registration using [Online IESO](#) and forms (if applicable) noted in Section 5.0.

## 2.2 IESO Website

The *IESO's* website ([www.ieso.ca](http://www.ieso.ca)) is used to communicate with the public about *IESO-administered market* issues and to provide access to information and documents related to all activities carried out in the *IESO-administered markets*. Market participants who wish to register or update information related to their *facilities* will find all of the information and documents they require to complete the *facility* registration, maintenance and de-registration processes on the *IESO's* website. Specifically, *market participants* will find the latest versions of:

- The *market rules*,
- The “Participant Technical Reference Manual”,
- The “Market Entry, Maintenance & Exit Manual”, and
- Other *market manuals* that are referred to in this market procedure.

## 2.3 Registration System

The *IESO* operates a web-based online registration system for electronic processing and storing of information related to the participant’s *facility* information.

Participants must submit their *facility* information using the online registration system which will be reviewed and accepted by the *IESO*.

The participant will assign an equipment registration specialist (ERS) contact role to their organization. During the registration process the ERS will be responsible to submit attributes to their equipment, *facility* and resources using the online registration system. These attributes will be either mandatory or optional and may require supporting documentation to verify the attributes. The participant will be responsible for assigning *facility* registration contacts to the equipment it operates. These contacts would include the facility contact that is responsible 24/7 for operating equipment at their *facility* location and if applicable, the facility contact for carrying out *dispatch instructions*. An online registration Help file will be available to provide guidance.

Program participants and *market participants* can track the progress of the *facility* registration process online. Participants may also e-mail [market.registration@ieso.ca](mailto:market.registration@ieso.ca) or contact their market registration project manager to request a progress update.

## 2.4 IESO Registration System and Registration

### 2.4.1 IESO Registration System Terminology

To complete the *facility* registration process, *market participants* need to understand five important terms as they apply to *facility* registration in the *IESO* registration system:

- Physical *facility*,
- *Boundary entity*,
- Resource,
- *Facility*, and
- Connection Point

These terms have specific meanings related to the functioning of the *IESO* registration system for the purposes of this procedure. Resource and *facility* are data record types that must be created in the *IESO* registration system for each *facility* to be registered. Resources are associated with a DPOS.

### Physical Facility

A physical *facility* refers to an actual physical site containing equipment such as a *generator* or transformer. Such physical sites may contain transmission, load, generation, storage or distribution

*facilities*. A physical *facility* may have more than one owner and operator. All equipment associated to a *facility* will require a designated owner and operator.

### Boundary Entity

A *boundary entity* means the capacity of one or more resources including but not limited to *generation facilities* or *load facilities*, located at a point or points external to the *IESO control area* at which a *market participant* is entitled to inject into or withdraw from the *IESO-controlled grid* and which shall be deemed to be located in an *intertie zone* in accordance with Section 2. 2.7.2 of Chapter 7.

### Resource

A resource is a representation in the *IESO* registration system of a part of or the entire physical *facility*. Each resource record is associated with a unique connection point (also referred to as Defined Point of Sale (DPOS), see below) to the *IESO-controlled grid*. As a result, a single physical *facility* may need to be modeled as two or more resource records in the *IESO* registration system. If a *facility* has more than one *connection point* the *facility* will be represented by more than one resource. A resource record in the *IESO* registration system provides the *IESO* with information related to the *dispatch data* of the physical *facility* or *facilities* represented by the resource. The data fields contained in the resource information screen are used by the *IESO* market systems for the purposes of validating *bids*, *offers* and *schedules* for undertaking *settlement*. Resource records are created for a physical *facility* by the *IESO* after a *market participant* or program participant demonstrates their intention to register a particular physical *facility* by their submission online. The *IESO* will review the information provided by *market participants* during *facility* registration and ensure that physical *facilities* are modeled in a manner that accurately reflects their operational and *settlement* requirements. To ensure that resources do not negatively affect the *reliability* of the *IESO-controlled grid*, the *IESO* will most likely require individual resources created for each generating unit in a *generation facility*. For example if a *generation facility* consists of one combustion turbine and one steam turbine connecting to a common *connection point* they will be modelled as two separate resources (refer to section 2.4.2 for more details). It is important that the *market participants* inquires early in the *facility registration* process on how many resources are required at their *facility* as there is a 'one revenue meter to one resource' relationship.

**Note:** The terms "Delivery Point" (DP) and Location ID are used in other *IESO* systems and market manuals, and are understood to be equivalent to the term "Resource" used in this market manual.

### Facility

A *facility* is the representation of a physical *facility* or a *boundary entity* in the *IESO* registration system. In contrast, a *facility* record would store information including technical data relating to the physical equipment within the *facility*. The *dispatch data* for the *facility*, such as whether or not the resource is *dispatchable* and the type of *operating reserve* it can offer, would be stored in the *facility* record.

*Facility* records are created for a physical *facility* or a *boundary entity* by the *IESO* when a *market participant* demonstrates their intention to register a particular physical *facility* by their submission online of registration information. The *IESO* will ensure that all *facility* information provided by *market participants* is referenced appropriately in the *IESO* registration system.

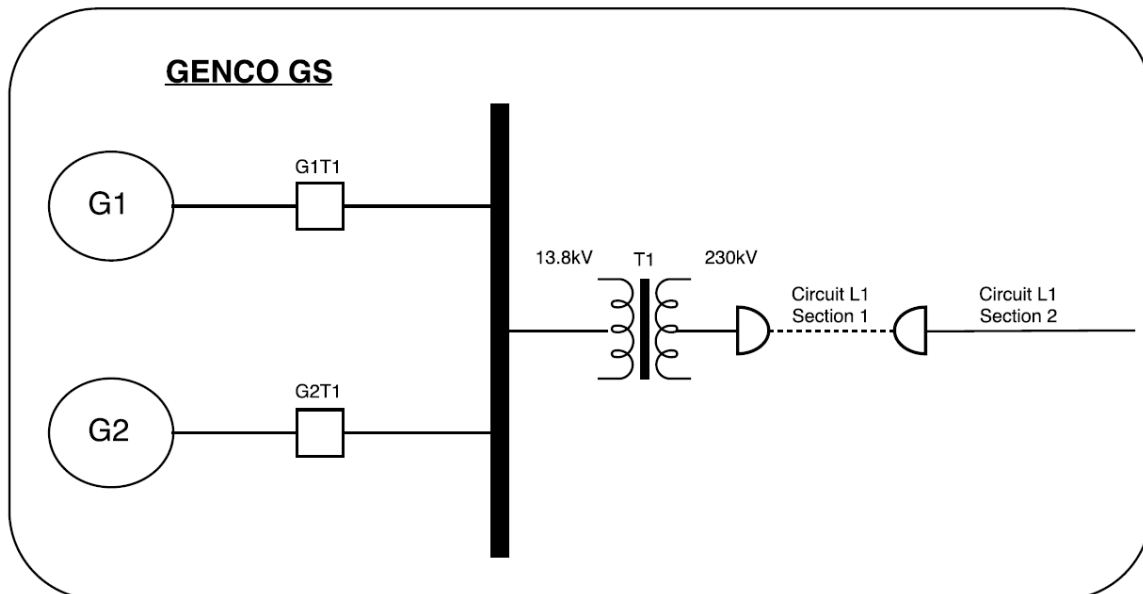
## Connection Point

**Note:** A connection point is a representation in the *IESO* registration system of a physical connection at the high voltage side of the grid-connecting transformer at which a service is injected into or withdrawn from the *IESO-administered markets*. The term “Defined Point of Sale (DPOS)” are used in other *IESO* systems and market manuals, and are understood to be equivalent to the term “Connection Point” used in this market manual.

All Connection Point records in the *IESO* registration system are created by the *IESO*.

### 2.4.2 Relationship between Physical Facilities and Resource, Facility and Connection Point Records

Establishing relationships between a *physical facility* and resource is important to ensure the *IESO settlements* system and operations works correctly. This is illustrated in the example below, where a fictitious company GenCo has submitted the following single line diagram (SLD):



**Figure 2-1: Example Single Line Diagram**

The physical *facility* would be registered as GenCo GS and includes all physical equipment for example generating units, transformers, circuits and breakers.

The *IESO* would register two resources for this *facility*. The first resource would be identified as Genco-LT.G1 which includes information for the generating unit G1 and the second resource would be identified as Genco-LT.G2 which includes information for the generating unit G2. The *market participant* would establish the applicable relationships to the resources to ensure the RMP can place *bids, offers* or schedules for each of the two resources (see section 2.4.3).

A *market participant (generator-owner)* may apply to aggregate a number of *generating units* into a single resource. The *IESO* will review any request and may approve or reject.



Where a *market participant* is seeking to aggregate two or more generating units in one resource record, the resource information (e.g. *generator* capability) must be representative of the total sum of the generating units.

It is important to note that there is a “one to many” relationship between a connection point and a resource. That is, one connection point can have many resources associated with it. For instance, a *distributor* might own a transformer station connected to the *IESO-controlled grid* and be set up with a resource for bidding, metering and *settlement* at that connection point. If a *dispatchable generator* is embedded in that *distribution system*, that *generator* would be set up in the *IESO* registration system as a separate resource associated with the same connection point.

In other words, for the purposes of the *IESO*, the *generator* resource must be distinguished from the *distributor* resource in which the *generator* is embedded. Both resources have the same connection point because they both inject or withdraw (as the case may be) *physical services* into or from the *IESO-administered markets* at the same physical point.

The *IESO* will create resource and *facility* records for *market participants* based on the information *market participants* submitted during the *Facility Registration* process. It is critical that *market participants* review these records in the *IESO* registration system to ensure that the records have been set up appropriately and that the information contained in the records is accurate.

### 2.4.3 About MP/Resource Relationships in the IESO Registration System

The *market participant/resource* relationship is an important *IESO* registration system screen for *facility* registration, and for participation in the *IESO-administered markets*. Various relationships are possible, depending on the *market rules* and the business requirements of *market participants*. Each resource that is recorded in the *IESO* registration system may have relationships to several different *market participants*, however, each relationship must be unique. For example, if a *market participant* has been designated as the RMP for a resource, a second *market participant* cannot be similarly designated as the RMP.

The following relationships are possible for a specific resource:

#### Owner of the Resource

This is the *participant* that owns and maintains the resource information.

#### Operator of the Resource

This is the *participant* that operates the resource.

#### RMP – Registered Market Participant

The RMP is the *market participant* who has operational control of the resource under the definition of the *market rules*. The RMP is authorized to submit *dispatch data*, and since *dispatch data* is actually submitted by resource, the RMP must be designated for each resource.

The *market participant* identifies the RMP for each *dispatchable* resource created for the *facility* during the *facility* registration process.

As well, the RMP identifies the Users that will have the right to submit *dispatch data* for each *dispatchable* resource

### **MMP – Metered Market Participant**

The *metered market participant* is the *market participant* assigned to a resource who is responsible for the financial *settlement* with the IESO of all quantities of *physical services* (including *energy* and *Operating Reserve*) allocated to that resource as part of the IESO's *settlement process*. The *metered market participant* may be different from the RMP associated with the resource. All *market participants* who register a *facility* with the IESO will be asked to identify the *metered market participant* for each resource record that is created during the *facility* registration process, along with the RMP - see Section 2.6. The *facility* registration process is not completed until the *market participant* identifies the *metered market participant*-resource relationship.

