PROCEDURE

Market Manual 1: Connecting to Ontario's Power System

Part 1.5: Market Registration Procedures

Issue 5.0

This market manual contains procedures to be followed by entities wishing to apply for participation in the IESO-administered markets or programs. It also contains procedures to be followed by new or existing market participants wishing to register, maintain, or deregister facilities, or withdraw from the IESO-administered 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.

Document ID	PRO-408
Document Name	Part 1.5: Market Registration Procedures
Issue	Issue 5.0
Reason for Issue	Issue released for Baseline 46.0.
Effective Date	September 15, 2021

Document Change History

Issue	Reason for Issue	Date
1.0	Initial release in advance of Baseline 44.0, resulting in the obsoleting of the following market manuals: • Market Manual 1.1: Participant Authorization, Maintenance & Exit, • Market Manual 1.2: Facility Registration, Maintenance & De-registration, and • Market Manual 9.1: Submitting Registration Data for the DACP	June 29, 2020
2.0	AODA Remediation Only	November 26, 2020
3.0	Issue released in advance of Baseline 45.0. Updated to include electricity storage participation.	February 26, 2021
4.0	Issue released for Baseline 45.1	June 2, 2021
5.0	Issue released for Baseline 46.0	September 15, 2021

Related Documents

Document ID	Document Title
MDP_PRO_0048	Market Manual 1.4: Connection Assessment and Approval
IESO_REQ_0208	Market Manual 1.6: Performance Validation

Table of Contents

List of Figures

List of Tables

Table of Changes

Reference	Description of Change
3.1.3	Clarification of the responsibilities of the Applicant Representative, and the addition of the Facility Coordinator role, and the *Operator* High and Normal Priority and *Dispatch* High and Normal Priority sections.
3.3.1 and 4.1.3	Update of the "IESO Portal" to the "IESO Gateway".

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.

"Connecting to Ontario's Power System" is Series 1 of the *Market Manuals*, in which this document is "Part 1.5: Market Registration Procedures*".*

– End of Section –

1. Introduction

1.1 Purpose

Market Manual 1.5: Market Registration Procedures is the second of three *market manuals* that cover the Connecting to Ontario's Power System process. The Connecting to Ontario's Power System process consists of six (6) stages, which are described in the following *market manuals*:

Stage	Market Manual
1. Prepare application 2. Obtain conditional approval to connect	Part 1.4: Connection Assessment and Approval (formerly Market Manual 2.10)
3. Design and build	N/A[1]
4. Authorize market and program participation 5. Register equipment	**Part 1.5: Market Registration Procedures**
6. Commission equipment and validate performance	**Part 1.5: Market Registration Procedures**, and Part 1.6: Performance Validation (formerly Market Manual 2.20)

This *market manual* contains the procedures related to Market Registration, which encompasses all of Stages 4 and 5 of the process, as well as Commission Equipment procedures for Stage 6.

The content of this *market manual* serves as a roadmap for *market participants* or program participants ("Participants") and reflects the requirements set out in the *market rules* and in certain standards and policies established by the *IESO*.

As applicable, the procedures in this market manual are to be followed by:

- Any organization wishing to apply for participation in the *IESO-administered markets* or programs, or wishing to apply as a service provider (Stage 4),
- Participants wishing to register equipment (Stage 5),
- Participants wishing to commission equipment (Stage 6),
- Participants wishing to update their registration or equipment data,
- Participants wishing to deregister equipment, and
- Participants wishing to withdraw participation from the *IESO-administered markets* or programs.

The Market Registration Process Schedule provides estimated timelines for the completion of Stages 4 and 5 when a Physical Facility[2] is involved. Listed timelines are for guideline purposes only.

Before starting the procedures described in this *market manual*, it is assumed that an *applicant* for participation in the *IESO-administered markets* or programs has completed the applicable pre-requisite requirements described in Section 2.2.1 of this manual.

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[1] The "Stage 3: Design and build" activities are determined between the connection *applicant* and its associated *transmitter* or *distributor* after the completion of Stages 1 and 2.

[2] "Physical Facility" is described in Section 3: Register Equipment.

Owners of new Physical Facilities connecting to the *IESO-controlled grid,* or providing *ancillary services* for the *IESO*, or modifying existing Physical Facilities registered with the *IESO* are required to complete Stages 1 through 3 of the Connecting to Ontario's Power System process before starting the market registration procedures described in this *market manual*. Stages 1 and 2 are described in Market Manual 1.4: Connection Assessment and Approval Procedure.

1.2   Scope

This *market manual* covers the Market Registration procedures, which are comprised of[3]:

- Authorize market and program participation (described in Section 2 of this manual),
- Register and commission equipment (described in Section 3),
- Maintain Participant, *facility*, and equipment data (described in Section 4), and
- Deregister *facility* and withdraw participation (described in Section 5).

In some cases, an *IESO* contract will require an organization to register as a program participant regardless as to whether it has a Physical Facility, or whether that *facility* is connected to the *IESO-controlled grid*.

Metering registration must be completed for any Physical Facility connecting to the *IESO-controlled grid* or where any financial transaction associated with a Physical Facility is to be settled by IESO. For information on processes relating to the registration of *meter points* and submission of *meter* totalization tables, refer to Market Manual 3.0: Metering Overview.

