



PROCEDURE

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

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

Issue 31.0

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

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Table of Changes

Reference	Description of Change
Throughout	Clarified instructions for distribution connected <i>variable generators</i> that are not registering to become <i>market participants</i>
Sections 2.1 and 2.4.3	Updated definitions of Owner and Operator
Section 3.4.2	Updated link to NPCC directory # 5
Section 5.3.1, Appendix E	Added requirements for the use of sodar units as meteorological data collection devices for wind facilities
Section 5.3.1	Clarified that data collection point refers to both nacelle mounted, meteorological towers and sodar devices
Section 5.3.2	Changed solar array to be more specific and say solar panel instead
Appendix E	Clarity provided for the available megawatt requirement Separated Operational and Meteorological monitoring requirements
Appendix F	Definitions provided for: solar array, and angle of array. Clarity provided to where GPS coordinates should be provided from and how many are required Clarified solar meteorological data measurement precision requirements, added wind protection data requirement and requirement to report changes in tracking settings Separated Operational and Meteorological monitoring requirements

Market Manuals

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 Volume 1 of the *Market Manuals*, where this document forms “Part 1.2: Facility Registration, Maintenance & De-registration”.

A list of the other component parts of the “Market Entry, Maintenance and Exit Manual” is provided in “Part 1.0: Market Entry, Maintenance and Exit Overview”, in Section 2, “About This Manual”.

Structure of Market Procedures

This market procedure is composed of the following contents:

1. **“Introduction”**, which contains general information about the procedure, including an overview, a description of the purpose and scope of the procedure, and information about roles and responsibilities of the parties involved in the procedure.
2. **“Procedural Work Flow”**, which contains a graphical representation of the steps and flow of information within the procedure.
3. **“Procedural Steps”**, which contains a table that describes each step and provides other detail related to each step.
4. **“Appendices”**, which may include such items as forms, standards, policies, and agreements.

Conventions

The *market manual* standard conventions are as defined in the “Market Manual Overview” document.

– End of Section –

1. Introduction

1.1 Purpose

The purpose of the *facility* registration, maintenance and exit procedure is to assess physical *facilities* or *boundary entities* to ensure that they adhere to established *reliability*, performance, and technical standards as defined in the *market rules*. This process also ensures that *IESO* information systems are updated with current *facility* or *boundary entity* status information. This is an essential pre-requisite for maintaining the *security* and *adequacy* of the *IESO-controlled grid*, and to operate the *IESO-administered markets* in an orderly manner. This procedure document is intended to provide organizations planning to register *facilities* or *boundary entities* for the *IESO-administered markets* with a summary of the steps and interfaces required between *Market Participants*, the *IESO*, and other parties for the registration process. 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 markets 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*¹ that are not *market participants* with a summary of the steps and interfaces required (between the *variable generators* and the *IESO*) to register with the *IESO* to provide data for centralized forecasting. The requirements set out in section 5 Variable Generation, Appendix E: Data Requirements - Wind and Appendix F: Data Requirements – Solar 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 Variable Generation, Appendix E: Data Requirements - Wind and Appendix F: Data Requirements – Solar.

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 *IESO*'s Market Entry, Maintenance and Exit processes comprise four sub-processes:

- Participant authorization, maintenance and withdrawal;
- Registration and maintenance of digital certificates that support secure communications;
- *Facility* registration, maintenance and de-registration; and
- Registration of *meter points* and the submission of *meter* totalization tables for the purpose of the *settlement* of the *physical services* pertaining to the *facility* being registered.

¹ Definition - Chapter 11 of the *market rules*: *variable generation* means all wind and solar photovoltaic resources with an installed capacity of 5MW or greater and 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, see “Part 1.1: Participant Authorization, Maintenance & Exit”. For information on the digital certificate registration process, see “Part 1.3: 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: Metering, Part 3.0: Metering Overview”.

1.3 Overview

Overviews of each sub-procedure (Participant Authorization, Participant Maintenance and Participant Exit) are provided in their respective sections.

1.4 Roles and Responsibilities

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

Market Participant

- Submit technical assessment forms, supporting documentation, and supplemental information;
- Provide *facility* registration and operations contact names;
- Identifying the *registered market participant* (RMP) and *metered market participant* (MMP) for the each Resource record created for the *facility* in the IESO registration system;
- Submit *responses* to *IESO* requests for incomplete information or clarifications;
- Download *facility* related documents to be completed by the *market participant*. Once completed the *market participant* will provide them to the *IESO*;
- Use the IESO registration system to view the information being used by the *IESO* for registration purposes, and submit any corrections to the *IESO*;
- Participate in ability testing, as scheduled together with the *IESO*; and
- Notify the *IESO* of any and all changes to the registration information that may occur during or after the registration process.

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;

- 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
- Approve the RMP-Resource and *metered market participant*-Resource relationships submitted by the *market participant*.

1.5 Contact Information

General inquiries regarding the role of the *IESO*, becoming a *market participant*, or *market participant* related questions should be directed to *IESO* Customer Relations. Contact information is available on the *IESO*'s web site (www.ieso.ca). The 'Contact Us' link at the top of the home page, when clicked, will redirect and display the *IESO* telephone numbers, e-mail, mail, and courier addresses.

As part of the *participant authorization* and registration process, *applicants* are able to identify a range of contacts within their organization that address specific areas of market operations. For *facility* registration, this contact will most likely be the Full Access User. The *IESO* will seek to contact these individuals for activities within this procedure, unless alternative arrangements have been established between the *IESO* and the *market participant*.

Forms that *market participants* must complete for this procedure are listed in Appendix A. These forms are generally available for downloading on the *IESO*'s Web site. These forms as well as the accompanying supporting documentation must be transmitted to the *IESO* via mail or courier, by using the appropriate address or number provided on the *IESO*'s Web site. All correspondence relating to this procedure shall identify the **subject: Market Entry**. If you have any questions regarding the registration of a *facility* you can also contact market.entry@ieso.ca

- End of Section -

2. Facility Registration

2.1 Overview

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 *security* and *adequacy* of the *integrated power system*.

Except for in certain circumstances², all *market participants* who wish to:

- Participate in the *IESO's real-time markets*; 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 Entry process. In order to initiate registration of a *facility*, or *boundary entity*, an organization must first initiate the Participant Authorization process. The registration process cannot be completed though, until the organization has been authorized as a *market participant*³. 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:

² See Section 2.5.

³ Unless otherwise stated, *market participants* should also be taken to include any organization that is applying to register a facility with the *IESO* during the period prior to market commencement and has previously applied to be authorized as a *market participant*.

Role	Responsibility
<i>Market Participant</i>	For purposes of the <i>IESO</i> and the <i>market rules</i> , responsible for registering the <i>facility</i> .
<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> .
<i>Metered Market Participant</i>	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>
Owner	Owns and maintains the facility
Operator	Operates the facility

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

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 (RMP)* and *metered market participant (MMP)* 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 forms noted in Section 5.0.

2.2 IESO Web site

The IESO has developed a Web site (www.ieso.ca) in order 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 Web site. Specifically, *market participants* will find the latest versions of:

- The *market rules*;
- The “Participant Technical Reference Manual”;
- The “Market Entry, Maintenance & Exit Manual”;
- All forms required for the *Facility* Registration, Maintenance, and De-registration processes; and
- Other *market manuals* that are referred to in this market procedure.

2.3 Registration System

The IESO has developed a Web-based registration system for electronic processing and storing of information related to *market participants* and their participation in the *IESO-administered markets*. Upon IESO receipt of an *applicant's application for authorization to participate* form with required documents, the IESO will create a record in the registration system and input application information supplied by the *applicant*.