### **MSP – Meter Service Provider**

The *metering service provider* (MSP) is a third party organization responsible for servicing *metering installations* associated with the resource and is assigned by the *metered market participant* – see Section 2.6. The *metering service provider* for a resource is recorded in the IESO registration system in order to provide the *metering service provider* with access to *metering data*.

The *metering service provider* relationship is set up by the *metered market participant* as part of the metering processes detailed in “Market Manual 3.8: Creating & Maintaining Delivery Point Relationships”.

### **Distributor & Transmitter**

*Distributor* or *Transmitter* relationship types define the *market participant* that connects the *facility* to the IESO-controlled *grid*. The *distributor* or *transmitter* for a resource is recorded in the IESO registration system in order to provide the *distributor* or *transmitter* with access to *metering data*.

A *distributor* or *transmitter* may create a transmission network resource (TN) or a transmission connection (TC) resource for the *facility*.

The relationship is set up by the *metered market participant* as part of the metering processes detailed in “Market Manual 3.8 - Creating & Maintaining Delivery Point Relationships”.

## **2.5 Registration Requirements**

*Facilities* are defined in the *market rules* as *generation facilities*, *load facilities*, *transmission systems* and *distribution systems* within the IESO control area, or any other equipment that is a component or part of the *electricity system*.

Subject to certain caveats in the *market rules*, the IESO requires that *market participants* register all facilities directly connected to the IESO-controlled *grid*, with capacity of not less than 1 MW. The process of registering a *facility* cannot be initiated until a *market participant* has started the procedure to become authorized as a *market participant*. Once a participant has access to the IESO online registration system, they will submit the resource and *facility* information to be registered. Before this *facility* registration process can be started it is expected that the participant has completed a *connection assessment*. The *connection assessment* process is detailed in “Market Manual 2.10 - Connection Assessment and Approval”

Once the participant completes the *connection assessment* process, there are 3 stages to the *facility* registration process. They are:

1. Submission of registration information online by the participant. This information will be reviewed and verified by the IESO. The participant is expected to submit “as built” data. Once all data and supporting documentation has been verified the next stage can start.
2. IESO internal equipment registration activities. This stage completes all IESO internal equipment registration activities required to prepare IESO staff and their systems to place in-service or commission equipment and their associated resources. This includes but is not limited to building network models, securing regulatory approvals, securing agreements with other jurisdictions, testing operational telemetering and configuring settlement systems.
3. Commissioning. The final stage is the commissioning of equipment and their associated resources with an obligation for *market participants* to demonstrate equipment performance based on requirements identified in the previous registration stage. This stage applies only for new equipment or changes to performance characteristics of the existing equipment. More information on the performance validation requirements can be found in “Market Manual 2.20: Performance Validation”. Registration information will likely be required to be updated after commissioning tests have been completed.

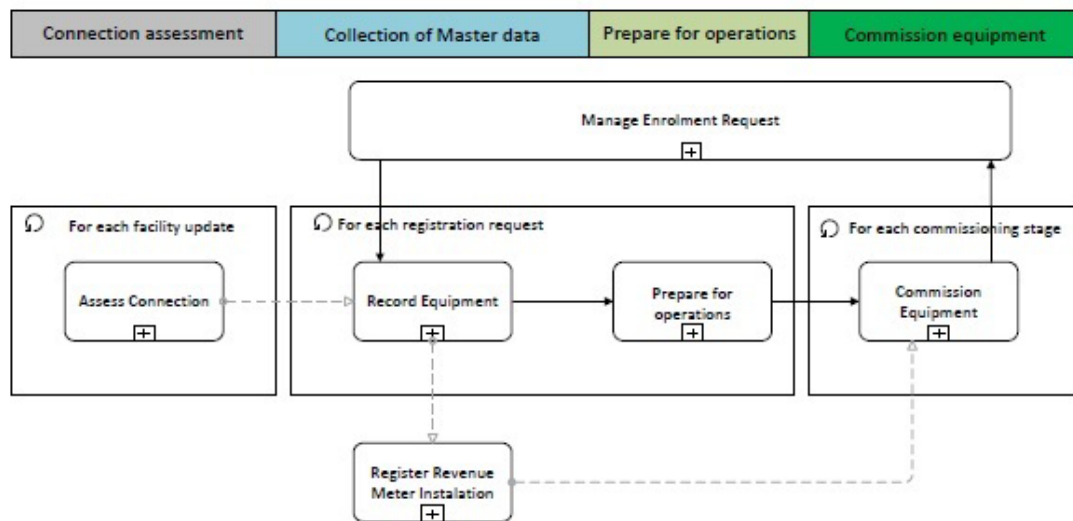
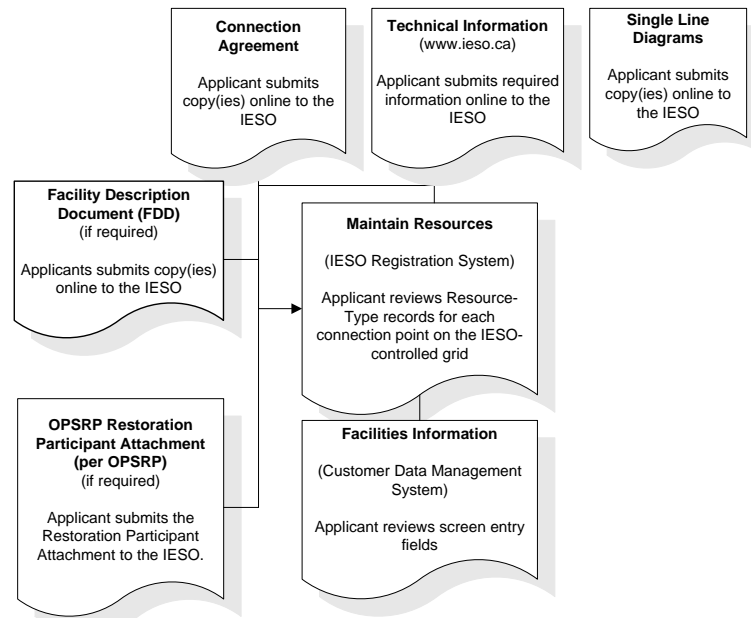


Figure 2-2: Register Facility – Process Map

### 2.5.1 Initial Application Components

A *market participant* initiates the *facility* registration process by submitting online comprehensive information about the *facility* and its equipment to the *IESO* as illustrated in Figure 2-3 below.



**Figure 2-3: Initial Application Requirements**

Some of the supporting documents are required of all *facilities* to be registered, others are only required under certain circumstances as described below. The following items submitted online to the *IESO* form part of a *market participant's* existing documentation:

- “Connection Agreement”,
- Single-line diagrams (see Appendix C),
- *Facility Description Document* (only required if a *facility* has a *Special Protection System*), and
- Based on the SLD submitted and any requirements provided to the *applicant* in their *connection assessment*, the balance of the required data for registration are submitted online by the participant to the *IESO*

All data information and supporting documentation will be submitted online by the participant’s ERS contact role.

When a participant submits data information and supporting documentation to the *IESO*, the *IESO* will review and assess. If after this submission the *IESO* determines that any of this information is incomplete or missing, the *IESO* will reject and require the participant to resubmit the request.

## Connection Agreement

All *market participants* that have *facilities* that participate in the *physical markets* must provide a copy of their signed transmission or distribution connection agreement (depending if the connection is to *IESO-controlled grid* or to *distribution system*) to the IESO where the *facility* ownership is clearly identified.

## Single-Line Diagrams

Single-line diagrams annotated with monitored points and quantities are required for all *facilities* being registered. These diagrams help the IESO determine monitoring requirements. SLDs are expected to be submitted online and shall:

- 1) Be accepted by their *transmitter* or their *distributor*,
- 2) Contain the appropriate approved operating nomenclature, not engineering nomenclature,
- 3) Show the electrical equipment at the *facility* and the *connection points* to the grid,
- 4) Show “as built” data that is approved for construction, and
- 5) Clearly reference the participant’s name, and the *facility* name.

## Technical Information

The IESO undertakes technical assessments of a *facility* to ensure its compliance with all applicable technical requirements as prescribed by the *market rules* and all applicable standards and policies established by the IESO. The technical requirements and associated performance standards for each type of *facility* are stipulated in the *market rules* (see Appendix B) and the “Participant Technical Reference Manual” ([www.ieso.ca](http://www.ieso.ca)). The technical assessments undertaken by the IESO are based on the technical data for the *facility* submitted by the *market participant* online as part of their registration. Based on the equipment listed on the SLD the *market participant* shall provide the required information to the IESO online. The *market participant* may also be required to submit supporting documentation.

## Thermal Limit Data

*Market participants* that own and operate transmission equipment must provide the IESO with the continuous and limited thermal ratings for their transmission circuits and transformers. Where other equipment is more limiting, *market participants* must provide the IESO with the thermal rating of the most restrictive element. Limited time thermal ratings shall be 15-minute ratings, unless mutually agreed by the IESO and *market participant*.

## Ontario Power System Restoration Plan (OPSRP) Requirements

The OPSRP contains the criteria by which a *market participant* is designated as a *restoration participant* thus indicating who the OPSRP applies to. The criteria are a method the IESO uses to assess which *market participants* affect the *grid* restoration process by virtue of the *facilities* they own.

If a *Restoration Plan Market Participant Attachment* covers more than one *facility* with a common Controlling Authority, such as an Operating Centre, the IESO only requires one attachment to be submitted. This *Restoration Plan Market Participant Attachment* must reference all the *facilities* covered by the Attachment.

## Facility Description Documents

*Facility* description documents are required for *facilities* within the *IESO control area* with Special Protection Schemes (*SPS*), such as Generation or Load Rejection Schemes, Capacitor Switching Schemes, or Breaker Backup Protection. These are unusual schemes rather than typical transformer or *generator* installations. *Facility* description documents are mostly narrative but normally include a block diagram showing how the *facility* is configured and functions.

If the *facility requires a SPS* the *market participant* shall submit the documents to the *IESO*.

Where a *market participant's facility* has been modeled as multiple resource and *facility* records in the *IESO* registration system, complete data will be input for one *facility*. For the subsequent *facilities*, a reference document will simply include a reference to the first *facility*.

### 2.5.2 Ability Tests

*IESO* inter-operation with the *market participant* and its *facility* with respect to the real-time operation in the *physical market* is accomplished through the Operational Network. (See the "Participant Technical Reference Manual".)

Examples of the type of information relayed through the Operational Network include:

- Operational monitoring,
- Automated *dispatch instructions*, and
- *Automatic generation control* signals.

Ability tests are conducted to prove that the *market participant* and the *facility* can inter-operate with the *IESO* over the Operational Network and will:

- Verify real-time data,
- Ensure the connectivity of the *dispatch workstation*,
- Confirm that appropriate voice communications are in place,
- Verify that the *market participant* can actually carry out specific market operations,
- Confirm capability of transmitting and the accuracy of the monitored quantities to the *IESO* interface, and
- If applicable, verify that the *facility* responds to the *IESO* control signals.