1.3   Roles and Responsibilities

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

1.3.1   Participant

- Read and comply with the applicable *market rules* pertaining to Participant authorization and equipment registration (Chapter 2 and Chapter 7, Section 2),
- Complete all applicable pre-application requirements,
- Provide mandatory organization, Participant and *facility* contact information,
- Manage system access requests for users requiring access to *IESO* information systems,
- Review, sign, and submit the *Participation Agreement*,
- Submit *facility* and equipment registration data, supporting documentation, and supplemental information (*licence*(s), Single Line Diagram, etc.) through the *IESO*'s online registration system (Online IESO),
- Identify the relationship roles for each Resource record created for the *facility* in Online *I*ESO (see Section 3.1.4),
- Submit *responses* to *IESO* requests for incomplete information or clarifications,

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[3] Identity management operations is also part of Market Registration, and is described in Market Manual 1.3: Identity Management Operations Guide.

- Submit appropriate registration data for participation in the Day-Ahead Commitment Process (see Sections 3.4 and 3.5),

- Participate in *market participant* and facility testing (see Section 3.3) as scheduled together with the *IESO*,

- Register *variable generation facility* to provide data for the centralized forecasting service program (Section 3.9, Appendix C, and Appendix D)[4],

- Review and maintain *market participant*, *facility*, and equipment registration data in Online IESO to ensure the accuracy of the data, and submit any changes, additions, or deletions through Online IESO (see Section 4),

- 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* (see Section 4.2.6), and

- Notify the *IESO* when they wish to deregister a *facility* or *facilities* that are being decommissioned (see Section 5).

1.3.2   IESO

- Acknowledge Participant submissions related to Market Registration activities,

- Manage records in Online IESO and Participant accessibility,

- Generate Participation Agreement, issue to the *applicant* for signature, and then execute at *IESO* (see Section 2.1.1),

- Issue requests for incomplete data or clarifications,

- Validate Participant's completion of connection requirements coming from any applicable connection assessment,

- Assess *facilities* for their ability to deliver the services for which they are seeking to be registered,

- Based on the Participant's intended market operations, create appropriate setup of *facilities* and associated Resources to enable *bidding*, *dispatching*, *metering*, and *settlement*[5],

- Coordinate testing schedules with the Participant for Market Participant and Facility Testing (see Section 3.3),

- Provide the Participant with assistance in executing applicable commissioning tests for new or modified equipment (see Section 3.11.1),

- Validate a *facility*'s compliance with data monitoring and communication requirements as defined in the *market rules* and applicable standards and policies established by the *IESO* and other governing bodies[6],

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[4] *Variable generators* that intend to connect directly to the *IESO-controlled grid* or participate in the *IESO-administered markets* are required to complete the requirements in Sections 2 and 3 of this *market manual*, along with the requirements in Section 3.9 and Appendices C and D. *Distribution*-connected *variable generators* that are not registering to become *market participants* may bypass Section 2 and all of Section 3 prior to Section 3.9.

[5] Metering information is contained in the Market Manual 3 series of manuals. *Settlements* information is contained in the Market Manual 5 series. Refer to the IESO Market Rules & Manuals Library.

[6] Other governing bodies include the *North American Electric Reliability Corporation* (*NERC*), *Northeast Power Coordinating Council, Inc.* (*NPCC*), as well as the Ontario government.

- Provide the Participant with appropriate operational *IESO* contacts, and
- Issue Registration Approval Notifications (RANs) to the Participant relating to the Market Registration activities.

1.4   Recommended Reading

Before applying for participation in the *IESO-administered markets* or programs or as a service provider, the *IESO* recommends that *applicants* read the following information:

1.4.1   Market Rules

Chapter 2: Participation of the *market rules* contains material relevant to the Participant Authorization Procedures and should be thoroughly reviewed by all *applicants* for participation in the IESO-administered markets or programs, as well as by potential service providers. Chapter 7: System Operations and Physical Markets should also be thoroughly reviewed by applicants for participation in the *IESO-administered markets*.

1.4.2   Market Manuals

Many of the procedures necessary for market involvement are interrelated, therefore it is strongly suggested that *applicants* review the entire set of *market manuals* before starting the Participant Authorization Procedures. Particular attention should be paid to the market manuals listed in the References page at the end of this manual.

1.4.3   Training and Reference Documents

The Marketplace Training page of the *IESO* website contains workbooks, training guides, and quick takes that *applicants* can use, specific to each participation type. Instructor-led courses are also available for applicants.

1.5   Contact Information

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

To contact the *IESO*, you can email IESO Customer Relations at customer.relations@ieso.ca or use telephone or mail. Telephone numbers and the mailing address can be found on the IESO website (IESO Corporate Contact Information). IESO Customer Relations staff will respond as soon as possible.

– End of Section –

2. Authorize Market and Program Participation

Any organization planning to participate in the *IESO-administered markets* or programs, to cause or permit electricity to be conveyed into or out of the *IESO-controlled grid,* or to cause or permit electricity via an *IESO* contract requiring *settlement* by the *IESO*, must initiate with the IESO and complete a request for authorization. In particular, organizations must be authorized by the *IESO* if connecting a Physical Facility[7] to the *IESO-controlled grid*, providing via a Physical Facility an *ancillary service* for the *IESO-controlled grid*, or providing a specific service as a service provider.

The authorize market and program participation procedures ("Participant Authorization Procedures") allow the *applicant* organization and the *IESO* to identify the market(s) or program(s) in which the *applicant* intends to participate. It also ensures that the *applicant* will satisfy their *prudential support* requirements (if applicable) and registration application fee for participation in the *IESO-administered markets.*

2.1 Registering an Organization

Before starting the Participant Authorization Procedures, an *applicant* should review the [Stage 4: Authorize market and program participation](#) page of the *IESO* website before completing the [online application form](#), which can be accessed from that page.