A *market participant* can track the progress of the *facility* registration process by making a request by e-mail to market.entry@ieso.ca.

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 four important terms as they apply to *facility* registration in the IESO registration system:

- Physical *facility*;
- *Boundary entity*;
- Resource;
- *Facility*; and
- Defined Point of Sale (DPOS).

These terms have specific meanings related to the functioning of the IESO registration system for the purposes of this market 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 Defined Point of Sale.

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, or distribution *facilities*.

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* 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 physical *facility*. Each Resource record is associated with a unique connection (or 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 that *facility* has more than one connection point. A Resource record in the IESO registration system provides the *IESO* with information related to the bidding and *dispatch* of the physical *facility* or *facilities* represented by the Resource. The data fields contained in the Resource Information Screen go on to be reflected in the *IESO* market systems for the purposes of validating *bids* and *offers* and for undertaking *settlements*.

Resource records are created for a physical *facility* by the *IESO* when a *market participant* demonstrates their intention to register a particular physical *facility* by their submission of the initial registration forms. 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 *settlements* requirements.

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

Facility

A *Facility* – written with a capital “F” for the purposes of this section – is also the representation of a physical *facility* or a *boundary entity* in the IESO registration system. Most of the information about a physical *facility* is entered in a *Facility* record; only a small amount is required for a Resource 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 of the initial registration forms. The *IESO* will ensure that all *facility* information provided by *market participants* is referenced appropriately in the IESO registration system.

Defined Point of Sale (DPOS)

A Defined Point of Sale (DPOS) is a representation in the IESO registration system 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*.

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

2.4.2 Relationship Between Physical Facilities and Resource, Facility and DPOS Records

To identify which physical *facility* has placed a *bid* or *offer* at a specific single physical connection to the *IESO-controlled grid* (DPOS), all physical *facilities* are modeled as Resource records within the *IESO* network model and recorded in the *IESO* registration system. While each physical *facility* is typically modeled as a single Resource, there are exceptions to this rule. For example, a *market participant* may apply to aggregate a number of *facilities* into a single Resource, or a physical *facility* may have more than one connection to the *IESO-controlled grid* (DPOS) and must therefore be modeled as more than one Resource. Examples of this situation are *distributors* with a DESN station that has two transformer banks, each connected to a different physical connection, or where a *facility* has a back-up supply that has a separate physical connection from the main supply. Each Resource registered by the *market participant* will have its own name and ID and must be set up to accommodate the full capability of the system⁴.

Where a *market participant* is seeking to aggregate two or more physical *facilities* in one Resource record, the Resource information (e.g. *generator* capability) must be representative of the total for the aggregated *facilities*.

When registering physical *facilities*, *market participants* will be required to indicate, through the “Facility Profile” (IMO-FORM-1181) form, the physical connection to which the physical *facility* is attached. If a Participant is unsure as to which DPOS to select, the *IESO* will identify the valid DPOS. It is important to note that there is a “one to many” relationship between a DPOS and a Resource. That is, one DPOS 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 DPOS. 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 DPOS.

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 DPOS 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* provide 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 resource⁵ 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*

⁴ This will ensure that, if one of the physical connections was out of service, the participant could *bid* the entire capability of the facility through the single remaining (valid) resource.

⁵ The “Resource” record is used in the *IESO* registration system to associate the DPOS (Defined Point of Sale) used by the *facility* for connection to the *IESO-controlled grid* with the *facility* record. A physical *facility* may have several *connection points*, and therefore several resources.

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 Facility

This is the *Participant* that owns and maintains the facility.

Operator of the Facility

This is the *Participant* that operates the facility.

RMP – Registered Market Participant

The RMP is the *market participant* who has operational control of the *facility* under the definition of the *market rules*. The RMP is authorized to submit *dispatch data*, and is responsible for *security* issues related to connection of the *facility*. 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*⁶. 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: Metering, Part 3.8: Creating & Maintaining Delivery Point Relationships”.

⁶ 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: Settlements, Part 5.2: Meter Data Processing” for more details on this process.

Distributor & Transmitter

Distributor or *Transmitter* relationship types define the *market participant* that provides distribution and transmission information for the Resource. 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*.

The relationship is set up by the *metered market participant* as part of the metering processes detailed in “Market Manual 3: Metering, Part 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*, unless a *facility* is embedded within a *generation facility*, a *load facility*, or a *distribution system*, and that:

- For *generation facilities*, the maximum rated *generation capacity*, net of auxiliary requirements, is less than 1 MW;
- For *load facilities*, the maximum load capacity is less than 1MW; or
- For *distribution systems*, the maximum load capacity is less than 1MW.

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 registration system, they confirm that Resource and *Facility* records exist for all *facilities* to be registered.

Once this has been achieved, there are 3 stages to the *facility* registration process. They are:

1. Submission of the initial documentation components.
2. Assessment of the *market participant's* registration submissions by various *IESO* groups to ensure the facility's compliance with the *market rules* and all *IESO* standards and policies related to *facilities*, and
3. Ability Testing.

2.5.1 Initial Application Components

A *market participant* initiates the *facility* registration process by submitting comprehensive information about the *facility* to the *IESO* as illustrated in Figure 2–1, below.

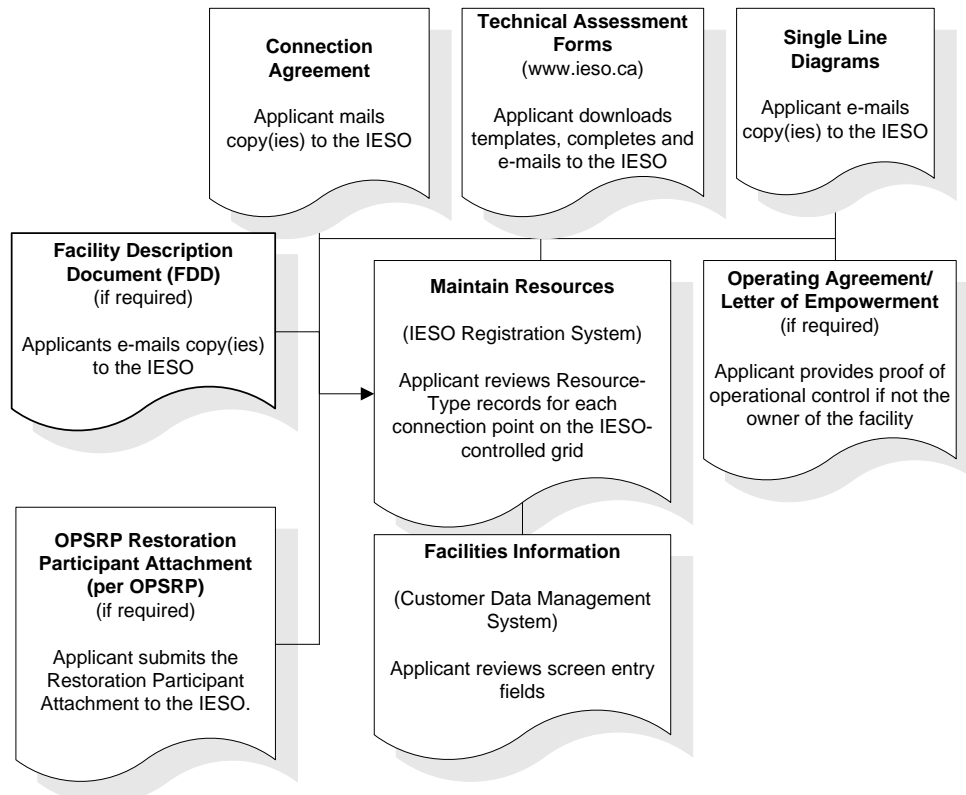


Figure 2–1: Initial Application Requirements

Some of the above documents are required of all *facilities* to be registered, others are only required under certain circumstances as described below. Some of the documents form part of a *market participant's* existing documentation, while others will need to be downloaded from the *IESO's* Web site.