If the original configuration alters as a result of updates to *registered facilities*, or the registration of new *facilities*, the *IESO* will determine whether ability testing must be repeated.

Ability testing will be scheduled as mutually agreed between the *IESO* and the *market participant*. In order to complete the *facility* registration process, all operational monitoring points must be verified and accepted by the *IESO*.

## 2.6 Metering Requirements

As part of the *facility* registration process, the *IESO* requires the *market participant* to confirm the identity of the *metered market participant* to be assigned to each resource that has been created for the *facility* being registered.

The *metered market participant* is responsible for the financial *settlement* with the *IESO* of all quantities of *physical services* (including *energy* and *Operating Reserve*) allocated to that resource as part of the *IESO's settlement process*<sup>3</sup>. These allocated quantities are based on the totalization of *meter* readings from *revenue wholesale meter(s) (RWM)*<sup>4</sup> to the resource, as described in the “Market Manual 3.7: Totalization Table Registration”.

Once the *market participant* has applied to register a *facility* with the *IESO* and a resource record(s) has been created in the *IESO* registration system, the *IESO* will request that the *market participant* identify the *metered market participant* for each resource record. This *metered market participant* is responsible for appointing the *metering service provider* for the resource, which in turn approves the totalization table on behalf of the *metered market participant*, for the purposes of the *settlement* of *physical services* allocated to the resource. In addition, the *metered market participant* identifies the *Transmitter* or *Distributor* for the resource. The *market participant* should ensure that the *metered market participant* submits information on the *metering service provider* and *Distributor* or *Transmitter* for the resource once it has provided the information on the *metered market participant* to the *IESO*. This process is described in the “Market Manual 3.8: Creating and Maintaining Delivery Point Relationships”.

The *Facility* Registration process cannot be completed until the *metered market participant* - resource relationship is approved by the *IESO*. The approval of the *metered market participant* - resource relationship occurs after the *metering service provider* has approved the totalization table relating to the resource, on behalf of the *metered market participant*, in accordance with the process described in the “Market Manual 3.7: Totalization Table Registration”.

## 2.7 Boundary Entities

As part of the Participant Authorization process, *market participants* will provide the *IESO* with information related to their intention to import/export *energy* to/from the *IESO-controlled grid* (see “Market Manual 1.1, Participant Authorization, Maintenance & Exit” procedure for more information on this process). The *IESO* has created resource records in the *IESO* registration system for the *boundary entities* that are used to submit *bids* and *offers* for exports from, and imports to, the *IESO-administered markets*. These records will be available to all *market participants* who have registered a capability to import and/or export as part of the Participant Authorization process.

Those *market participants* who indicate an intention to undertake import/export trade<sup>5</sup> will have the appropriate *boundary entity facility* records attached to their *market participant* record in the

<sup>3</sup> The *metered market participant* can allocate some or all of these quantities to other *market participants* as part of the *physical allocation data* process – see “Market Manual 5.2: Meter Data Processing” for more details on this process.

<sup>4</sup> An *RWM* is a *meter* that meets all applicable requirements of Chapter 6 of the *market rules* and all standards and policies established by the *IESO* and is registered with the *IESO* using the *metering installation* registration process set out in the “Metering Market Manual”.

<sup>5</sup> Imports and/or export trades are from, or to, the Ontario real-time market. For example, a *market participant* seeking to export *energy* from a *facility* within Ontario will have to submit both an *offer* for that *energy* into the Ontario real-time market and an *offer* to export that *energy* into another *control area*. The first *offer* would be associated with the resource that is registered with the *IESO*. The second *offer* would be associated with a *boundary entity* resource. See “Market Manual 4.2: Submission of Dispatch Data” for further information on this process.

*IESO* registration system. When a *market participant* meets the authorization requirements for importers/exporters, this indicates they are registering a *boundary entity*. At this time the *IESO* will forward to the *market participant* a contact list of *IESO* operational contact phone numbers, and will request a 24/7 contact phone number from the *market participant*, to be used in case of difficulties with import/export trades.

## 2.8 Disputes

Either the *IESO* or a *market participant* may initiate the Dispute Resolution process in accordance with Chapter 3, Section 2 of the *market rules* if either believes the circumstances warrant such action. For example, *market participants* may dispute an *IESO* Denial of Registration for a *facility*. For more information on the Dispute Resolution process, see “Market Manual 2.1: Dispute Resolution”.

## 2.9 Exemptions

The procedure for applying for an *exemption* against any obligation set out in the *market rules* relating to the *Facility* Registration, Maintenance and De-registration procedure is outside the scope of this document. The *exemption application* procedure is set out in “Exemption Application and Assessment”.

## 2.10 Outage Management Reporting

Each *market participant* is required to inform the *IESO* of its long-term plans for *outages* in accordance with the *market rules*. As part of the *Facility* Registration process, the *IESO* assesses whether *facility* equipment is non-impactive on the *reliability* of the *IESO-controlled grid* and therefore may not need to be included in the *outage* reporting requirement. For more information on the *outage* management process, including the mandatory *outage* reporting requirements, see the “Market Manual 7.3: Outage Management”

In addition, the *market participant* is required to report an *outage* prior to:

- Energization of any new *facility*, or
- Energization of any new *facility* equipment impactive on the *reliability* of the *IESO-controlled grid*, or
- Returning into service replacements of any existing *facility* equipment impactive on the *reliability* of the *IESO-controlled grid*.

It is the obligation of the *market participant* to ensure that all applicable *facility* registration requirements are complete, prior to the commencement of any such *outage*.

## 2.11 Facility Registration Status

A *facility* cannot be used to participate in the *physical markets* or cause or permit electricity or any *physical service* to be conveyed into, through or out of the *integrated power system* unless the *facility* is registered by the *IESO*.



A participant's *facility* is considered registered when the participant receives a Registration Approval Notification (RAN) document from the IESO. The RAN will clearly specify what *facility* is registered with the IESO and the stage of the *facility* registration.

For example, the RAN would:

1. Allow *market participant's facility* to connect and energize on potential only.
2. Allow *market participant's facility* to connect and energize as a load.
3. Allow *market participant's facility* to connect for commissioning purposes.
4. Indicate that a *market participant's facility* has completed the *Facility* Registration process.

The RAN may have conditions that are mandatory and must be met by an expiry date. If a condition cannot be met due to circumstances beyond the *market participant's* control, the *market participant* may request an extension with the IESO by initiating a request e-mail to [market.registration@ieso.ca](mailto:market.registration@ieso.ca), providing the reason and a plan for meeting conditions. If an extension is not granted by the IESO or the *market participant* does not apply for an extension, in the first place, the *facility's* RAN will no longer be valid and if applicable, the previous RAN issued will be in effect.

No *market participant* shall place into service a *facility* until the IESO has issued a RAN.

A RAN will also be required for any existing *facility* before placing into service new/modified equipment, or new/modified *facility* information.

Those *facilities* not meeting all IESO's requirements but having been granted *exemptions* or functional deferments will also be classified as registered, subject to any applicable conditions or obligations identified by the IESO in its RAN.

– End of Section –

## 3. Facility Maintenance

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### 3.1 Overview

The purpose of the *facility* or *boundary entity* maintenance process is to ensure that the IESO retains current and accurate information on *facilities* or *boundary entities* registered for the IESO-administered markets. After approval of a *facility* or *boundary entity* for participation in the IESO-administered markets, *facility* or *boundary entity* maintenance is used by the IESO to ensure that all *facilities* or *boundary entities* continue to meet the minimum requirements defined by the *market rules*. In addition, the *facility* or *boundary entity* maintenance process ensures that any changes or additions to *facilities* or *boundary entities* participating in the IESO-administered markets or the *facility* or *boundary entity*-related information stored in the IESO registration system do not negatively affect the *security* or *reliability* of the IESO-controlled grid. *Facility* or *boundary entity* maintenance is required in the following circumstances:

- Physical plant modifications, including changes in MW output, ramp rates, governor models, data monitoring and voice communication equipment etc.,
- Market participation changes, including *physical markets*, class of participation, aggregation, self-scheduling, *dispatchable*, combined cycle *facility* modeling (pseudo unit model), etc., and
- Changes in operational control, as defined by the *registered market participant* (RMP).

*Market participants* are required to keep the IESO updated about any changes, additions or deletions to information concerning their physical *facilities* or *boundary entities*. This information may concern data stored in the IESO registration system or supporting documentation relating to the *facility*. *Market participants* will manage their *facility*, resources, equipment and their relationships using [Online IESO](#). Any changes that are not available in Online IESO will require the participant to contact Market Registration by email at [market.registration@ieso.ca](mailto:market.registration@ieso.ca). The IESO will update the relevant data in the *market participant's* IESO registration system record, which may then be confirmed by the *market participant* by accessing their IESO registration system record.

Depending on the change request submitted by the *market participant*, the *market participant* may require an approval document (RAN) issued to them allowing the change to proceed.

As a guideline to participants with existing facilities, a RAN will be issued to the participant for changes such as but not limited to:

- Resource attribute changes:
  - *Operating reserve* type,
  - Decrease/increase in maximum capacities,
  - Bid /*offer* type (i.e., from non-*dispatchable* to *dispatchable*),
  - Minimum Run-Time (MRT), Minimum Generation Block Run-Time (MGBRT), Minimum Load Point (MLP), and
  - Participation in an IESO program (e.g., RT-GCG, DR).
- Physical equipment changes (this includes operating nomenclature changes as well):

- Breaker, transformer, and switch replacements,
- SVC, DVAR, capacitor and reactor,
- Special Protection System (SPS), Remedial Action Scheme (RAS),
- Modifications to Automatic Voltage Regulator (AVR), Power System Stabilizer
- Relationships changes for equipment at a *facility* or resource (i.e. organization ownership, RMP or operating changes)

A RAN will generally not be issued for changes to *facility* contact information, user-resource relationship, protection changes to an existing *facility*, and revenue metering changes.

It is recommended that the participant contact [market.registration@ieso.ca](mailto:market.registration@ieso.ca) to inquire if a RAN is required early in the process.

## 3.2 Revised Registered Data

*Market participants* are required to inform the *IESO* of any required changes to the following *facility* data stored in the *IESO* registration system:

- Changes in information displayed on the resource, equipment or *Facility* screens,
- Addition/termination of a *market participant* /resource relationship, and
- Changes in the RMP-resource and *metered market participant*-resource relationship maintained in the *IESO* registration system.

Changes to the resource relationships will require notification to market registration.

Many of the possible changes to the information in a *market participant's IESO* registration system record will also require the re-submission of supporting documentation<sup>6</sup>.

## 3.3 Technical Changes

### 3.3.1 Physical Facility Capability

*Market participants* may apply to the *IESO* to alter the capability of the physical *facility* as previously registered and set out in Appendix B. These changes may be major, as when changing MW quantities injected into or withdrawn from the *IESO-controlled grid*, or minor as when changing a governor model. *Market participants* should manage their change requests in [Online IESO](#). The *IESO* will assess the requested changes and supporting documentation and, if the *IESO* deems the change not to represent a threat to the *reliability* of the *IESO-controlled grid*, the *IESO* will approve these changes. Depending on the change request submitted by the *market participant*, the *market participant* may require an approval document (RAN) issued to them allowing the change to proceed.