The online application form is divided into four parts, as described in Table 2-1.

Table 2-1: Online Application Form Descriptions

	Part	Description
1	**Organization Information**	Organization name, organization short name (maximum of eight characters), address, main phone number, web address, HST registration number.
2	**Active Organization Evidence**	Two sections: • Identify **Business Entity Type** (e.g., corporation, LLP, proprietorship, etc.), business identification number (if applicable), and jurisdiction of registration.[8] • **Intent of Registration:** *Applicant* identifies if they intend to register as a *market participant*, program participant, and/or service provider. See **Note** below.

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[7] "Physical Facility" is described in [Section 3: Register Equipment](#).

[8] The *IESO* will conduct a business registry search to confirm evidence of an active organization, including the registered officers, and current status.

Part		Description
3	**Mandatory Organization Contacts**	Identify at least one person (preferably more) in the organization for each of the following contact types. Click the links for more information on each type. • **Authorized Representative:** Person(s) responsible for contractually binding an organization with the *IESO*. The Authorized Representative is required to sign the Participation Agreement (described in Section 2.1.1). • **Primary Contact:** Person(s) responsible for the organization's day-to-day activities with the *IESO*. • **Rights Administrator:** Person(s) responsible for submitting and managing the organization's system access requests for users requiring access to *IESO* information systems. • **Applicant Representative:** Person(s) responsible for submitting registration requests for adding and updating contacts, *facilities*, organization, or different participations on behalf of the organization. This step-by-step guide will assist an Applicant Representative in adding and updating contact roles. Organization contact roles are listed and defined in Appendix A. Mandatory organization information must always be kept up-to-date. For information on changing a mandatory contact, see Section 4.1.4.
4	**Submitter's Contact Information**	The name and contact information of the person who will be the *IESO*'s point of contact for Register an Organization*.

The submitted data on the online application will be validated and then approved by the IESO. In some cases, the submitted data may need to be revised by the applicant before it is approved. Once approved, the IESO will create organization and contacts records in Online IESO (see Section 2.1.3) using the submitted data. These records will be the online repository for all of the applicant's data and documents related to their participation in the *IESO-administered markets* or programs.

Note: As of early 2020, the **Intent of Registration** section of the online application form is in a state of transition. By mid-2020, the IESO intends to have this section set so that it contains only the options of "Market Participant", "Program Participant", and "Service Provider". Until this change is in place, please select the checkbox(es) that best indicate the intended participation type. The options are explained in Sections 2.2.2, 2.3.2, and 2.4.2.

2.1.1   Participation Agreement

Once the organization and contact records in Online IESO are established, a *Participation Agreement* is generated, printed, and sent by courier to the *applicant's* Authorized Representative, who must sign it and return it to the *IESO.*

The *Participation Agreement* formally binds a Participant to the *market rules* and other applicable standards, policies, or procedures established by the *IESO* and other governing bodies[9]. It also serves as certification by the *applicant* of readiness to participate in the *IESO-administered markets* or programs.

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[9] Other governing bodies include the *North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council, Inc. (NPCC)*, as well as the Ontario government.

Once the signed *Participation Agreement* has been received by the *IESO*, it is reviewed and executed by the appropriate *IESO* management representative, at which point the *Participation Agreement* is considered to be official and final. The *IESO* sends a hard copy of the executed *Participation Agreement* to the *applicant* to have for their records.

2.1.2   Initial Access to Online IESO

Once the *Participation Agreement* is executed by the *IESO*, all of the *applicant's* mandatory organization contacts will be provided with initial access to Online IESO, which they will be notified of via email from Online IESO. The initial access will allow applicable mandatory contacts to complete their assigned Manage Participation procedures (i.e., Actions) in Online IESO.

This guide will assist users when logging into Online IESO for the first time.

2.1.3   Manage Participation Tasks

Applicants who have registered their organization with the *IESO*, seek to participate in the *IESO-administered markets* or programs and have received access to Online IESO can then authorize as a market, program participant, and/or service provider.

The Applicant Representative will need to log in to Online IESO and initiate the Manage Participation action. Once initiated, the Applicant Representative will receive a series of emails, which contain assigned submission tasks that must be completed in Online IESO. These include identifying the specific *market participant,* program participant, and/or service provider types for which the *applicant* is registering. *Market Participant* and Program Participant types are defined in Sections 2.2 and 2.3. Service Provider types are described in Section 2.4.2.

The majority of submission tasks are listed on the Stage 4: Authorize market and program participation page of the *IESO* website and are explained in further detail in Section 2.2.1. Some of these tasks will require review and approval by the *IESO*, and may be rejected by the *IESO*, requiring further follow-up by the Applicant Representative before participation can be authorized.

2.2   Registering as a Market Participant

2.2.1   Prerequisite Requirements for Market Participant Applicants

Before registering as a Participant in the *IESO-administered markets*, the *applicant* must submit the information described in Table 2-2 through Online IESO. The *applicant* may contact the *IESO* at market.registration@ieso.ca for additional information about requirements that may be applicable for their intended participation type.