The following items submitted to the *IESO* form part of a market participant's existing documentation:

- “Connection Agreement”;
- Single-line diagrams (see Appendix D);
- *Facility Description Document* (only required if a *facility* has a *Special Protection System*); and
- “Operating Agreement” with the *Facility* Owner or “Letter of Empowerment” (IMO-FORM-1141) (if required).

The balance of the documents required for registration are provided by the *IESO* or downloaded from the *IESO's* Web site, as appropriate, as described in this section, “Technical Assessments”, and Subsection 2.5.2, *Ability Tests*.

All information will be emailed to the *IESO* via the Market Entry Mailbox (market.entry@ieso.ca) or through regular mail or courier.

If after the initial submission the *IESO* determines that any of this information is incomplete or missing, a formal “Request for Missing Information” is issued to the *market participant* requesting completion.

Connection Agreement

All *facilities* connected to the *IESO-controlled grid* and all *generators* (both connected and embedded) must provide a copy of their “Connection Agreement” to the *IESO*. The *IESO* will assess the “Connection Agreement” to ensure it is valid, identifies *facility* ownership to assess operational control, and ensure there is an operating schedule that allows the *market participant* to comply with the direction of the *IESO*.

Single-Line Diagrams

Single-line diagrams, annotated with monitored points and quantities, are required for all *facilities* being registered. These diagrams facilitate the *IESO’s* assessment of the data monitoring structure.

If possible, these diagrams should be scanned and provided electronically to the *IESO*. However, these drawings can be very large in size and difficult to scan. If a *market participant* finds it difficult to provide these drawings in electronic form, the *market participant* can provide them in hard copy to the *IESO* by mail or courier. Any drawings submitted this way should clearly reference the *market participant’s* name, the *market participant’s* ID number⁷ and the *Facility* name, and be directed to the attention of the Market Relations Consultant.

Technical Assessment Forms

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 C) and the “Participant Technical Reference Manual” (www.ieso.ca). The technical assessments undertaken by the *IESO* are based on the technical data for the *facility* submitted by the *market participant* as part of their registration application, using a series of form templates available from the *IESO*, as well as existing documentation required to support the registration request.

The form templates for technical assessment are available on the *IESO’s* Web site⁸. The *market participant* downloads the forms that apply to the *facility* being registered for completion and submission to the *IESO*.

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.

⁷ The *market participant’s* ID number is obtained during the Participant Authorization, Maintenance & Exit procedure.

⁸ See Appendix A for a list of the required Technical Assessment forms.

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.

The *IESO* may request further information from the *market participant* to enable the assessment to be completed.

Proof of Operational Control

A *market participant* may identify a RMP for the *facility* (who may be the *market participant* himself) that is NOT the owner of the *facility*, as determined by the *IESO* assessment of the “Connection Agreement” and *OEB license*. In such situations, the *market participant* must supply the *IESO* with proof that the proposed RMP has operational control of the *facility* to satisfy the *IESO* that the RMP has the authority to submit *dispatch data* to the *IESO* and to execute *dispatch instructions* with respect to the *facility*.

This proof of operational control may take two forms:

- An operating or agent agreement between the Owner and *market participant*; or
- A “Letter of Empowerment” (IMO-FORM-1141).

Market participants who are not owners can provide proof of operational control of the *facility* by providing the *IESO* with an *operating agreement* between the RMP and the owner of the *facility*. The *IESO* will assess the agreement for the RMP’s authority to submit *dispatch data* on behalf of the *facility* and the authority to direct the operation of the *facility* according to the *dispatch instructions* of the *IESO*.

Alternatively, the *market participant* may submit a “Letter of Empowerment” (IMO-FORM-1141) from the owner to state that the proposed RMP is the only entity authorized to submit *dispatch data* with respect to that *facility*, is authorized to direct the operation of the *facility* in accordance with *IESO dispatch instructions*, and is bound to fulfill the requirements laid out in Chapter 7 of the “Market Rules”. The “Letter of Empowerment” (IMO-FORM-1141) includes the period during which the RMP is authorized to submit *dispatch data* for the *Facility*. Any change in RMP must be reported “ante factum” (before they are implemented) to the *IESO* so that all necessary changes in the *IESO* registration system are included.

A template for a “Letter of Empowerment” (IMO-FORM-1141) is provided by the *IESO* and can be downloaded from the *IESO* Web site (www.ieso.ca) and applied to the *facility* owner's letterhead. Both the *market participant* and the *facility* Owner must sign the Letter. This signed copy must be sent by mail to the *IESO*, to the attention of Market Services.

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.

The *market participant* should scan the documents and provide them to the *IESO* electronically.

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*; under 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*.

2.6 Metering Requirements

As part of the *facility* registration process, the *IESO* requires the *market participant* to confirm the identity of the RMP and 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*⁹. These allocated quantities are based on the totalization of *meter* readings from *revenue wholesale meter(s) (RWM)* to the Resource, as described in the “Market Manual 3: Metering, Part 3.7: Totalization Table Registration”. (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”.)

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* (and RMP) 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: Metering, Part 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: Metering, Part 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 “Part 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 trade¹⁰ will have the appropriate *boundary entity facility* records attached to their *market participant* record in the *IESO* registration system. When a *market participant* meets the authorization requirements for importers/exporters, this indicates he is 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.

⁹ 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: Settlements, Part 5.2: Meter Data Processing” for more details on this process.

¹⁰ Imports and/or export trades are from, or to, the Ontario spot 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 spot 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: Market Operations, Part 4.2: Submission of Dispatch Data” for further information on this process.

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: Market Administration - Part 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: System Operations, Part 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 Registered Status

Once a *market participant's facility* has met all *facility* registration requirements, the *facility* will be classified as registered and allowed to participate in the *IESO-administered markets*.

- New Facility Notification: at the time the *facility* is energized, enters the market or changes role in the market, a New Facility Notification is issued and e-mailed to the *market participant*.
- Those *facilities* not meeting all 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 “Notification of Registration”.

2.12 Procedural Work Flow

Table 2–1: 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, 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* registration between the *market participant*, the *IESO*, and other parties.