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<sup>6</sup> See Section 3.5, below.

### 3.3.2 Data Monitoring and Voice Communications

Any change to a *market participant's* data monitoring or to voice communications *facilities* requires re-submission via [Online IESO](#) and, if necessary, revised Single Line Diagrams. Changes to this information may require the *market participant* to redo certain Ability Tests. After assessment of the requested changes, the *IESO* will advise the *market participant* in writing whether the requested changes have been accepted or denied.

### 3.3.3 Outage Management

As part of the *Facility* Registration process, the *IESO* assesses whether *facility* equipment is non-impactive on the *reliability* of the *IESO-controlled grid* and may not need to be included in the *outage* reporting requirement. All exclusions are subject to periodic review by the *IESO* and may be revoked at any time as a result of such a review and/or technical changes to *registered facilities*. For more information on the *outage* management process, including the mandatory *outage* reporting requirements, see “Market Manual 7.3: Outage Management”.

## 3.4 Market Changes

### 3.4.1 Participant Class Change

*Market participants* may apply to the *IESO* to change their class of participation in the *IESO-administered markets*. Although this procedure is part of the Participant Maintenance process, the *IESO* will still be required to verify any possible impact on the *market participant's facility* information as well. The *IESO* will check whether the requested change in participation involves a *market participant's facilities* and, if it does, assess the impact of the change on the *security* and *reliability* of the *IESO-controlled grid*. The *IESO* will provide an approval document (RAN) to the *market participant* of the acceptance of the requested change.

### 3.4.2 Market Changes

*Market participants* may apply online to the *IESO* to change how a *facility* is used in the *IESO-administered markets*. These changes may relate to the following:

- Resource type (*generator*, load, etc.),
- Bid type (*dispatchable* (regular), *non-dispatchable*, self-scheduled, intermittent),
- Operating reserve (10 min/30 min), and
- Facility class (*generator*, load, etc.).

This information is displayed on the Resource and *Facility* screens in a *market participant's IESO* registration system record. The *market participant* should submit a request online requesting the change. The *IESO* will then assess the request with respect to the appropriate supporting documentation. The *IESO* will inform the *market participant* whether or not the requested change has been accepted or denied. Depending on the change request submitted by the *market participant*, the *market participant* may require an approval document (RAN) issued to them allowing the change to proceed.

### Operating Reserve Markets

Requests to change a *facility's* registration information to allow it to be used for participation in the *operating reserve market* will be subject to the following assessments:

- Whether the *facility* is eligible to provide *10 minute spinning reserve*. *Boundary entities* are not eligible to *offer 10 minute spinning*, and
- Whether the *facility's Ancillary Services* form indicates that there may be difficulty in providing *10 minute vs. 30 minute reserve*, and
- Whether the *dispatchable load facility* is eligible to provide *10 minute or 30 minute reserve*.

*Dispatchable load* participants must have a predictable, periodic consumption cycle, and meet the eligibility criteria for participation in the *10 minute* and *30 minute reserve* market tabled below:

Criteria		Rationale
1	Must demonstrate a load cycle of more than 0.75 (total minutes consuming divided by total minutes of the cycle period),	This allows the IESO to make assumptions about the availability and consumption level of the load resource. A lower duty ratio means that the IESO has to carry more <i>10 minute or 30 minute reserve</i> or AGC to compensate for a higher uncertainty of the ability of the load to comply with the <i>10 minute or 30 minute reserve</i> activation request. This also limits the exposure that load will be scheduled for <i>10 minute or 30 minute reserve</i> but not able to activate because they would be down ten or thirty minutes after receipt of the activation message. For instance, for <i>10 minute non-spinning reserve</i> , if a load were down 6 minutes then up 4 minutes, they would meet criterion #2, but have a duty cycle of 40%. However, if they were activated in minute 3, ten minutes hence, say minute 13 they would have been down anyway. Criterion #2 (combined with criterion #4) limits this exposure.
2	Must not be at zero consumption for more than 10 minutes at a time (exceptions are allowed for unplanned events).	Required to ensure that the load resource will be able to respond to a <i>10 minute reserve</i> activation and reduce load within 10 minutes - i.e. they would have been loaded at the time the relief is required.
3	Must not be at zero consumption for more than 30 minutes at a time. (exceptions are allowed for unplanned events)	Required to ensure that the load resource will be able to respond to a <i>30 minute reserve</i> activation and reduce load within 30 minutes - i.e. they would have been loaded at the time the relief is required.
4	Must be able to maintain a zero consumption level for at least one hour, when activated for <i>10 minute or 30 minute reserve</i>	NPCC Directory #5

Criteria		Rationale
5	Must be able to respond to the <i>IESO's</i> activation request for <i>10 minute reserve</i> and reduce load within 10 minutes.	<ul style="list-style-type: none"> <li>• <i>IESO market rules</i>, Definitions of 10 and 30 minute reserve</li> <li>• <i>NERC Glossary of Terms</i></li> </ul>
6	Must be able to respond to the <i>IESO's</i> activation request for <i>30 minute reserve</i> and reduce load within 30 minutes.	<ul style="list-style-type: none"> <li>• <i>IESO market rules</i>, Definitions of 10 and 30 minute reserve</li> <li>• <i>NERC Glossary of Terms</i></li> </ul>

*Dispatchable* loads providing *10 minute spinning reserve* through a *generator* greater than 20 MVA are required to provide unit synchronizing breaker status on that *generator*.

### Aggregation

Subsequent to their initial registration, *market participants* may apply to aggregate *generating units/ load equipment* for bid /offering purposes. Requests for aggregation shall be granted provided the registration information demonstrates all of the following in respect of the equipment proposed to be aggregated:

- That all *facilities* noted are within the *IESO control area*,
- That the individual status of any of the noted *facilities* will not affect *Operating Security Limits*, and
- That the individual status of any of the noted *facilities* is not required for *security* or resource *adequacy* assessments.

### Resource Compliance Aggregation

*Market participants* may identify resources which do not qualify for aggregation under model aggregation but do qualify for aggregation for the purpose of following dispatch.

*Market participants* shall submit a request online for compliance aggregation, noting the relationships between these resources (e.g. river system),

The request for aggregation will be considered based on:

- Whether the resources to be aggregated are *quick-start* resources or *non-quick-start* resources. Where a *market participant* wishes to register *non-quick-start* resources, such resources will be subject to ramp rate restrictions when exercising compliance aggregation in real-time. These restrictions are outlined in Market Manual 4.3 Section 1.12,
- Whether the resources are related resources (e.g. river systems), and
- The likelihood that the resource will be sent to Unit Specific Dispatch (USD) for *security* reasons.

If the request for aggregation is approved, the *market participant* will be notified. The in-service activities of the aggregated resources will be coordinated by Market Registration in the same way as for any new or modified *facility*, as described in Section 2. 11.

### Pseudo Unit

The *pseudo-unit* (PSU) model is used to change how a combined cycle *facility* is used in the *IESO - administered markets*. The PSU model is used solely by the day-ahead commitment process (DACP).

The PSU cannot be used in conjunction with aggregation of the steam turbine (ST) *generation unit* and a combustion turbine (CT) *generation unit* at the same combined cycle *facility*.

Subsequent to their initial registration, a *market participant* who owns a combined cycle *facility* may apply to model their *facility* using the PSU model for day-ahead bidding purposes. *Market participants* who wish to register their combined cycle plant *facility* for PSU modeling must submit a request using [Online IESO](#). Requests for PSU model shall be granted provided the registration information demonstrates all of the following in respect of the combined cycle *facility* proposed to be modeled:

- All CT and ST are part of the same registered *generation facility* and are under the operational control of a single *market participant*,
- All CTs and ST have already been registered individually,
- The ST is not part of an aggregate with a CT,
- All CTs and ST have a resource *bid type* of 'dispatchable', and
- All CTs and ST are assessed a *settlement* under a single *metered market participant*.

The in-service activities of the *pseudo units* are coordinated by Market Registration in the same way as for any new or modified *facility*, as described in Section 2. 11.

*Market participants* who wish to de-register their *pseudo units* for their combined cycle *facility* must submit a request online. De-registration must include all of the *pseudo units* associated with the combined cycle *facility* (i.e., all of the PSUs associated with the CTs that share the same ST).

### Self-scheduling Generators

Requests for changes to *self-scheduling generation facilities* will be assessed with respect to the following:

- Ensuring that the *generator* is between 1 and 10 MW name-plate rating and is within the *IESO control area*, and
- Whether the changes to the noted *generator* will affect *IESO-controlled grid security*.

### Intermittent Generators

Requests for changes to intermittent generation will be assessed ensuring that the change to the *facility* will not affect *security* of the *IESO-controlled grid*. The participant shall submit sufficient documentation for the intermittent status and this documentation must be accepted by the IESO. The documentation must demonstrate that the generation generates on an intermittent basis as a result of factors beyond the control of the generator.

## Cogeneration Facilities

A *cogeneration facility* that is currently registered as a *transitional scheduling generator* (TSG) is required to be re-registered as a *dispatchable, self-scheduling or intermittent generation facility* within one month of the coming into effect of the amendment to the applicable Power Purchase Agreement (PPA) with the *Ontario Electricity Financial Corporation* (OEFEC).

## Real-Time Generation Cost Guarantee (RT-GCG)

Any *generator* already registered to participate in the *IESO-administered market* can also opt to register their resource in the real-time generation cost guarantee (RT-GCG) program by submitting a request online and providing technical data and supporting documentation to validate such data. To be applicable, the *market participant* must also meet the requirements specified in the *market rules*, Chapter 7, Section 2.2B.1.

Initial registration in the program or changes will be processed during regular *business days* and within 10 *business days* of receipt. Updates such as registration, de-registration or changes to *minimum run-time*, minimum generation block run time or minimum load point will always become effective at midnight.

*Market participants* may choose to de-register their *facilities* from the RT-GCG program by submitting a request online to the *IESO*.

## Day-Ahead Production Cost Guarantee (DA-PCG)

The DA-PCG eligibility for a *dispatchable generation facility* is determined by the *IESO* based on the following registered technical data submitted by the *market participant*:

- Not a *quick-start facility*, and
- *Minimum loading point* (MLP) greater than zero, and
- *Minimum generation block run time* (MGBRT) is greater than one hour, and
- *Elapsed time to dispatch* (ETD) is greater than sixty minutes, and
- *Generation unit fuel type* is not uranium

If all of the above requirements are met the *IESO* will register the *generation facility* in the DA-PCG program.

Concurrently to their registration in the DA-PCG program, a *market participant* who owns a combined cycle *facility* which does not have an aggregation of the steam turbine (ST) *generation unit* and a combustion turbine (CT) *generation unit* must submit online resource information that the *IESO* will use to apply the DA-PCG commitments to the ST based on the combined cycle *facility* configuration (e.g., 1CT-ST, 2CT-ST, etc.).