Table 2-2: Prerequisite Requirements for Market Participant Applicants

Type	Description
Ontario Energy Board Licence	The *Ontario Energy Board (OEB)* is responsible for *licensing* all *participants* in the *IESO-administered markets*. *Applicants* must have an *OEB licence* for each *market participation* type (see Section 2.2.3) for which they intend to conduct market activities. The **only exception** is for *applicants* having *demand response resources* participating solely in the **Capacity Auction** (refer to Market Manual 12: Capacity Auctions).

Type	Description
Canadian Bank Account	*Applicants* seeking authorization as a *market participant*, where billing and effecting payment in respect of financial obligations or transactions will be processed by the IESO, are required to have Canadian bank account(s). Applicants to be paid or invoiced by the IESO must submit relevant bank account details.
Import/Export/ e-Tag Data	*Applicants* seeking authorization to import, export or wheel electricity are required to identify any *interties* between the *IESO control area* and adjacent *control areas* across which it wishes to import or export energy and/or *operating reserve*[10] as stipulated in Market Rules Chapter 7, Section 2.2.7.
	Applicants must obtain the relevant e-Tag[11] capability and submit relevant data associated with it. The e-Tag specifications and schema are maintained by the North American Energy Standards Board (NAESB) and assist in providing the processes required by the NERC and NAESB standards related to *interties*.
Canada Energy Regulator Permit	*Applicants* seeking authorization as a *market participant* to export or wheel electricity over *interties* between the *IESO control area* and adjacent *control areas* must obtain an export permit issued by the Canada Energy Regulator (CER).
	Applicants intending to export or wheel electricity must submit a CER permit.
Harmonized Sales Tax (HST) Registration Number	*Applicants* seeking authorization as a *market participant*, where billing and effecting payment in respect of financial obligations or transactions will be processed by the *IESO*, must obtain an HST registration number[12].
	Applicants to be paid or invoiced by the *IESO* must submit a HST registration number.
Prudential Support	*Applicants* seeking authorization to participate in real-time *IESO-administered markets* are required to meet the *prudential support obligations* set out in Market Rules Chapter 2, Section 5.2 and in Market Manual 5.4: Prudential Support. *Applicants* must submit evidence of *prudential support* for approval by the *IESO*.
	For more information, refer to the Guide to Prudentials at the IESO.
Emergency Preparedness Plan	*Applicants* are required to prepare and submit an *emergency preparedness plan (EPP)* for approval by the *IESO*.
	Market Rules Chapter 5, Section 11 describes the content requirements for an *EPP*. For more information on *EPP* preparation, refer to:
	- Market Manual 7.10: Ontario Electricity Emergency Plan (OEEP), Appendix C - Market Participant Emergency Planning Guidelines
	Applicants that do not have Physical Facilities are required only to submit a single-page *EPP*, as provided in the template in Section 2 of the Market Participant Emergency Planning Guidelines document. Simply state "N/A" for any items that do not apply.

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[10] *Market participants* may import *energy* and *operating reserve* but can only export *energy*.

[11] For information on e-Tags, refer to the North American Energy Standards Board (NAESB) website.

[12] For information on HST registration, refer to the Canada Revenue Agency website.

Type	Description
	Applicants intending to register Physical Facilities are required to complete and submit an *EPP* that meets all applicable requirements in Sections 2 and 3 of the Market Participant Emergency Planning Guidelines document.
	EPP signoff must be obtained by at least one of the following authorities: CEO, CFO, COO, CIO, President, Vice-President, or Legal Counsel/Secretary.

2.2.2   Market Participant Types

Applicants for participation in the *IESO-administered markets* select their applicable *market participant* types in Online IESO. Table 2-3 lists the available *market participant* types and the markets in which they are eligible for participation.

Table 2-3: Market Participant Types

Type	Scope of Market Participation
Capacity Auction Participant	A *market participant* who wishes to participate in the *capacity auction* is required to authorize as a *capacity auction participant*. For more information on *capacity auctions*, refer to Market Manual 12: Capacity Auctions.
Capacity Market Participant	A *capacity auction participant*, who secures a *capacity obligation* through a *capacity auction* shall apply to become authorized by the *IESO* as a *capacity market participant*.
Distributor	A *distributor* may participate in the *energy* market.
Energy Trader[13]	A person who may participate in the *energy* and *operating reserve* markets by importing, exporting, or wheeling electricity[14] must register as an Energy Trader. An Energy Trader who is exporting energy is represented as a *wholesale seller*.
Generator	A *generator* may participate in both the *energy* and *operating reserve* markets.
Load	A load may participate in both the *energy* and *operating reserve* markets. A *load facility* that is importing *energy* is represented as a *wholesale consumer*.
Retailer	A *retailer* may participate in the financial markets for *settlement* purposes only.
Transmission Rights Participant	Transmission rights participants are represented as *financial market participants*. For information on *transmission rights*, refer to Market Manual 4.4: Transmission Rights Auction and Market Rules Chapter 8, Section 4.8.
Transmitter	A *transmitter* may participate in the *energy* market.

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[13] A *generation facility* owner who intends to pursue *capacity export* opportunities (either as a Prospective Capacity Seller or a Capacity Seller) must register as an Energy Trader, or arrange for another Energy Trader to act on their behalf. For information on *capacity exports*, refer to Market Manual 13.1: Capacity Export Requests.

[14] Imports and/or export trades are from or to the Ontario *energy market*. For example, a *market participant* seeking to export *energy* from a *facility* within Ontario will have to submit both an *offer* for that *energy* into the Ontario real-time market and a *bid* 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. Refer to Market Manual 4.2: Submission of Dispatch Data for more information on this process.