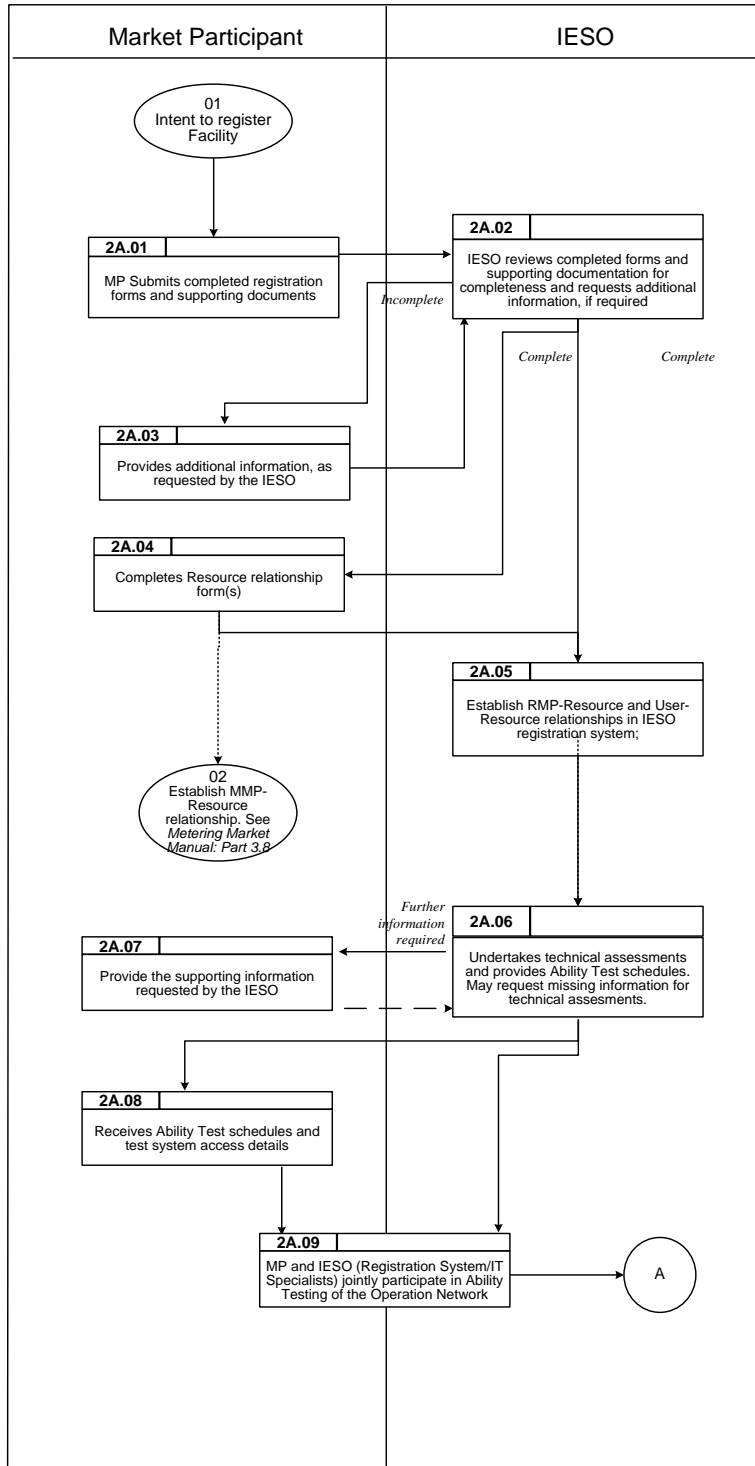


Figure 2–2: Workflow for Facilities Registration

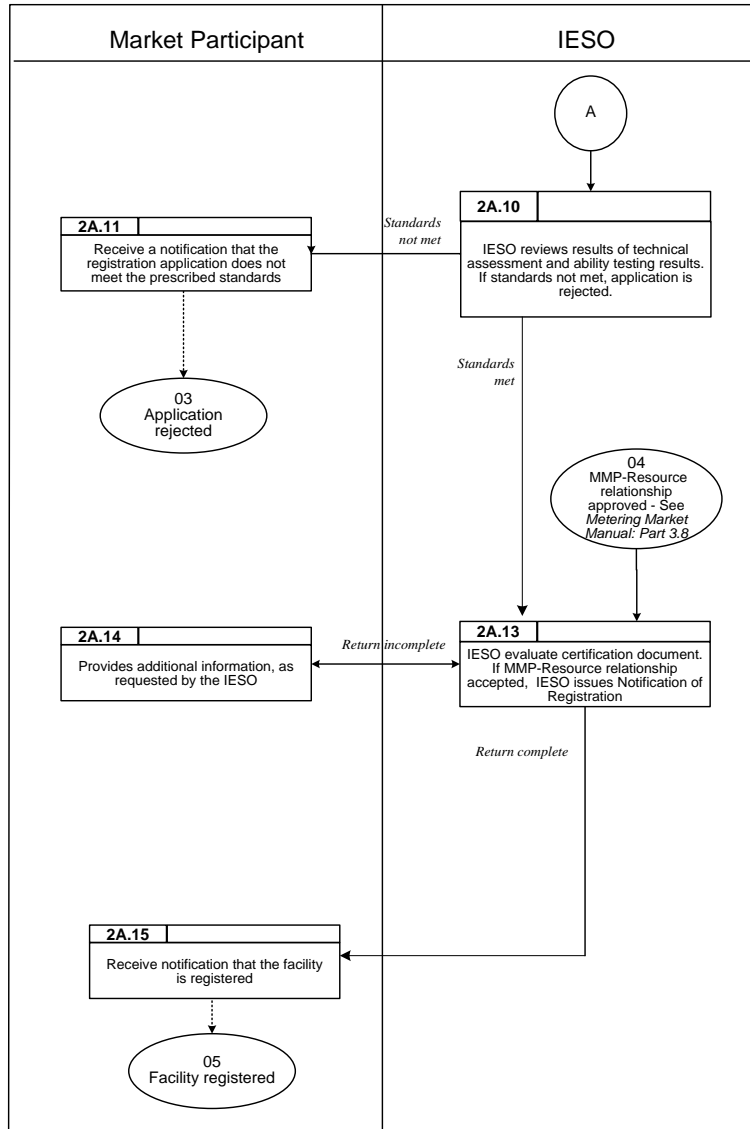


Figure 2–2: Workflow for Facilities Registration (continued)

2.13 Procedural Steps

This subsection contains a table of the detailed tasks (steps) that comprise the *Facility Registration, Maintenance and 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 2-2.

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 2–2: Procedural Steps for Facility Registration

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.01	<i>Market participant</i> submits completed registration forms and supporting documents.	<i>Market participant</i> downloads the relevant forms and supporting material from the <i>IESO</i> Web site and completes this documentation.	<i>Market participant</i> intends to register a <i>facility</i> . “Connection Agreement” to be submitted to the <i>IESO</i> at least 60 days prior to the time that a new or modified <i>facility</i> is to be placed in service.	The information included in the completed forms will be used to create entries in the following <i>IESO</i> registration system screens: <ul style="list-style-type: none"> • Resource Information; • <i>Facility</i> Information; and • <i>Facility</i> Contacts. The following is uploaded into the <i>IESO</i> registration system (see appendix A, unless noted): <ul style="list-style-type: none"> • Single Line Diagrams, annotated to show monitored quantities (see Appendix D); • The “Connection Agreement”; • “Technical Assessment Forms”; • “Operating Agreement” (if required); • A “<i>Facility</i> Description Document” (if required) for facilities with <i>Special Protection Systems</i>; • OPSRP Restoration Participant Attachment Guideline (if required); and • “Operating Agreement/Letter of Empowerment” (if required) 	Mail for material requiring a signature. Email for other material.	The statuses of the appropriate records in the following <i>IESO</i> registration system screens reflect “RECEIVED”: <ul style="list-style-type: none"> • Resource Information; • <i>Facility</i> Information; and • <i>market participant/Resource Relationship</i>.