Initial registration in the program or changes will be processed during regular *business days* and within 10 *business days* of receipt. Updates such as registration, de-registration or changes to the technical data will always become effective at midnight.

## Batch Type Dispatchable Loads

*Market participants* having *dispatchable loads* may participate in the *IESO* energy and *operating reserve markets* and are responsible for: submitting *bids for energy* and *offers for operating reserve for registered facilities* in the real-time energy and *operating reserve markets* in the required



timeframe (Chapter 7, Section 7.5.1 of the *market rules*), and making changes to data as required within the required timeframe (Chapter 7, Section 7.5.2 of the *market rules*).

The *IESO* has determined that batch type loads may be considered for participation in the *energy market* as *dispatchable loads* if they meet the following basic criteria:

1. The batch type load shall have an hourly consumption schedule that is predictable at least 2 hours in advance of the *dispatch* hour in order to allow the *market participant* to formulate and submit its offers within the timelines specified by the *market rules* for *dispatchable facilities*,
2. The batch type load shall exhibit a duty ratio of at least 0.75. This means that within an hour the load should not be at zero consumption for more than a cumulative of 15 minutes.

### **Additional Generation Facility Characteristics**

In order for *IESO dispatch instructions* to respect certain *generation facility* limitations and areas of its output that may cause excessive wear and tear or equipment damage, a *generation facility* registered to participate in the *IESO-administered market* can submit *facility* specific data stating number of *forbidden regions*, up to three sets of *forbidden region* values, and a *period of steady operation* (0, 1 or 2 intervals). The data can be submitted through the manage resource tab in [Online IESO](#).

The *period of steady operation* is specifically for slow moving units such as fossil or nuclear *generation units* and may also include combined cycle and *cogeneration facilities*. This value which is stated in number of five-minute intervals, with a maximum value of 2, is used to ensure that units do not reverse direction without a minimum *period of steady operation*. Depending upon the information submitted by *market participants*, it may be necessary for the *IESO* to adjust the *period of steady operation* for some units if there is a negative impact on overall system operation. *Market participants* will be made aware of any changes that are made to this value.

*Forbidden regions* are specifically for hydraulic *generation units*. These regions up to a maximum of 3 are accompanied by an upper and lower limit measured in MW and are intended to ensure equipment safety. This feature is not intended to ensure economic operation. These values will allow the *IESO* to not schedule *facilities* within these predefined operating ranges. If submitted, *forbidden regions* should meet the following criteria:

*Forbidden region 1* Lower Limit shall be greater than or equal to 0,

*Forbidden region 1* Upper Limit shall be greater than *forbidden region 1* Lower Limit,

*Forbidden region 2* Lower Limit shall be greater than *forbidden region 1* Upper Limit,

*Forbidden region 2* Upper Limit shall be greater than *forbidden region 2* Lower Limit,

*Forbidden region 3* Lower Limit shall be greater than *forbidden region 2* Upper Limit,

*Forbidden region 3* Upper Limit shall be greater than *forbidden region 3* Lower Limit.

The *IESO* will review the data and may request additional technical data to support the values submitted. The *IESO* may deny registration of the submitted values if the *IESO* believes that the technical data does not support the request.

If no values are submitted or accepted then the *IESO* shall assign default values. The default values for number of *forbidden regions* and *period of steady operation* shall be zero.

This data will be entered into the *IESO* registration system.

### 3.4.3 Changes of Operational Control

On initial registration, the owner will be registered as the operator of the equipment and resources at the *facility* being registered, the owner of the equipment and resources at a *facility* may assign an operator through [Online IESO](#). The operator must be authorized as an operator with the *IESO* and must approve this relationship assigned to them.

## 3.5 Changes in Documents

*Market participants* are required to re-submit online the following documentation any time the content of the original document has changed:

- *OEB license*,
- “Connection Agreement”,
- “Restoration Plan Participant Attachment”,
- SLDs,
- Thermal Limit Data (*transmitters* ),
- *Facility Description Documents*, and
- “Technical information”.

The *IESO* will confirm the receipt of the document with the *market participant*. The *market participant* can subsequently confirm that the new document has been added to its documentation stored in the *IESO* registration system. Old documents are not deleted from the *IESO* registration system, each document is retained and identified by date of receipt.

## 3.6 Transfer of Facility Registration

A *market participant* who wishes to transfer the registration of a *facility* to another *market participant* as a result of their intent to sell, lease, assign, or transfer control of that *facility* must submit a request to the *IESO* for the transfer of the *facility* at least 10 *business days* in advance of the proposed date of transfer. The request must specify:

- The identity of the transferee and whether or not they are or intend to be a *market participant*, and
- The date on which the proposed transfer is to take place.

The *Market participant* to whom the *facility* is to be transferred must provide to the *IESO*:

- Confirmation that it is willing and able to assume control of the *facility* to be transferred and to comply with all provisions of the *market rules* related to *facilities* and any *reliability must-run contract* or *contracted ancillary services contract* applicable to the *facility*,
- A new “Connection Agreement”,
- A new or revised *Restoration Participant Attachment* (if applicable),

- Any changes related to the operational control of the *facility* (e.g. new *Registered Market Participant* information),
- Information concerning any planned changes to the *facility's* physical characteristics or its associated data monitoring or voice communications equipment, and
- Information concerning changes to contacts for the *facility*.

If the *facility* and resources refer to the prior *market participant's* name, the new *market participant* will be required to register a new *facility* and resource names in the *IESO* registration system to ensure they do not negatively affect the *security* or *reliability* of the *IESO-controlled grid*. The new *facility* owner is expected to also complete this registration change with their applicable *transmitter* or *distributor*.

If the proposed transferee is not a *market participant* at the time the request for transfer is made, the *IESO* will not approve the transfer until such time as the transferee has completed the participant authorization process. All obligations will remain with the current registered *market participant*.

– End of Section –

## 4. Facility De-registration

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### 4.1 De-registration Requested by Market Participant

*Market participants* who wish to de-register a *facility* or *facilities* that are being decommissioned are required to file with the *IESO*, a notice of request to de-register in such a form as may be specified by the *IESO*. *Generators* and *Transmitters* must provide the *IESO* with at least six month notice of plans to retire *facilities*. The notice should be addressed to the Section Head of Market Registration and sent by email to [market.registration@ieso.ca](mailto:market.registration@ieso.ca).

Within 10 *business days* of receiving a *market participant's* request for de-registration of a *facility*, the *IESO* will inform the *market participant* and the *transmitter* to whose *transmission system* the *registered facility* is connected as to whether or not an *IESO* technical assessment of the impact of the de-registration of the *facility* on the *reliability* of the *IESO-controlled grid* is required. If the *IESO* determines that a technical assessment is required, the *IESO* will inform the *market participant* and the *transmitter* of the anticipated date of completion of the assessment in its notice. This date will be no more than 45 days from the date of issuance of the *IESO's* notice, unless mutually agreed upon by the *IESO* and the *market participant*.

If the *IESO's* technical assessment of the de-registration request indicates that the de-registration of the *facility* represents a real or possible threat to the *reliability* of the *IESO-controlled grid*, the *IESO* will not grant approval for the de-registration of the *facility*. In a case where a request for de-registration of a *facility* is denied, the *IESO* and the relevant *market participant* are required by the *market rules* to enter into good faith negotiations to conclude a *reliability must-run contract* for the applicable *facility*.

If the *IESO's* technical assessment of the de-registration request indicates that the de-registration of the *facility* does not represent a threat to the *reliability* of the *IESO-controlled grid*, and the *facility* is not directly connected to the *IESO-controlled grid*, upon notice by the *IESO*, the *market participant* shall file with the *IESO* a notice setting forth the date upon which the *market participant* wishes the *IESO* to de-register the *facility*. Such date shall not be less than five *business days* from the date of receipt by the *market participant* of the notice issued by the *IESO* indicating that the de-registration request is granted.

If the *facility* to be de-registered is directly connected to the *IESO-controlled grid*, upon notice by the *IESO*, the *market participant* shall file with the *IESO*, a notice setting forth the date upon which the *market participant* wishes the *IESO* to de-register the *facility*. Such date shall not be less than five *business days* from the date of receipt by the *market participant* of the notice issued by the *IESO* and, as applicable, shall be subject to the date on which the registered facility has been disconnected as confirmed by the relevant transmitter to the *IESO* indicating that the de-registration request is granted. The *IESO* will first issue a disconnection letter to the relevant *transmitter*, directing the relevant *transmitter* to *disconnect* the *registered facility* from the *IESO-controlled grid* on the date specified in the notice filed by the *market participant*. The *IESO* will subsequently de-register the *facility* on the date on which the *IESO* receives confirmation from the relevant *transmitter* that the *facility* has been disconnected.

If the *IESO* determines that a technical assessment of a deregistration is not required, the *IESO* will contact the *market participant* and inform them of this decision. The *market participant* will then

inform the *IESO* of the date on which they wish to have the de-registration take effect. This date may not be less than five days after the date on which the *market participant* received the *IESO's* notification that the de-registration would not require a technical assessment and, as applicable, shall be subject to the date on which the registered facility has been disconnected as confirmed by the relevant transmitter to the *IESO*. If the *facility* is directly connected to the *IESO-controlled grid*, the *IESO* will issue a disconnection letter to the relevant *transmitter*, and *disconnect* the *facility* on the date it receives confirmation of the disconnection from the *transmitter*.

The *market participant* is expected to submit a request online to remove the physical equipment from the *facility*.

## 4.2 De-registration Resulting from Non-Compliance Process

The *IESO* may seek to de-register a *facility* as a result of the suspension of a *market participant* for non-compliance with the *market rules* or as a result of persistent breaches of the *market rules* by the *market participant*. This de-registration activity may be restricted to a specific *facility* or may be part of the process to terminate the *market participant's* participation in the *IESO-administered markets*. Refer to “Market Manual 2.6: Treatment of Compliance Issues” for more information of this process.

## 4.3 Procedural Work Flow

Table 4–1: Legend for Work Flow Diagrams

Legend	Description
Oval	An event that triggers task or that completes task. Trigger events and completion events are numbered sequentially within procedure (01 to 99)
Task Box	Shows reference number, the party responsible for performing task (if “other party”), and task name or brief summary of task. Reference number (e.g., 1A.02) indicates procedure number within current “Market Manual” (1), sub-procedure identifier (if applicable) (A), and task number (02)
Solid horizontal line	Shows information flow between the <i>IESO</i> and external parties
Solid vertical line	Shows linkage between tasks
Broken line	Links trigger events and completion events to preceding or succeeding task

The following diagram represents the flow of work related to *facility* de-registration between the *market participant*, the *IESO*, and other parties.