Type	Scope of Market Participation
Electricity Storage Participant	*Electricity storage participants* may participate in the *energy* and *operating reserve* markets and may also provide certain *ancillary services*, all subject to the requirements of Market Rules Chapter 7, Section 21.

2.2.3   Organization Roles and Responsibilities

Table 2-3 describes the organization roles applicable to *generators*, *loads*, and *capacity market participants (CMPs)*. One organization may fill one, more, or all of the roles, depending on its qualifications and responsibilities. In all cases, any organization fulfilling a role must be authorized as a *market participant*.

Table 2-4: Organization Roles and Responsibilities

Role	Responsibility
Owner	The *market participant* who legally owns, holds rights equivalent to ownership, or has an exclusive legal relationship with the legal owner to utilize the facility or specific equipment within a facility in regards to its own participation in the *physical market*. Documentation supporting such legal ownership or the legal relationship is required to be submitted to the IESO for review and validation. The responsibility of this registered owner role entails being the point of contact, completing all registration of equipment, responsibility for the *facility's* compliance with the *market rules*, and assigning all roles, including the *registered market participant*, *metered market participant* and Operator role relationships to equipment or Resources if applicable. It is **not** possible for multiple parties to be registered as the Owner. There can only be one registered owner, who is responsible for all activities and obligations described herein.
Operator	The *market participant* responsible for operating the equipment within a Physical Facility in the real-time operations.
*Registered Market Participant (*RMP*)*	The *market participant* responsible for submitting *dispatch data* for an *energy* Resource it has been assigned to.
*Metered Market Participant (*MMP*)*	The *market participant* responsible for accessing *metering data* pertaining to, and to be settled at, the relevant *delivery point*. Each *delivery point* requires the assignment of a *MMP*.
Metered Market Participant Transmission (MMPT)	The *market participant* responsible for paying for one or more transmission services to a transmitter relating to an owned *facility*.

2.3 Registering as a Program Participant

2.3.1 Prerequisite Requirements for Program Participant Applicants

Applicants registering as a Participant in one or more *IESO* programs where billing and effecting payment in respect of financial obligations or transactions will be processed by the *IESO*, but who are not registering as a *market participant*, must submit the information described in Table 2-5 through Online IESO. The *applicant* may contact the *IESO* at market.registration@ieso.ca for additional information about requirements that may be applicable for their intended participation type.

Table 2-5: Prerequisite Requirements for Program Participant Applicants

Type	Requirements
Canadian Bank Account	*Applicants* to be paid or invoiced by the *IESO* must have a Canadian bank account and must submit relevant bank account details to the *IESO*.
Harmonized Sales Tax (HST) Registration Number	*Applicants* to be paid or invoiced by the *IESO* must obtain an HST registration number[15] and submit it to the *IESO*.

2.3.2 Program Participant Types

If applicable, the applicant selects their program participant type in Online IESO. Table 2-6 describes the available program participant types.

Table 2-6: Program Participant Types

Type	Description
Centralized Forecasting Provider	An organization with wind and solar *generation facilities* (i.e., *variable generators*) connecting to the *IESO-controlled grid*, or connecting to a *distribution system* with an installed capacity of 5 MW or greater. These organizations must participate in the centralized forecasting program and be authorized as a Centralized Forecasting Provider. See Section 3.9: Variable Generation Facility Registration for more information.
Embedded Generator	An organization with embedded facilities (i.e., connected to a *distribution system*) that are not wind or solar generation. These organizations are not required to be *market participants*.
Embedded Load	An organization that participates with an *embedded load facility* that is not directly *connected* to the *IESO-controlled grid,* but is instead embedded within a *distribution system*. These organizations are not required to be *market participants*. Embedded load is represented as an *embedded load consumer*.
Embedded Electricity Storage Facility	An organization with one or more *embedded electricity storage facilities* (i.e., connected to a distribution system). These organizations are not required to be *market participants*.
Energy Performance Program	An organization that participates in the Province-wide Energy Performance Conservation and Demand Management Program for Multi-Site Customers.

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[15] For information on HST registration, refer to the Canada Revenue Agency website.

Type	Description
Industrial Accelerator	An organization that is eligible to participate in the Industrial Accelerator Program (IAP), which is designed to assist eligible transmission-connected companies to fast track capital investment in major energy.
Program Non-Specific	For organizations participating in an *IESO* program that is not listed in Online IESO.
Smart Metering Cost Recovery	An organization that has a financial settlement with respect to the smart metering charge.
Smart Submetering Provider	An organization that has a financial settlement with respect to Ontario Clean Energy Benefit Program Government electricity support program as a Smart Unit Sub-Metering Provider.

2.4   Registering as a Service Provider

2.4.1   Prerequisite Requirements for Service Provider Applicants

Applicants registering as a service provider where billing and effecting payment in respect of financial obligations or transactions will be processed by the *IESO*, but who are not registering as a *market participant*, must submit the information described in Table 2-7 through Online IESO. The *applicant* may contact the *IESO* at market.registration@ieso.ca for additional information about requirements that may be applicable for their intended participation type.

Table 2-7: Prerequisite Requirements for Service Provider Applicants

Type	Description
Canadian Bank Account	*Applicants* to be paid or invoiced by the *IESO* must have a Canadian bank account and must submit relevant bank account details to the *IESO*.
HST Registration Number	*Applicants* to be paid or invoiced by the *IESO* must obtain a Harmonized Sales Tax (HST) registration number[16] and submit it to the *IESO*.