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.02	<p><i>IESO</i> reviews completed forms and supporting documentation for completeness and requests additional information, if incomplete.</p>	<p><i>IESO</i> verifies the documentation sent by the <i>market participant</i> is complete and updates the <i>IESO</i> registration system status for each item.</p> <p>If complete, the <i>IESO</i>:</p> <ul style="list-style-type: none"> • Creates Resource record(s) for the <i>facility</i>; • Provides Resource record(s) information to <i>market participant</i> and requests that a completed Resource relationship form is submitted for each Resource record; • Commences the technical assessment of the <i>facility</i>; and • Requests the <i>market participant</i> to identify the <i>metered market participant</i> (MMP) for each Resource created (See “Market Manual 3: Metering - Part 3.8 Creating and Maintaining Delivery Point Relationships” 	Following Step 2A.01.	<p>If complete:</p> <p>Resource record information and request completed Resource relationship forms.</p>	Email or fax	<p>The following tasks in the Status Info screen reflect "UNDER REVIEW":</p> <ul style="list-style-type: none"> • Registered; • System/Technical Capability; • Data Monitoring/Voice Communications; and • Metering.
				<p>If incomplete: “Request for Missing Information”)</p>	Email or fax	

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.03	Provides additional information, as requested by <i>IESO</i> .	<i>Market participant</i> provides additional information to support the application.	Within 10 <i>business days</i> of <i>IESO</i> request.	That requested in “Request for Missing Information”.	<i>Market participant</i> submits information to the <i>IESO</i> , <i>IESO</i> ensures data is set up appropriately in the <i>IESO</i> registration system.	<i>IESO</i> registration system Task Status reflects “UNDER REVIEW” status for related task(s).

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.04	Complete “Resource relationship” form.	<p>The <i>market participant</i> submits a completed form for each Resource record on the <i>registered market participant</i> (RMP) and <i>metered market participant</i> (MMP) for each Resource identified by the <i>IESO</i> in Step 2A.02.</p> <p>The <i>metered market participant</i> for the Resource, as identified by the <i>market participant</i>, is responsible for identifying the <i>Meter Service Provider</i> (MSP) and <i>Distributor</i> or <i>Transmitter</i> for the Resource through submitting a completed “Assigning a Meter Service Provider and a Transmitter or a Distributor for an Energy Resource” form.</p> <p>The <i>market participant</i> is expected to notify the <i>metered market participant</i> of this requirement, where the <i>Market Participant</i> is not the <i>metered market participant</i>. The form must be completed by the <i>metered market participant</i> before the <i>facility</i> registration process can be completed - see “Market Manual 3: Metering, Part 3.8: Creating and Maintaining Delivery Point Relationships” for more information on this second form.</p>	Following Step 2A.02, when the application is complete.	<p>“Assigning a <i>registered market participant</i> and <i>metered market participant</i> for an Energy Market Resource”.</p> <p>(IMO-FORM-1299)</p>	Mail or Courier	Form submitted to <i>IESO</i> .
Issue 3.0	.0 – March 6, 2013		Public			

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.05	Establish RMP-Resource and User-Resource relationships in the IESO registration system.	The <i>IESO</i> establishes the RMP-Resource and User-Resource relationships in the IESO registration system based on the information submitted by the <i>market participant</i> .	Following Step 2A.04.	None	None.	Relationships established.
2A.06	Undertakes technical assessment of application and provides ability test schedule. May request missing information for technical assessments.	<i>IESO</i> undertakes extensive technical assessments of the information provided by the <i>market participant</i> . <i>IESO</i> prepares a schedule of ability testing with the <i>market participant</i> .	Following Step 2A.02 when the <i>market participant's</i> application is complete.	If incomplete: "Request for Missing Information".	Email or fax	At least one of the following tasks reflect "INCOMPLETE": in the Status Info screen <ul style="list-style-type: none"> • System/Technical Capability; • Data Monitoring/Voice Communications; and • Metering. Or in the corresponding IESO registration system screens: <ul style="list-style-type: none"> • Resource Information; • <i>Facility</i> Information; and • <i>Market participant/</i> Resource Relationship.

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
				If complete: "Schedule for Ability Testing of the Operational Network"	Email or fax	Related tasks in the IESO registration system updated to "APPROVED".
2A.07	Provide the supporting information requested by the <i>IESO</i> .	<i>Market participant</i> provides additional information to support the assessment, as specified by the <i>IESO</i> .	As requested by the <i>IESO</i> .	Information requested in "Request for Missing Information".	<i>Market participant</i> submits information to the <i>IESO</i> , <i>IESO</i> ensures data is set up appropriately in the IESO registration system.	The tasks that were "INCOMPLETE" at 2A.06 change status to "UNDER REVIEW".
2A.08	Receive Ability Test schedule and system access details.	<i>Market participant</i> receives the schedule of ability tests and the system details required to access the test systems operated by the <i>IESO</i> .	When all required application information has been submitted.	None	None	The following task in the Status Info screen reflect "UNDER REVIEW": Operational Ability Test
2A.09	<i>Market participant</i> and <i>IESO</i> (Registration System/IT Specialists) jointly participate in Ability Testing of the Operation Network.	<i>Market participant</i> and <i>IESO</i> jointly perform ability testing to verify the <i>market participant's</i> ability to communicate with the <i>IESO</i> through the Operational Network.	As specified in test schedule.	Test Results	As appropriate	End of testing

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.10	<i>IESO</i> reviews results of technical assessment and ability testing results.	<i>IESO</i> reviews results of technical assessment and Ability Testing. If standards are not met, the application is rejected.	On completion of ability tests and technical assessment	If standards met: "Confirmation of Successful Ability Testing"	Mail or courier	The following tasks in the Status Info screen reflect "APPROVED": <ul style="list-style-type: none"> • Registered; • System/Technical Capability; • Data Monitoring/Voice Communications; • Metering; • Operational Ability Test; and • System Data/Software Modeling
				If standards not met: "Notification of Rejection"	Mail or courier	Notification sent
2A.11	Receive notification that the registration application does not meet requirements.	<i>Market participant</i> receives notification of the rejection of the application by the <i>IESO</i> .	Following Step 2A.10 if Ability Tests failed.	None	None	Application rejected

Ref.	Task Name	Task Detail	When	Resulting Information	Method	Completion Events
2A.13	<i>IESO</i> issues “Notification of Registration”.	<i>IESO</i> issues Notification of Registration if certification documentation is valid and once the <i>metered market participant</i> has been approved for the Resource (See “Market Manual 3: Metering, Part 3.8: Creating and Maintaining Delivery Point Relationships”). The <i>IESO</i> requests resubmission if the original submission is not valid.	All registration requirements have been met.	<i>IESO</i> issues “Notification of Registration.”	Mail or courier	<i>IESO</i> registration system Task Status reflects “APPROVED” status for Self Certification task.
2A.14	Provide the supporting information requested by the <i>IESO</i> .	<i>Market participant</i> provides additional information to support the assessment, as specified by the <i>IESO</i> .	Following Step 2A.13, where requested by the <i>IESO</i> .	Information requested in “Request for Missing Information” supplied.	<i>Market participant</i> submits information to the <i>IESO</i> , <i>IESO</i> ensures data is set up appropriately in the <i>IESO</i> registration system.	<i>IESO</i> registration system Task Status reflects “APPROVED” status for Self Certification task.
2A.15	Receives notification that <i>facility</i> is registered.	<i>Market participant</i> receives formal notification of registration approval from the <i>IESO</i> .	Following Step 2A.13.	None	None	<i>Facility</i> registered.

– End of Section –

3. Facility Maintenance

3.1 Overview

The purpose of the *facility* or *boundary entity* maintenance process is to ensure that the *IESO* retains current information on *facilities* or *boundary entities* registered for the *IESO-administered markets* including that set out in Appendix C. 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, 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 either contact the *IESO* Market Relations Consultant directly or send via email updated information or documents. Documents that bear signatures shall be sent in hard copy via courier. 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.