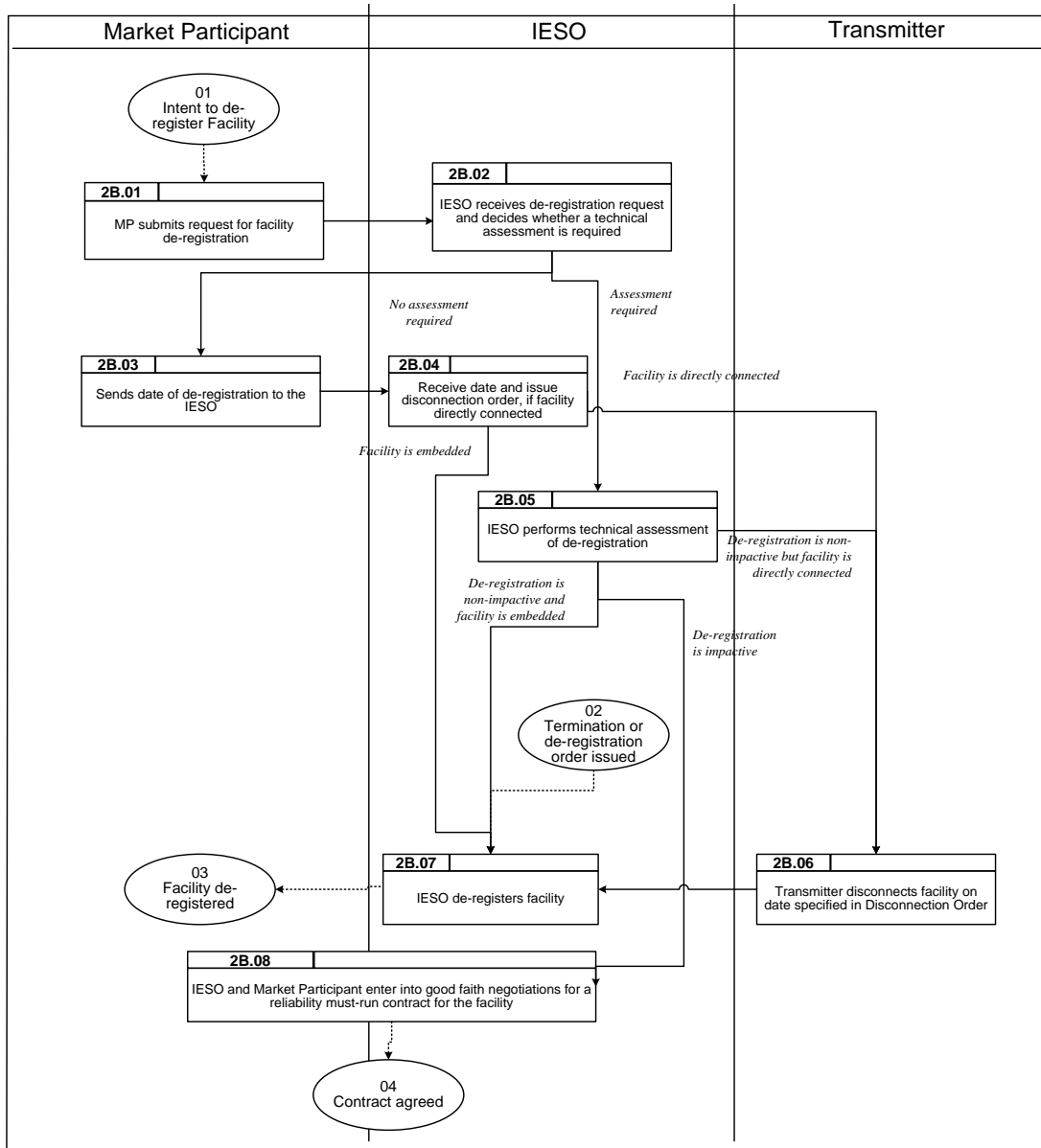


Figure 4-1: Workflow for Facilities De-registration

## 4.4 Procedural Steps

This subsection contains a table of the detailed tasks (steps) that comprise the *facility* de-registration procedure. The table contains seven columns, as follows:

### **Ref.**

The numerical reference to the task.

### **Task Name**

The task name as identified in Table 4-2.

### **Task Detail**

Detail about the task.

### **When**

A list of all the events that can trigger commencement of the task.

### **Resulting Information**

A list of the information flows that may or must result from the task.

### **Method**

The format and method for each information flow are specified.

### **Completion Events**

A list of all the circumstances in which the task should be deemed finished.

Table 4–2: Procedural Steps for *Facility De-registration*

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2B.01	<i>Market participant</i> submits request for <i>facility de-registration</i>	The <i>market participant</i> submits a written request to the <i>IESO</i> for the de-registration of one or more of their <i>facilities</i> .	When the <i>market participant</i> wishes to decommission a <i>facility</i> .	Identification of <i>facility</i> to be de-registered.	E-mail or courier.	Associated task status in the <i>IESO</i> registration system set to "RECEIVED".
2B.02	<i>IESO</i> receives de-registration request and decides whether a technical assessment is required	Upon receipt of the de-registration request, the <i>IESO</i> updates the relevant field in the <i>IESO</i> registration system and determines whether or not a technical assessment of the de-registration request will be required. The <i>IESO</i> informs the <i>market participant</i> if a technical assessment will be performed and the timetable for completing the assessment.	Within 10 <i>business days</i> of the <i>IESO's</i> receipt of the <i>market participant's</i> de-registration request.	<p>Assessment Not Required: <i>IESO</i> informs <i>market participant</i> no assessment is required.</p> <hr/> <p>Assessment Required: <i>IESO</i> informs <i>Market participant</i> assessment required and the date by which the assessment will be complete.</p>	E-mail.	<p>Associated task status in the <i>IESO</i> registration system set to "UNDER REVIEW"</p> <p>Notification of note sent to <i>market participant</i> logged in Outlook.</p>



Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2B.03	Sends date of de-registration to the <i>IESO</i>	The <i>market participant</i> sends to the <i>IESO</i> a note indicating the date on which they wish the de-registration of the <i>facility</i> to become valid. The date may not be less than 5 days from the date on which the <i>market participant</i> received the <i>IESO's</i> notification that the de-registration would not require a technical assessment.	Upon receipt of the <i>IESO's</i> notification that the de-registration does not require a technical assessment.	Date of de-registration of <i>facility</i> .	E-mail	Date of de-registration entered into the <i>IESO</i> registration system by <i>IESO</i> .
2B.04	Receive date and issue "Disconnection Order" (IMO_FORM_1302) , if <i>facility</i> directly connected.	The <i>IESO</i> receives the date on which the <i>market participant</i> wishes the <i>facility</i> to be de-registered. If the <i>facility</i> is connected to the <i>IESO-controlled grid</i> , the <i>IESO</i> will issue a "Disconnection Order" (IMO_FORM_1302) to the relevant <i>transmitter</i> . The <i>IESO</i> will ensure that the physical disconnection of the <i>facility</i> and its <i>IESO</i> de-registration occur on the same date.	On date requested by the <i>market participant</i> .	"Disconnection Order" (IMO_FORM_1302), if <i>facility</i> directly connected.	Mail or Courier.	Associated task in the <i>IESO</i> registration system set to "ACCEPTED".

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2B.05	<i>IESO</i> performs technical assessment of de-registration.	<p>If <i>IESO</i> deems a technical assessment of the de-registration is required, the appropriate <i>IESO</i> groups perform the assessment.</p> <p>If the assessment confirms that de-registration of the <i>facility</i> does not impact the <i>security</i> and <i>reliability</i> of the <i>IESO-controlled grid</i>, the <i>IESO</i> will issue a "Disconnection Order" (IMO_FORM_1302), where the <i>facility</i> is directly connected, or proceed directly to de-register the <i>facility</i>, where it is embedded.</p> <p>If the assessment confirms that de-registration of the <i>facility</i> does impact the <i>security</i> and <i>reliability</i> of the <i>IESO-controlled grid</i>, the <i>IESO</i> will enter into negotiations for a <i>reliability</i> must run contract.</p>	After <i>IESO</i> deems a technical assessment of the de-registration is required. The assessment must be complete within timeline indicated to the <i>market participant</i> .	De-registration not impactful: "Disconnection Order" (IMO_FORM_1302), if <i>facility</i> directly connected.	Mail or Courier.	Impact of de-registration on <i>IESO-controlled grid</i> determined.

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2B.06	<i>Transmitter disconnects facility</i> on date specified in “Disconnection Order” (IMO_FORM_1302)	The <i>Transmitter</i> receives the “Disconnection Order” (IMO_FORM_1302) for the <i>facility</i> , <i>disconnects</i> the <i>facility</i> on the date specified in the Order, and notifies the <i>IESO</i> when disconnection has been completed.	On receipt of a “Disconnection Order” (IMO_FORM_1302), following Step 2B.04 or Step 2B.05.	Notification that disconnection is completed.	Telephone, followed by Mail or Courier.	<i>Facility</i> disconnected from <i>IESO- controlled grid</i> .
2B.07	<i>IESO</i> de-registers <i>facility</i>	The <i>IESO</i> de-registers the <i>facility</i> within its systems on the date agreed with the <i>market participant</i> .  The <i>IESO</i> will also de-register a <i>facility</i> where it has issued a <i>termination order</i> or a de-registration order to a <i>market participant</i> as a result of either a failure to remedy an <i>event of default</i> or persistent breach of the <i>market rules</i> – see “Market Manual 2: Market Administration, Part 2.6: Treatment of Compliance Issues” for further information on this process.	Promptly after: <ul style="list-style-type: none"> <li>• Issuing a <i>termination order</i></li> <li>• Issuing a de-registration order,</li> <li>• Notification from a <i>Transmitter</i> that a <i>facility</i> has been disconnected from the <i>IESO- controlled grid</i>, or</li> <li>• A technical assessment of an embedded <i>facility</i> indicated that the de-registration of the <i>facility</i> would not affect <i>IESO- controlled grid security</i> or <i>reliability</i>.</li> </ul>	None	None	Associated task in <i>IESO</i> registration system set to “ACCEPTED”.

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2B.08	<i>IESO and market participant enter into good faith negotiations for a reliability must-run contract for the facility.</i>	If the technical assessments indicate that the de-registration of the <i>facility</i> would affect the <i>security or reliability</i> of the <i>IESO- controlled grid</i> the <i>IESO and market participant</i> will enter into good faith negotiations for a <i>reliability must-run contract</i> for the <i>facility</i> .	After <i>IESO</i> technical assessment indicates that the de-registration of the <i>facility</i> would affect the <i>security or reliability</i> of the <i>IESO-controlled grid</i> .	<i>Reliability must-run contract.</i>	As appropriate.	Contract completed.

– End of Section

## 5. Variable Generation

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All *variable generators* are required to register with the *IESO* to provide operational and meteorological monitoring data for centralized forecasting. Registration is accomplished by registering online.

All *variable generators* are also required to submit *facility* data and provide operational monitoring to the *IESO*.

### 5.1 Responsibilities

#### 5.1.1 Variable Generators

- Submit registration information online to the *IESO* ,
- Submit responses to *IESO* requests for incomplete information or clarifications,
- Participate in ability testing, as scheduled together with the *IESO* ,
- Keep the *IESO* updated about any changes, additions or deletions to information concerning their physical *facilities* by resubmitting any change online,
- Notify the *IESO* they wish to de-register a *facility* or *facilities* that are being decommissioned,
- Coordinating with the *IESO* for scheduling and performing telemetry (operational and meteorological monitoring) testing, and
- Submit a request to transfer the registration of a *facility* as a result of their intent to sell, lease, assign, or transfer control of that *facility*, at least 10 *business* days in advance of the proposed date of transfer.