2.4.2   Service Provider Types

If applicable, the applicant selects their service provider type in Online IESO. Table 2-8 describes the available program participant types.

Table 2-8: Service Provider Types

Type	Description
Metering Service Provider	A person that provides, installs, commissions, registers, maintains, repairs, replaces, inspects and tests *metering installations* associated with a Resource. For more information, refer to Market Manual 3.8.

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[16] For information on HST registration, refer to the Canada Revenue Agency website.

Type	Description
Meter Data Associate (MDA)	A person, other than the *Metered Market Participant (MMP)* that has access to *metering data.* Access to this data is assigned by the *MMP* role (see [Section 3.1.5, Table 3-2](#)).

2.5 IESO Notification of Participant Authorization

2.5.1 Authorization Notification for Market Participants

Once the Applicant Representative of an *applicant* for *market participation* has completed their assigned submission tasks in Online *IESO*, a Registration Approval Notification (RAN) will be emailed to the Applicant Representative. The RAN is the confirmation that the *applicant* has been approved by the *IESO* to participate in the *IESO-administered markets* they requested in their authorization tasks.

The *applicant* is now officially a *market participant*. New *market participants* can now begin the Register Equipment procedures described in Section 3.

2.5.2 Authorization Notification for Program Participants

The Applicant Representative of an applicant for participation as a:

- Centralized forecasting provider,
- *Embedded generator*, or
- *Embedded load*

who has completed their assigned submission tasks in Online IESO, will receive a RAN emailed from the IESO notifying of *IESO* authorization for participation.

Applicants for participation in other *IESO* programs (see Section 2.3.2) are notified of their authorization by email from IESO Energy Efficiency.

2.5.3 Authorization Notification for Service Providers

Applicant Representatives for service provider *applicants* (see Section 2.4.2) who have completed their assigned tasks in Online IESO, are notified of *IESO* authorization by email from *IESO* Metering.

– End of Section –

3.   Register Equipment

The *IESO* uses the Register Equipment procedures to collect specific data. This data is used for purposes that include assessing or validating whether the *facilities* and equipment meet all connection obligations identified in a related *connection assessment* or all requirements defined by the *market rules.* The Register Equipment procedures are outlined on the [Stage 5: Register equipment](#) page of the *IESO* website (refer also to the [Register equipment process diagram](#)) and are described in greater detail in the [Facility Registration Help File](#).

Facilities are defined in the *market rules* as *generation facilities*, *load facilities*, *electricity storage 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 Physical Facilities directly connected to the *IESO-controlled grid*, with capacity of 1 MW or greater, providing an *ancillary service*, or having a contract with the *IESO*.

The Register Equipment procedures enable the *IESO* to complete all activities required to prepare their staff, systems, tools, or operational documentation to accommodate the new/modified *facility*, equipment, and associated Resources. These activities include, but are not limited to:

- Understanding operational capabilities and impacts,
- Maintaining operating limits,
- Identifying where compliance with *NERC reliability standards* and *NPCC* criteria is required,
- Establishing visibility via data monitoring, and
- Establishing Resources for market operations and *settlement* systems.

A "Physical Facility" is a *facility* that is a physical site containing equipment (e.g., *generation unit(s),* transformer, circuits, breakers, etc.). Such physical sites may include transmission, load, or *generation* connected directly to the *IESO-controlled grid* or an *embedded load*, or *generation* connected within a *distribution system*.

A "Resource" is a unique *IESO* representation of a part of or the entire Physical Facility. Each Resource is associated with a *connection point*. If a *facility* has more than one *connection point,* the *facility* will be represented by more than one Resource. The submission of *bids, offers* and/or *schedules* is done at the Resource level. To ensure that Resources do not negatively affect the *reliability* of the *IESO-controlled grid*, the *IESO* may require individual Resources to be created for each unit in a *generation facility* if additional Resources cannot be aggregated*.* See [Section 3.1.4](#) for more information.

3.1   Register Equipment Overview

The following subsections contain pre-requisite requirements, roles and responsibilities information, and other background information that organizations having an owner role (see Section 2.2.3) should review before starting the Register Equipment procedures (which start in Section 3.2).

3.1.1   Prerequisite Requirements

Depending on the scope of the equipment change (e.g., a new Physical Facility or a modified *facility*), the organization owner (see Section 2.2.3) must complete the applicable requirements described in Table 3-1.

Note: All of the requirements listed in Table 3-1 (except for the CAA process and Participant Authorization procedures) are considered by the *IESO* to be "supporting documentation".