3.2 Revised IESO Registration System Information

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 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

The process for changing the Resource relationships maintained by the *metered market participant* is set out in the “Market Manual 3: Metering, Part 3.8: Creating and Maintaining Delivery Point Relationships”.

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 documentation¹¹.

¹¹ See Section 3.5, below.

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 C. 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. Often these changes require both a request to the *IESO* to alter data in the *IESO* registration system as well as the submission of updated *IESO* forms or supporting documentation. *Market participants* should email their change requests to Market Entry (market.entry@ieso.ca) and mail any revised documentation or technical assessment forms as required. 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*, update the required fields in the *market participant's IESO* registration system record. The *IESO* will inform the *market participant* when the changes have been made. The *market participant* should review the updated information in the *IESO* registration system to ensure that it has been entered accurately.

3.3.2 Data Monitoring and Voice Communications

Any changes to a *market participant's* data monitoring or voice communications *facilities* requires the re-submission of the appropriate *IESO* forms¹² along with a Technical Assessment Change Control Form 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: System Operations, Part 7.3: Outage Management”.

¹² See Appendix A for a list of the Data Monitoring and Voice Communications forms.

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 confirmation in writing to the *market participant* of the acceptance or rejection of the requested change.

3.4.2 Market Changes

Market participants may apply 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 apply to the *IESO* in writing or email requesting the change. The *IESO* will then assess the request with respect to the appropriate supporting documentation (e.g. "System Capability Form, Connection Agreement"). The *IESO* will inform the *market participant* in writing whether or not the requested change has been accepted or denied.

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 <i>IESO</i> to make assumptions about the availability and consumption level of the load resource. A lower duty ratio means that the <i>IESO</i> 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 criteria #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. Criteria #2 combined with criteria #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 – https://www.npcc.org/Standards/Directories/Directory_5-Full%20Member%20Approved%20Clean-20120914-GJD%20October%2018%202012.pdf
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"> • <i>IESO</i> Market Rules, Definitions of 10 and 30 minute reserve • NERC Glossary of Terms http://www.nerc.com/files/Glossary_of_Terms.pdf
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"> • <i>IESO</i> Market Rules, Definitions of 10 and 30 minute reserve • NERC Glossary of Terms http://www.nerc.com/files/Glossary_of_Terms.pdf

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 *facilities* for bidding purposes. Requests for aggregation shall be granted provided the registration information demonstrates all of the following in respect of the *facilities* 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.

Compliance Aggregation

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

Market participants shall send a list of resources for compliance aggregation, noting the relationships between these resources (e.g. river system), by e-mail to market.entry@ieso.ca. This email should also indicate whether or not the *market participant* wishes to elect to implement meter disaggregation for the listed resources.

The request for aggregation will be considered based on:

- Whether the *facilities* to be aggregated are *quick-start facilities* or non *quick-start facilities*. Where a *market participant* wishes to register non *quick-start facilities*, such *facilities* 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 aggregated resources are related resources (e.g. river systems); and
- The likelihood that the *facility* will be sent to Unit Specific Dispatch (USD) for *security* reasons.

If the request for aggregation is approved, the *market participant* will be notified. If the *market participant* elects to implement meter disaggregation, a model defining the delivery points, meter points, schedule set, and in-service date will be produced, as detailed in Part 3.7: Totalization Table Registration. This model along with IESO FORM 1660 – ‘Acceptance of Compliance Aggregation Model’ will be sent to the *metered market participant* for sign off. The *metering service provider* will submit the totalization table for the *facility* and request a Hotline ticket to implement the totalization table. Once implemented, a Site Registration Report will be sent to the *metering service provider* for sign off.

The in-service activities of the aggregated resources will be coordinated by Market Entry 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

IESO_FORM_1702 – “Combined Cycle Plant Form”. 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’;
- 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 Entry 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 IESO_FORM_1702 – “Combined Cycle Plant Form”. 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*.

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* (OEFC). These three options are also available for new *cogeneration facilities* in Ontario.

Upon *facility registration* or re-registration, the *market participant* of the *cogeneration facility* shall submit a completed form IMO_FORM_1553, Application for Registering as Cogeneration Facility. This application will contain technical information that the *IESO* will use to determine a suitable *dispatch instruction* compliance band, taking into consideration the impact that the production of other forms of useful *energy* within the *facility* has on electricity production. Information required for *registration* is specified in the *market rules*, Chapter 7, Section 2.2.6

Real-Time Generation Cost Guarantee (RT-GCG)

Any *generator* already registered to participate in the *IESO-administered market* can also opt to register as a *facility* in the real-time generation cost guarantee (RT-GCG) program by submitting a completed "Real-Time Generation Cost Guarantee and Day-Ahead Production Cost Guarantee Data Form" (IMO_FORM_1552). 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 6 *business days* of receipt. Updates such as registration, de-registration or changes to minimum 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 written request 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 IESO_FORM_1702 – “Combined Cycle Plant Form” (Part 1, 2 and 6). This form contains combined cycle *facility* 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 6 *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 (Market Rule Chapter 7, Section 7.5.1); and making changes to data as required within the required timeframe (Market Rule Chapter 7, Section 7.5.2)

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 via email to market.entry@ieso.ca on completed IMO_Form_1558.

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

Operational control of *registered facilities* is assigned to a *registered market participant* who may be different from the owner of the *facility*. To change the information related to the operational control of the *facility*, the *market participant* submits a signed request for a change of operational control, specifying the Resource, the new *registered market participant*, and the timeframe when the new *registered market participant* will be valid. If the new *registered market participant* is not the owner of the *facility*, a new “*Operating Agreement* or *Letter of Empowerment*” (IMO-FORM-1141) must also be included in the submission. The *IESO* will notify the *market participant* in writing whether or not the requested change has been accepted or denied. When appointing a new *registered market participant*, the *market participant* has the ability to restrict viewing access to resource and *facility* data. This is done on the *market participant/Resource Relationship* screen in the *IESO* registration system by not checking the box, *Allow registered market participant to view resource and facility data*' (for information on the *IESO* registration system, contact *IESO* Customer Relations as detailed in Section 1.5 “*Contact Information*”). Since *market participants* have read-only access to the *IESO* registration system, they should contact the *IESO* to have the box checked off if they would like the *registered market participant* to be able to view resource and *facility* data, or if they would like to revise the existing condition.

3.5 Changes in Documents

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

- *OEB license*;
- “Connection Agreement”;
- “Letter of Empowerment or Operation Agreement”;
- “Restoration Plan Participant Attachment”;
- Single Line Diagrams;
- Thermal Limit Data (transmitters);
- *Facility Description Documents*; and
- “Technical Assessment Forms”.

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*:

- Written 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);
- A new “Operating Agreement” or “Letter of Empowerment” (IMO-FORM-1141)(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 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.

– End of Section –

4. Facility De-registration

4.1 Overview

4.1.1 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 months notice of plans to retire *facilities*.

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 *security* and *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 *security* or *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* or *security* 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* indicating that the de-registration request is granted. The *IESO* will first issue a "Disconnection Order" (IMO-FORM-1302) 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 the de-registration 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 5 days after the date on which the *market participant* received the *IESO's* notification

that the de-registration would not require a technical assessment. If the *facility* is directly connected to the *IESO-controlled grid*, the *IESO* will issue a “Disconnection Order” (IMO-FORM-1302) to the relevant *transmitter*, and *disconnect* the *facility* on the date it receives confirmation of the disconnection from the *transmitter*.