#### 5.1.2 IESO

- Acknowledge and process submissions from *variable generator* ,
- Maintain registry system records and availability,
- Issue requests for incomplete information or clarifications,
- Agree with the *variable generator* on a schedule and participate in ability testing of the operational monitoring,
- Validate a *facility's* compliance with data monitoring, telecommunication and voice communication requirements as defined in the *market rules* and applicable standards and policies established by the *IESO*,
- Provide the appropriate operational *IESO* contacts.

## 5.2 Facility Data

*Variable generators* shall submit *facility* data online for their equipment and supporting documentation for their meteorological equipment.

Please see [Appendix D \(wind\)](#) and [Appendix E \(solar\)](#) for a complete listing of the required *facility* data. Participants must submit their *facility* data online which will be reviewed and accepted by the *IESO*.

## 5.3 Operational and Meteorological Monitoring

*Variable generators* shall provide the *IESO* with operational and meteorological monitoring.

Meteorological monitoring that measures local weather shall be reported to the *IESO* at least once every 30 seconds. Meteorological monitoring shall not be modified by the *generator* (i.e. the reported value is not an averaged value).

The operational monitoring requirements are based on a per *facility* basis. All operational monitoring shall be communicated to the *IESO* per *IESO* approved methodologies and standards. These standards and methodologies are found in the Participant Technical Reference Manual - Section 4.

The operational monitoring requirements as outlined in *market rules* appendix 4.15 are still applicable for *market participants*.

### 5.3.1 Meteorological Monitoring - Wind Generation Facilities

At the time of registration the *IESO* will provide *variable generators* with a list of applicable operational monitoring based on the requirements in Appendix D (wind).

No turbine shall be further than 5 km from the nearest meteorological data collection point. This is the minimum requirement only and *facilities* may collect and send this data from as many points at the *facility* as are available. Data collection can be accomplished by using meteorological towers, sodar or lidar technology, nacelle mounted equipment, or a combination of these methods<sup>7</sup>. However, the minimum number of meteorological towers or sodar/lidar units per *facility* must be met, as per table 5-1, prior to considering any other technology (i.e. nacelle mounted equipment). Multiple *facilities* can provide data from the same data collection points if they are within the 5 km range.

### 5.3.2 Meteorological Towers and Sodar/Lidar Technology

Each wind *facility* shall provide operational monitoring that measures local weather from standalone meteorological towers or sodar or lidar units that are located in areas that are representative of the microclimate and winds on the prevailing upstream side of the wind farm. Wind *facilities* shall provide data from multiple meteorological towers or sodar or lidar units as per table 5-1 and Appendix D.

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<sup>7</sup> As alternative technologies are identified, the *IESO* will review their compatibility with the existing requirements and where appropriate expand the list of acceptable technologies.

If a wind *facility* provides weather data using sodar or lidar technology, supplementary nacelle mounted wind speed and direction data shall be provided. Meteorological monitoring using nacelle mounted equipment shall comply with the requirements as stated in Appendix D (Nacelle mounted data collection Requirements).

**Table 5-1: Met Tower or Sodar/Lidar Unit Requirement for Wind Facilities**

<b>Facility Size</b>	<b>Total number of meteorological towers or sodar/lidar units per facility</b>
Less than 10 MW	None
10 MW to less than 100 MW	1 minimum
100 MW to less than 200 MW	2 minimum
200 MW to less than 300 MW	3 minimum
300 MW to less than 400 MW	4 minimum

### 5.3.3 Operational Monitoring - Solar Generation Facilities

At the time of registration the *IESO* will provide *variable generator s* with a list of applicable Monitoring based on the requirements in Appendix E (solar).

Each solar *facility* shall have a minimum of two meteorological data collection points irrespective of the physical size of the solar *facility*. No solar panel shall be further than 12km from the nearest two meteorological data collection points. Multiple *facilities* can provide data from the same data collection points if they are within the 12 km range.

– End of Section –

## 6. Demand Response Auction

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The Demand Response (DR) Auction is a market-based mechanism for procuring DR resources in the province. Through the DR Auction, the IESO has transitioned the procurement of *demand response* from a contract-based approach to a market-based approach. “Market Manual 12: Demand Response Auction” provides details on the *demand response auction*.

### 6.1 Registration Requirements

*Facility registration* is not required in order to submit offers into the *demand response auction*, however, participants must register their resources on time upon successfully clearing the *demand response auction*, in order to fulfill their *demand response capacity obligations*<sup>8</sup> by participating in the *energy market*, as described in “Market Manual 12: Demand Response Auction”. Participants must begin the registration of their resources at least three months prior to the beginning of the *commitment period*.

Prior to resource registration, a *connection assessment* may be required in accordance with “Market Manual 2.10: Connection Assessment and Approval” for a new or an existing *load facility* (transmission-connected *load facility* or *embedded load facility*) providing *demand response capacity* greater than 10 MW at the *IESO-controlled grid connection point*.

The *demand response auction participants* that clear the *demand response auction* must be authorized as *demand response market participants*<sup>14</sup>.

The *demand response market participants* (DRMP) providing *demand response capacity* with transmission connected *load facilities* or with *embedded load facilities* that are revenue metered by the IESO must register their resources as *hourly demand response* or as *dispatchable loads* (for example, a *non-dispatchable load* could be registered as *hourly demand response*), and submit the *demand response capacity* per resource at least three months prior to the beginning of the *commitment period*.

Note that the registration of new (transmission connected or *embedded*) *load facilities* (that are revenue metered by the IESO) must start ahead of time and must follow the registration requirements described throughout this manual. This is a prerequisite for the resource registration required to provide *demand response capacity*.

A *dispatchable load* cannot be part of an *hourly demand response* resource at the same time.

All of the *demand response* resources (*dispatchable load* and/or *hourly demand response* resources) registered to fulfill one physical zonal capacity obligation must have the same *metered market participant*.

The DRMP providing *demand response capacity* with *facilities* that are not revenue metered by the IESO must register only one resource per zonal capacity obligation, per load type (residential or

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<sup>8</sup> The pre-auction and post-auction participant authorizations are described in Market Manual 1.1 – “Participant Authorization, Maintenance and Exit”.



commercial/ industrial/ institutional load type, as applicable) as *hourly demand response* (HDR) at least three months prior to the beginning of the *commitment period*.

A DRMP providing *demand response* with both, residential and commercial/ industrial/ institutional, non-revenue metered contributors in the same zone must register two separate HDR resources in that zone (one for each load type).

The DRMP must submit and update the information for each contributor to its registered HDR resource(s) as described in “Market Manual 12: Demand Response Auction”.

**– End of Section –**

## 7. Capacity Exports

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Following the IESO's assessment of a *capacity export request*, as described in Market Manual 13.1: Capacity Export Requests, if the IESO has issued an approval or a partial approval to a *market participant* (i.e., a Prospective Capacity Seller or a Capacity Seller, as applicable) to pursue a Capacity Export Opportunity<sup>9</sup>, the *market participant* will be subject to additional registration requirements in order to identify the applicable Ontario-based generating resource as a Capacity Resource.

### 7.1 Registration Requirements

Capacity Sellers must submit Commitment Information to the IESO in [Online IESO](#) no later than the Commitment Notification Date

Commitment Information must comply with the terms and conditions of the approval or partial approval of the *capacity export request* provided by the IESO as described in Market Manual 13.1. Failure to submit Commitment Information by the Commitment Notification Date may result in the IESO revoking its approval of the *capacity export request*.

The IESO will review the Commitment Information and, if it is approved, will issue a RAN and update the commitment status to "Registered". The submitted Commitment Information will become registered data in the IESO registration system

– End of Section –

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<sup>9</sup> Capitalized terms in this section are defined in Market Manual 13.1: Capacity Export Requests, Appendix A: Glossary of Capacity Export Terms.

## Appendix A: Ability Testing

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Ability Testing consists of two parts, A and B. Part A is associated with the testing of the *participant workstation* and will be undertaken in the authorization process. The details will be developed as part of the *market testing* design and will appear in a subsequent release of this document. Part B pertains to the testing of the communications devices associated with the *facilities* to be registered and will be done in the Registration phase. See “Ability Testing Overview”.

- End of Section -

## Appendix B: Technical Requirements

Please refer to Chapter 2, Section 6.1 6.2, 6.3, Chapter 2, Appendix 2.2, Chapter 4, Chapter 5, Section 12 of the *market rules* for information related to the technical requirements of *market participants*. Other portions of Chapter 5 and Chapter 7 may contain material relevant to the technical requirements.

The following tables contain references relevant to technical communications requirements found in the *market rules*. These tables are provided for the benefit of *market participants* and are based on the *market rules*, and will be updated in future releases. However, given the detailed nature of these references, future rule amendments may alter them. It is the *market participant's* responsibility to confirm whether or not any rule amendments made to the *market rules*, subsequent to the publication of this procedure, change these references. Amendments to the *market rules* can be found on the IESO's website. In all cases, the latest *market rule* amendments shall prevail in case of any errors or omissions.

	Chapter 2			
	General	Voice	Data Monitoring	Workstations
<b>All</b>	Sections: 6.1, 6.3 Appendix 2. 2: 1.5	Appendix 2. 2: 1.1 , 1.1.7-11	Appendix 2. 2: 1. 2 1.2 .6	Appendix 2. 2: 1. 3 ( <i>dispatch</i> ) 1.4 (participant)
<b>Generators</b>		Appendix 2. 2: 1.1 .1, 1.1.2	Appendix 2. 2: 1.2 .1	
<b>Distributors</b>		Appendix 2. 2: 1.1 .3	Appendix 2. 2: 1.2 .4	
<b>Transmitters</b>		Appendix 2. 2: 1.1 .4	Appendix 2. 2: 1.2 .3	
<b>Connected Wholesale Customer</b>		Appendix 2. 2: 1.1 .5	Appendix 2. 2: 1.2 .2	
<b>Embedded loads</b>		Appendix 2. 2: 1.1 .6	Appendix 2. 2: 1.2 .5	

	Chapter 4	Chapter 7	
	Data Monitoring Requirements & Performance Standards	Communications Reliability	
		Data & Workstations	Voice
<b>All</b>	Sections: 7.1, 7.6A 7.7 (maintenance & repair, MTBF, <i>response</i> times) 7.8 (Reclassification)	Sections: 12,12.1. 1 12.1. 2 12.1. 4-6 12.3	Sections: 12.2 12.2. 1 -12 12.4
<b>Generators</b>	Sections: 7.3 Appendices: 4.2 item 9, 4.15, 4.19	Sections: 12.1. 1 .2 12.1. 3.1 12.1.3 .2	
<b>Distributors</b>	Sections: 7.5 Appendices: 4.17, 4.22	Sections: 12.1.3 .4-5	
<b>Transmitters</b>	Sections:, 7.2 7.4 Appendices: 4.4 item 9, 4.16, 4.20, 4.21	Sections: 12.1.3 .3	
<b>Connected Wholesale Customer</b>	Sections: 7.5 Appendices: 4.17, 4.22	Sections: 12.1. 3.1, 12.1.3.2 12.1.3 .4-5	
<b>Embedded loads</b>	Sections: 7.6 Appendices: 4.18, 4.23	Sections: 12.1.3 .1, 12.1.3.2	

– End of Section –

# Appendix C: Supporting Diagram Requirements

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## C.1 Facility Description Document Requirements

This document is required only for *special protection systems* and other specialized *facilities* as required by the *IESO*. It should provide a description of how the *facility* operates, when and under what conditions. Block diagrams and schematics should be used to facilitate the explanation.