Table 3-1: Prerequisite Requirements for Register Equipment

Requirement	Description
Complete *Connection Assessment* and Approval (CAA) Process	As per the requirements of Market Manual 1.4: Connection Assessment and Approval, *applicants* and existing *market participants* must complete the CAA process and receive a Notification of Conditional Approval to Connect (NoCA) from the IESO. It is important, during the *Connection Assessments* process, that the *market participant* confirms with the *IESO* on how many Resources are required at their *facility*. As the part of Register Equipment procedures, the proponent or *market participant* is required to provide evidence that they are meeting any connection obligations identified in a connection assessment before the IESO will issue a final Registration Approval Notification (RAN). See Section 3.2.4. For more information on the CAA process, refer to the Stage 2: Obtain conditional approval to connect page of the IESO website.
Complete Participant Authorization Procedures	See Section 2. **Note:** Once an *applicant* has been granted access to Online IESO (see Section 2.1.2), they may begin their applicable Register Equipment procedures, as described in Sections 3.2 through 3.11. However, the Register Equipment procedures cannot be completed until the IESO has issued a RAN for participant authorization. See Section 2.5.1.
Prepare Single-Line Diagram (SLD)	A station electrical diagram showing the new or modified facility and its connection path to the *IESO-controlled grid* must be prepared. It must have enough detail to allow the IESO to establish data monitoring requirements (see Figure 3-1) and to implement modeling changes in *IESO* systems and tools. An SLD is required for all *facilities* being registered for participation in the *IESO-administered markets*, and shall be annotated with data monitoring, including the location of the Dynamic Disturbance Recorder (DDR) and/or equivalent. SLDs are submitted by *market participants* via Online IESO. Prior to submission to *IESO*, the *market participant* shall ensure that the SLD: • Is accepted by their *transmitter* or *distributor*, • Contains the appropriate approved **operating nomenclature**, not engineering nomenclature, • Shows the electrical equipment at the *facility* and the *connection points* to the grid,

Requirement	Description
	• Shows as-built[17] data approved for construction, and marked with an Ontario Professional Engineer's seal, and • Clearly references the *market participant's* name, and the *facility* name to be registered in Online IESO.
Prepare Protection Description Document (PDD)	A document marked with an Ontario Professional Engineer's seal containing written descriptions of all protections and settings (e.g., A, B, primary, or backup), communication schemes, and tele-protections for each protection group at the new or modified *facility*. It includes local and remote estimated design fault clearing times, a tripping matrix, and (where applicable) describes the separation of redundant protection groups. A template can be provided by the *IESO* upon request.
Prepare Operational Philosophy Document	A document attesting to *facility's* operating conditions and limitations (e.g., common mode failures, hi/low temperatures, hi/low wind speed), and procedures for *planned* and *forced outages*, returning equipment to service, responding to *IESO* directives within five minutes, and training staff on *IESO* interaction. *Variable generators* must also provide a description of the power equipment and power curves. See Appendix C: Wind Facility Data Requirements. The *IESO* provides a template of what is required when registering a new *facility*.
Obtain Technical Data	The Register Equipment procedures in Online IESO will require technical data for equipment to be submitted and then reviewed and approved by the *IESO*. These procedures may require some time and may require several iterations to complete. *Market participants* should start these tasks as early as possible. The specific technical data required is identified in the Register Facility Help File.
Review Operational and Performance Requirements	The technical requirements and associated performance standards for each type of *facility* are stipulated in the *market rules* (see Appendix B) and in *Market Manual 6: Participant Technical Reference Manual (PTRM)* .
Execute *Connection Agreement*	For a Physical Facility to participate in the *IESO-administered markets*, the owner entity must submit an executed copy of their *connection agreement* with the applicable *transmitter* (if the connection is to the *IESO-controlled grid*) or with the applicable *distributor* (if the connection is to the *distribution system*.
Prepare Restoration Participant Attachment (if applicable)	Based on the criteria contained in Market Manual 7.8: Ontario Power System Restoration Plan (OPSRP) Section 2.2, and as identified in the applicable System Impact Assessment (SIA), certain *market participants* are designated as *restoration participants. Restoration participants* are entities that contribute to the *IESO-controlled grid* restoration process. *Restoration participants* are required to submit a Restoration Participant Attachment via Online IESO as outlined in Market Manual 7.8, Section 13.
Prepare Facility Description Document (FDD) (if applicable)	In some situations, as identified in a System Impact Assessment, new or modified Physical Facilities may need to participate in Remedial Action Schemes (RASs), *Special Protection Systems (SPSs)*, or other specialized control schemes. This includes Generation or Load Rejection Schemes, Generation Run-back schemes, Capacitor Switching Schemes, or Breaker Backup Protections. These are not typical protection system installations.

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[17] "As-built" data consists of the measurements and specifications of a *facility* prior to any modifications, and is submitted to the *IESO* on a single-line diagram. Confirming as-built equipment in some cases may be as simple as confirming nameplate values are provided during equipment registration. In other cases, data monitoring will be used to confirm model parameters.

Requirement	Description
	An FDD is prepared, marked with an Ontario Professional Engineer's seal, and submitted for review and approval by the owner of RASs, *SPSs*, or other specialized control schemes. It contains a description of how the RAS, *SPS*, or specialized control scheme operates, when and under what conditions, and the estimated design operating times. A block diagram showing the configuration, and functions, and (where applicable) the separation of the redundant functions is also submitted.
Other Supporting Documentation	Other supporting documentation may include such items as nameplate photos, synchronous machine capability curves, manufacturer's wind turbine power curves, or solar array power data.

3.1.2 Equipment Registration Specialist

The Applicant Representative of the organization applicant owner (see Section 2.1) must assign an Equipment Registration Specialist (ERS) contact role if the Register Equipment procedures need to be initiated and completed in Online IESO. The ERS is responsible for initiating and completing tasks, including submitting technical data through Online IESO for their Physical Facility, its equipment, and any applicable Resources. As defined in the Register Facility Help File, this data may apply to some types of *market participants* and not others, and may require supporting documentation (see Table 3-1) to verify the data. Once the data is reviewed and approved by the *IESO*, it is considered to be registered data with the *IESO*.

3.1.3 Facility Contacts

The Applicant Representative must assign specific *facility* contacts, where applicable, including:

- Operator High and Normal Priority, the 24/7 contact section responsible for operating equipment at the *facility* location,
- Dispatch High and Normal Priority, the 24/7 contact section responsible for carrying out *dispatch instructions*, and,
- The Facility Coordinator, responsible for communications with the IESO about a *facility* during regular business hours.