4.1.2 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*. See “Market Manual 2: Market Administration, Part 2.6: Treatment of Compliance Issues” for more information of this process.

4.2 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, 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.

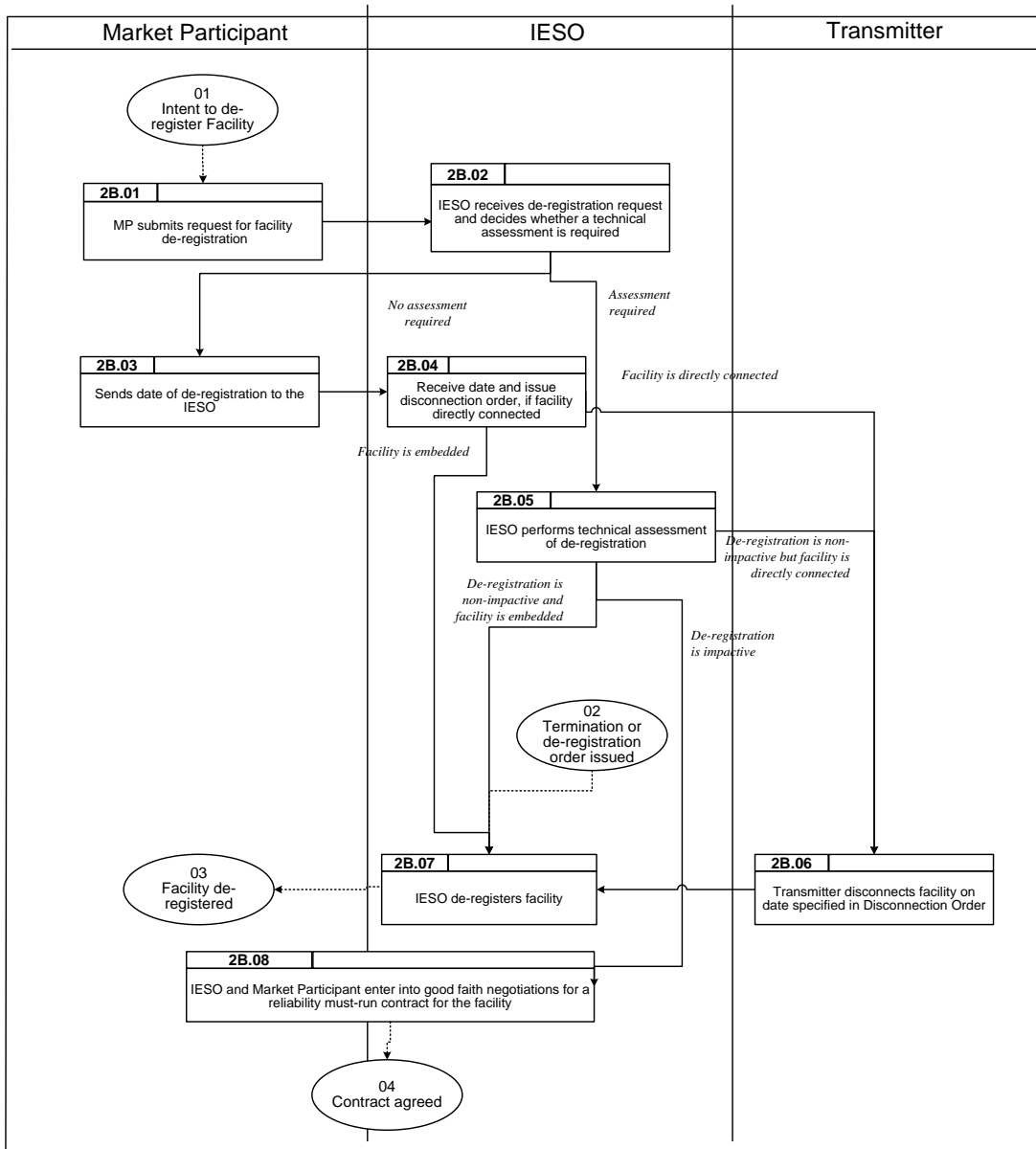


Figure 4-1: Workflow for Facilities De-registration

4.3 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</i> de-registration	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.	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</i> 's receipt of the <i>market participant</i> 's de-registration request.	Assessment Not Required: <i>IESO</i> informs <i>market participant</i> no assessment is required.	Email.	Associated task status in the <i>IESO</i> registration system set to “UNDER REVIEW” Notification of note sent to <i>market participant</i> logged in Outlook.
				Assessment Required: <i>IESO</i> informs <i>Market participant</i> assessment required and the date by which the assessment will be complete.		

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</i> 's notification that the de-registration would not require a technical assessment.	Upon receipt of the <i>IESO</i> 's notification that the de-registration does not require a technical assessment.	Date of de-registration of <i>facility</i> .	Email	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</i> -controlled grid, 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"> • Issuing a <i>termination order</i>; • Issuing a de-registration order; • Notification from a <i>Transmitter</i> that a <i>facility</i> has been disconnected from the <i>IESO-controlled grid</i>; or • 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>. 	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</i> or <i>reliability</i> of the <i>IESO-controlled grid</i> the <i>IESO</i> and <i>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</i> or <i>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

All *variable generators* are required to register with the *IESO* to provide operational and meteorological monitoring data for centralized forecasting. Registration is accomplished by completing IESO-FORM-1735 “Application to Register Variable Generation Facility Registration Data” and submitting it to the *IESO*.

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

5.1 Responsibilities

Variable Generators

- Complete required registration documents and submit them 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 the appropriate form 1735, 1736 or 1737;
- 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.

IESO

- Acknowledge and process submissions from *variable generator*;
- Maintain PLC 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 describing the details and physical layout of the *facility*.

Please see [Appendix E \(wind\)](#) and [Appendix F \(solar\)](#) for a complete listing of the required *facility* data. *Facility* data is to be provided to the *IESO* by completing the applicable form: IESO-FORM-1736 “Wind Generation Facility Data” for wind *generation facilities* and IESO-FORM-1737 “Solar Generation Facility Data” for solar *generation facilities*.

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 E (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 technology, nacelle mounted equipment, or a combination of these methods¹³. Multiple facilities can provide data from the same data collection points if they are within the 5 km range.

Meteorological Towers and Sodar Technology

Each wind *facility* shall provide operational monitoring that measures local weather from standalone meteorological towers or sodar 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 units as per table 5-1 and Appendix E.

If a wind facility provides weather data using sodar 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 E (Nacelle mounted data collection Requirements).

¹³ As alternative technologies are identified, the *IESO* will review their compatibility with the existing requirements and where appropriate expand the list of acceptable technologies.

Table 5–1: Met tower or Sodar unit Requirement for wind facilities

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

5.3.2 Operational Monitoring - Solar Generation Facilities

At the time of registration the *IESO* will provide *variable generators* with a list of applicable Monitoring based on the requirements in Appendix F (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 –

Appendix A: Forms

This appendix contains a list of the forms and agreements used in the *facilities* registration, maintenance and de-registration processes. These documents are available on the *IESO* Web site (www.ieso.ca) or provided as part of the *facility* registration process. Documentation on how to fill out the Technical Assessment forms is contained in “Facility Registration: A Guide for Market Participants”, available on the *IESO* Web site (www.ieso.ca).