## C.2 Single Line Drawing Requirements

This is typically a station electrical diagram showing the connection path to the *IESO-controlled grid* and has enough detail to assist the *IESO* in determining requirements for data monitoring.

– End of Section –

## Appendix D: Wind Facility Data Requirements

The following table identifies *facility* data requirements for the physical layout and details of the turbines. *Market participants* must also refer to section 2 for registration requirements.

#	Static Plant Information	Description
1	Turbine Hub location	Turbine Hub location (latitude and longitude), height, and elevation from sea level.
2	Meteorological (MET) Tower or Sodar or Lidar Unit location	Physical location (latitude and longitude), height of measurements, and elevation from sea level. Met towers require measurement at hub height, sodar/lidar units should measure at hub height as well as 50 and 110 m if possible
3	Type of turbine	Whether the turbine is a horizontal or vertical axis type.
4	Manufacturer's power curve	Power curve maps containing expected output for a turbine at varying wind speeds.
5	Cut in speed	The lowest wind speed (metres per second [m/s]) at which the turbine will generate power.
6	Cut out speed	The wind speed (m/s) at which the wind turbine will be shut down to prevent physical damage.
7	Cut out temperature	The maximum and minimum ambient temperature (in °C) at which the wind turbine will be shut down to prevent physical damage.

The following table identifies operational monitoring requirements for wind *generation facilities*.

Operational Monitoring Requirements			
Measurement Type	Unit of Measure	Height of Measurement	Precision (to the nearest...)
MW output <sup>10</sup> (per <i>facility</i> )	Megawatt (MW)	N/A	0.1 MW
Available Megawatts <sup>11</sup>	Megawatt (MW)	N/A	0.1 MW

<sup>10</sup> Megawatts shall be provided as one measurement per *connection point*.

<sup>11</sup> Available Megawatts shall be reported as the sum total of the capacities of all available turbines per *connection point*. This value should not take into account speed or temperature cut-outs (i.e. available MW = max capacity – outages).

The following table identifies monitoring requirements for wind *generation facilities* from Meteorological towers or sodar or lidar units.

Meteorological Tower and Sodar/Lidar Unit Requirements				
#	Measurement Type	Unit of Measure	Height of Measurement	Precision (to the nearest...)
1	Wind Speed	Metres per Second (m/s)	Met towers require measurement at hub height, sodar/lidar units should measure at hub height as well as 50 and 110 m if possible	0.1 m/s
2	Wind Direction	Degrees from True North	Met towers require measurement at hub height, sodar/lidar units should measure at hub height as well as 50 and 110 m if possible	1 degree
3	Ambient Air Temperature	Degrees Celsius (°C)	Can be provided from any height	0.1 °C
4	Barometric Pressure	Hectopascals (hPa)	Can be provided from any height	0.1 hPa
5	Relative Humidity	Percentage (%)	Can be provided from any height	1 %

The following table identifies monitoring requirements for wind *generation facilities* from Nacelle mounted data collection points (temperature, pressure and humidity measurements may be taken at any height at the turbine, not necessarily at the nacelle).

Nacelle mounted data collection Requirements				
#	Measurement Type	Unit of Measure	Height of Measurement	Precision (to the nearest...)
1	Wind Speed	Metres per Second (m/s)	Hub height	0.1 m/s
2	Wind Direction <sup>12</sup>	Degrees from True North	Hub height	1 degree
3	Ambient Air Temperature	Degrees Celsius (°C)	Can be provided from any height	0.1 °C

<sup>12</sup> Wind direction measured at the nacelle may only be used if properly calibrated and if it continues to be provided when the turbine is not generating.



Nacelle mounted data collection Requirements				
#	Measurement Type	Unit of Measure	Height of Measurement	Precision (to the nearest...)
4	Barometric Pressure	Hectopascals (hPa)	Can be provided from any height	0.1 hPa
5	Relative Humidity	Percentage (%)	Can be provided from any height	1%

Wind data collected at the nacelle is expected to represent the apparent wind not the true wind value at a *facility*, it does not need to compensate for changes in conditions due to the motion of the rotor blades.

– End of Section –

## Appendix E: Solar Facility Data Requirements

The following table identifies *facility* data requirements for the physical layout and details of the solar arrays. *Market participants* must also refer to section 2 for registration requirements.

#	Static Plant Information	Description
1	Solar <i>facility</i> location (latitude and longitude) <sup>13</sup>	Physical location (GPS coordinates) of each solar array <sup>14</sup> .
2	Meteorological data collection device location and elevation (latitude and longitude)	Physical location (GPS coordinates) of each met data collection device, its elevation and height of measurement.
3	Elevation and orientation angles of arrays	Height from ground level and angle of each solar array, Tilt (angle with horizontal plane) and Azimuth (angle in North-East-South West Plane)
4	Power Rating	Rated Power at standard test conditions.
5	<i>Generation capacity</i> of the generating <i>facility</i> and each generating unit	The name plate capacity of the entire <i>facility</i> with a breakdown for each array within the system. (DC and AC Power at standard test conditions for arrays and power of inverters.)
6	Temperature Coefficient	Temperature coefficient of the module power at the maximum power point.
7	Type of Mounting	Ground Mount, Rooftop, Rack Mount, Fixed or Solar Tracking (single or dual axis) <sup>15</sup> , etc.
8	Module Type	Crystalline, Thin-Film, Concentrated PV (CPV) etc.
9	Wind Protection	Wind speed at which panels are stored to avoid damage. (If applicable)

<sup>13</sup> The physical location should be representative of the GPS coordinates at the centre of each solar array such that every solar panel within that array is within 5km of the GPS coordinates. In the event that the array is larger, additional GPS coordinates will be required to outline the geographic footprint of the array.

<sup>14</sup> Solar array is defined as a collection of solar panels that share a *connection point* going into an inverter.

<sup>15</sup> If the tracking feature is disabled the generator shall notify the *IESO* using the address [renewableforecastinfo@ieso.ca](mailto:renewableforecastinfo@ieso.ca) with as much notice as possible.

The following table identifies operational monitoring for solar *generation facilities*.

Operational Monitoring Requirements					
#	Measurement Type	Definition	Unit of Measure	Data Required for,	Measurement Precision
1	MW output <sup>16</sup> (per <i>facility</i> )	Current Megawatt (MW) output for the <i>facility</i>	Megawatt (MW)	All	0.1 MW
2	Available Megawatts <sup>17</sup>	What the <i>facility</i> can produce after deducting <i>outages</i>	Megawatt (MW)	All	0.1 MW

The following table identifies meteorological monitoring for solar *generation facilities*.

Meteorological Monitoring Requirements					
#	Measurement Type	Definition	Unit of Measure	Data Required for,	Measurement Precision
1	Plane-of-Array Irradiance (POA)	Measurements perpendicular to the solar receiver	Watts/ Square Metre	Crystalline, Thin-Film, CPV	+/- 1W/m <sup>2</sup>
2	Global Horizontal Irradiance (GHI)	The solar irradiance available to a flat-plate collector oriented horizontal to the earth's surface	Watts/ Square Metre	Crystalline, Thin-Film, CPV	+/- 1W/m <sup>2</sup>
4	Direct Irradiance (DNI)	The amount of solar radiation received per unit area by a surface that is always held perpendicular (or normal) to the rays that come in a straight line from the direction of the sun at its current position in the sky.	Watts/ Square Metre	CPV	+/- 1 W/m <sup>2</sup>

<sup>16</sup> Megawatts shall be provided as one measurement per *connection point*.

<sup>17</sup> Available Megawatts shall be reported as the sum total of the capacities of all available panels per *connection point* (i.e. available MW = max capacity – *outages*).

<b>Meteorological Monitoring Requirements</b>					
<b>#</b>	<b>Measurement Type</b>	<b>Definition</b>	<b>Unit of Measure</b>	<b>Data Required for,</b>	<b>Measurement Precision</b>
5	Ambient temperature at the array average height	Ambient temperature at the array average height	Degrees Celsius (°C)	Crystalline, Thin-Film, CPV	0.1 °C
6	Back of Module Temperature <sup>18</sup>	Average temperature at the back of module	Degrees Celsius (°C)	Crystalline, Thin-Film, CPV	0.1 °C
7	Barometric pressure	Barometric Pressure	Hectopascals (hPa)	Crystalline, Thin-Film, CPV	0.1 hPa
8	Wind speed at the average array height	Anemometer	Metres/Second (m/s)	Crystalline, Thin-Film, CPV	0.1 m/s
9	Wind direction at the average array height	Wind vane or wind mast readings	Degrees from True North	Crystalline, Thin-Film, CPV	1 °

– End of Section –

<sup>18</sup> The GPS coordinates of the back of module temperature measurement locations shall be included.

# References

Document ID	Document Title
MDP_RUL_0002	Market Rules
MDP_PRO_0014	Market Manual 1: Market Entry, Maintenance & Exit, Part 1.1: Participant Authorization, Maintenance & Exit
IMP_GDE_0088	Market Manual 1: Market Entry, Maintenance & Exit, Part 1.3: Identity Management Operations Guide
IMO_MAN_0024	Market Manual 6: Participant Technical Reference Manual
MDP_PRO_0017	Market Manual 2: Market Administration, Part 2.1: Dispute Resolution
MDP_PRO_0022	Market Manual 2: Market Administration, Part 2.6: Treatment of Compliance Issues
MDP_MAN_0003	Market Manual 3: Metering, Part 3.0: Metering Overview
MDP_PRO_0013	Market Manual 3: Metering, Part 3.2: Meter Point Registration and Maintenance
IMP_PRO_0047	Market Manual 3: Metering, Part 3.7: Totalization Table Registration
IMP_PRO_0057	Market Manual 3: Metering, Part 3.8: Creating and Maintaining Delivery Point Relationships
MDP_PRO_0027	Market Manual 4: Market Operations, Part 4.2: Submission of Dispatch Data in the Real-Time Energy and Operating Reserve Markets
IMP_PRO_0034	Market Manual 4: Market Operations, Part 4.3: Real-Time Scheduling of the Physical Markets
IMP_PRO_0035	Market Manual 7: System Operations, Part 7.3: Outage Management
TRNG_GDE_0007	Market Entry Organizer A Guide to the Steps of Market Entry
IMO_PRO_0019	Market Manual 2: Market Administration, Part 2.2: Exemption Application and Assessment
IMO_PLAN_0001	Market Manual 7: System Operations Part 7.8: Ontario Power System Restoration Plan
MAN-44	Market Manual 12: Demand Response Auction
PRO-357	Market Manual 13.1: Capacity Export Requests

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