The forms and agreements included are:

Form Name	Form Number
Real-Time Generation Cost Guarantee and Day-Ahead Production Cost Guarantee Data Form	IMO_FORM_1552
Combined Cycle Plant Form	IESO_FORM_1702
Application for Registering as Cogeneration Facility	IMO_FORM_1553
Assigning a Registered Market Participant and Metered Market Participant for an Energy Market Resource	IMO_FORM-1299
RMP User – Resource Relationship	IMO_FORM-1421
Letter of Empowerment	IMO_FORM-1141
Operating Agreement	N/A
Connection Agreement	N/A
Disconnection Order	IMO_FORM-1302

Technical Assessment Forms

The following forms will be used for submitting data to support *IESO* assessment, and can be downloaded from the *IESO* registration system. Samples are also available on the *IESO* Web site as part of the “Market Entry Manual”. All *market participants* are to complete the relevant portions of the following forms to describe their *facilities*, and sent to market.entry@ieso.ca. *Market participants* also must provide, upon request, nameplate data for equipment directly connected to the *IESO-controlled grid*.

Form Name	Form Number
Ancillary Service Facilities	IMO-FORM-1006
Generic Information	IMO-FORM-1011
Facility Profile	IMO-FORM-1181
IEEE Type AC1 Excitation System	IMO-FORM-1013

Form Name	Form Number
IEEE TYPE DC2 Excitation System	IMO-FORM-1014
Proportional / Integral Excitation System	IMO-FORM-1015
IEEE Type ST1 Excitation System	IMO-FORM-1018
IEEE Type ST3 Excitation System	IMO-FORM-1102
Generation Facilities	IMO-FORM-1004
Additional Generation Facility Characteristics	IMO-FORM-1558
Hydro Turbine Governor	IMO-FORM-1103
IEEE Type 1 Speed-Governing Model	IMO-FORM-1104
IEEE Type 3 Speed-Governing Model	IMO-FORM-1105
IEEE Type 2 Excitation System	IMO-FORM-1106
IEEE Type 1 Excitation System	IMO-FORM-1107
IEEE Type 2 Excitation System	IMO-FORM-1108
IEEE Standard Governor	IMO-FORM-1109
Modified IEEE Type 1 Excitation System	IMO-FORM-1110
NERC Fields – Valid Codes	IMO-FORM-1111
Simplified Excitation System	IMO-FORM-1112
Steam Turbine Governor	IMO-FORM-1113
Woodward P.I.D. Hydro Governor	IMO-FORM-1114
Facilities – Circuit Breakers	IMO-FORM-1007
Transmission Facilities – Buses	IMO-FORM-1115
Transmission Facilities – Capacitors	IMO-FORM-1116
Transmission Facilities – Current Transformers	IMO-FORM-1117
Transmission Facilities – DC Lines	IMO-FORM-1118
Transmission Facilities – FACTS Devices	IMO-FORM-1119
Transmission Facilities – Circuits	IMO-FORM-1120
Transmission Facilities – Overhead Circuits	IMO-FORM-1121
Transmission Facilities – Surge Arresters	IMO-FORM-1122
Facilities – Switches	IMO-FORM-1123
Transmission Facilities – Transformers	IMO-FORM-1124
Transmission Facilities – Underground Circuits	IMO-FORM-1125
Transmission Facilities – Wavetraps	IMO-FORM-1126
Transmission Facilities – Shunt Reactors	IMO-FORM-1127

Form Name	Form Number
Connected Wholesale Customer Facilities	IMO-FORM-1005
Embedded Generation Facilities	IMO-FORM-1009
Wholesale Customer Facilities and Distributors Connected at Less than 50 kV	IMO-FORM-1010
Facility Contacts	IMO-FORM-1176
Application to Register Variable Generation data	IESO-FORM-1735
Wind Generation Facility data	IESO-FORM-1736
Solar Generation Facility data	IESO-FORM-1737

The following table includes the letters utilized by the *IESO* during the processing of an “Application for Facility Registration”.

Form Letters Utilized During Facility Registration	
Subject	Form Number
Letter of Empowerment (Pro Forma)	IMO-FORM-1141

– End of Section –

Appendix B: Ability Testing

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 C: 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 Web site. In all cases, the latest *market rule* amendments shall prevail in case of any errors or omissions.

Chapter 2				
	General	Voice	Data Monitoring	Workstations
All	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 (<i>participant</i>)
Generators		Appendix 2.2: 1.1.1, 1.1.2	Appendix 2.2: 1.2.1	
Distributors		Appendix 2.2: 1.1.3	Appendix 2.2: 1.2.4	
Transmitters		Appendix 2.2: 1.1.4	Appendix 2.2: 1.2.3	
Connected Wholesale Customer		Appendix 2.2: 1.1.5	Appendix 2.2: 1.2.2	
Embedded loads		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
All	Sections: 7.1, 7.6A 7.7 (maintenance & repair, MTBF, <i>response times</i>) 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
Generators	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	
Distributors	Sections: 7.5 Appendices: 4.17, 4.22	Sections: 12.1.3.4-5	
Transmitters	Sections:, 7.2 7.4 Appendices: 4.4 item 9, 4.16, 4.20, 4.21	Sections: 12.1.3.3	
Connected Wholesale Customer	Sections: 7.5 Appendices: 4.17, 4.22	Sections: 12.1.3.1, 12.1.3.2 12.1.3.4-5	
Embedded loads	Sections: 7.6 Appendices: 4.18, 4.23	Sections: 12.1.3.1, 12.1.3.2	

– End of Section –

Appendix D: Supporting Diagram Requirements

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.

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 E: Data Requirements - Wind

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 Unit location	Physical location (latitude and longitude), height of measurements, and elevation from sea level. Met towers require measurement at hub height, sodar 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 ¹⁴ (per facility)	Megawatt (MW)	N/A	0.1 MW
Available Megawatts ¹⁵	Megawatt (MW)	N/A	0.1 MW

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

Meteorological Tower and Sodar 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 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 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 %

¹⁴ Megawatts shall be provided as one measurement per connection point.

¹⁵ 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 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 ¹⁶	Degrees from True North	Hub height	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%

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 –

¹⁶ 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.

Appendix F: Data Requirements - Solar

Solar Facility 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 facility location (latitude and longitude) ¹⁷	Physical location (GPS coordinates) of each solar array ¹⁸ .
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	Generation capacity of the generating facility and each generating unit	The name plate capacity of the entire facility 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) ¹⁹ , 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)

¹⁷ 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.

¹⁸ Solar array is defined as a collection of solar panels that share a connection point going into an inverter.

¹⁹ If the tracking feature is disabled the generator shall notify the IESO using the address 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 ²⁰ (per facility)	Current Megawatt (MW) output for the facility	Megawatt (MW)	All	0.1 MW
2	Available Megawatts ²¹	What the facility can produce after deducting outages	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 ²
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 ²
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 ²
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 ²²	Average temperature at the back of module	Degrees Celsius (°C)	Crystalline, Thin-Film, CPV	0.1 °C

²⁰ Megawatts shall be provided as one measurement per connection point.

²¹ 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).

²² The GPS coordinates of the back of module temperature measurement locations shall be included.

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 –

References

Document ID	Document Title
MDP_RUL_0002	Market Rules
MDP_PRO_0015	Market Manual 1: Market Entry, Maintenance & Exit, Part 1.0: Market Entry, Maintenance & Exit Overview
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
IMP_GDE_0083	Understanding Facilities Registration: A Guide to Submitting and Maintaining Physical Resource Data
IMO_PLAN_0001	Market Manual 7: System Operations Part 7.8: Ontario Power System Restoration Plan

– End of Document –