3.1.4 Market Participant/Equipment Role Relationship

The key role relationships between *market participant* and equipment are Owner and Operator, as described in Section 2.2.3.

3.1.5 Physical Facility/Resource Relationship

Resource and *facility* are data record types that must be created in Online IESO for each facility to be registered. Resources are associated with a connection point.

Establishing relationships between a Physical Facility and an *energy* Resource ensures that a *facility* is properly represented in the *IESO-administered markets* and in the *IESO* systems and tools. This is illustrated in the Single-Line Diagram (SLD) in Figure 3-1, where a fictitious company GenCo owns a *generation facility* consisting of one combustion turbine (CT) and one steam turbine (ST) connecting to a common *connection point*.

Single-Line Diagram Example for a 2 Unit Generator Station
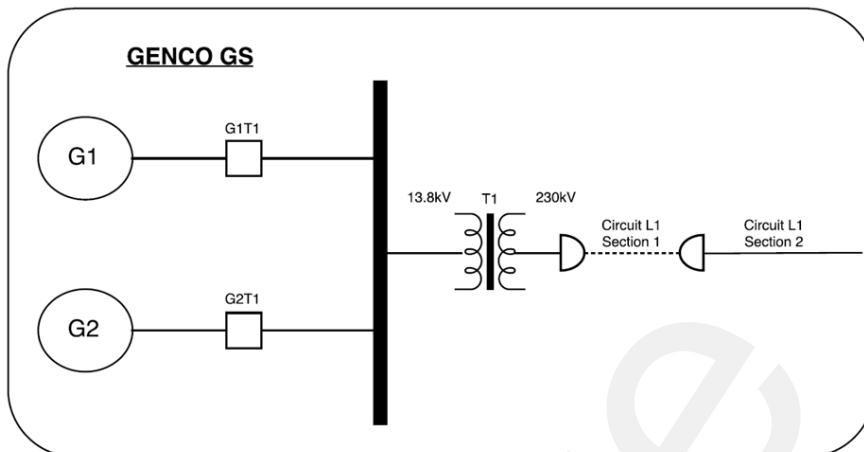
Figure 3-1: Single-Line Diagram Example

The *generation facility* would be registered in Online IESO as GenCo GS and would include all physical equipment that comprise the *facility* (e.g., *generation units*, transformers, circuits, and breakers) and their associated technical data. The *IESO* would create two *energy* Resources for this *facility*. The first Resource would be identified as Genco-LT.G1 and would include information pertaining to *generation unit* G1, information provided by the *generator*. The second Resource would be identified as Genco-LT.G2. It includes information pertaining to *generation unit* G2, provided by the generator owner.

As per [Market Rules Chapter 7](#), Section 2.3, the *generator* may apply to the IESO to aggregate the *generation units* into a single *energy* Resource, and must provide technical justification as to why the aggregation is necessary (see [Section 3.7](#)).

There is a 'one-to-many' relationship between a *connection point* and a Resource (i.e., one *connection point* can have many Resources associated with it). For example, a *distributor* might own a load facility connected to the *IESO-controlled grid* and be registered with an *energy* Resource at that *connection point*. If a dispatchable *generation unit* is embedded in the same *distribution system*, that *generation unit* would be registered as a separate *energy* Resource associated with the same *connection point*. In other words, the generating Resource must be distinguished from the load Resource, even though the generating Resource is embedded in the *distribution system*. Both Resources have the same *connection point* because they both inject or withdraw *energy* into or from the *IESO-controlled grid* at the same physical *connection point*.

3.1.6   Market Participant/Resource Role Relationships

In addition to the Physical Facility/Resource relationships, establishing role relationships between a *market participant* and an *energy* Resource is also important. Various role relationships are possible, some are required by the *market rules* and others are determined by the business requirements of the owner.

Each Resource within a Physical Facility may have role relationships to several different *market participants*. However, each role relationship must be unique. For example, if a *market participant* has been designated as the *metered market participant* (*MMP)* for a Resource, a second *market participant* cannot be similarly designated as the *MMP*.

One *market participant* may fill one, more, or all of the role relationships, depending on its qualifications and responsibilities.

The following role relationships are possible for a specific *energy* Resource:

Table 3-2: Market Participant/Resource Relationships

Role	Relationship to Resource
Operator	The *market participant* that operates the Resource.
Owner	The *market participant* that fills the Owner role (as per Table 2-4) for the Resource and assigns the *MMP*, *MSP*, *RMP* and Operator relationships to a Resource.
*Metered Market Participant (*MMP*)*	The *market participant* assigned to a Resource to access *metering data* pertaining to, and to be settled at, the relevant *delivery point*. The *metered market participant* assigns further relationships required for the complete definition of a *delivery point* as detailed in Market Manual 3.8: Creating & Maintaining Delivery Point Relationships. *MMPs* must contract with an *MSP* for their metered Resources.
Distributor	The *market participant* that owns and operates a *distribution system* where the Resource's *facility* is connected.
Transmitter	The *market participant* that owns and operates a *transmission system* where the Resource's *facility* is connected. The *transmitter* may create a transmission network (TN) Resource or a transmission connection (TC) Resource for the *facility* for the purpose of collecting the applicable transmission tariff.
Metered Market Participant Transmission Tariff (MMPT)	The *market participant* responsible to pay for one or more *transmission services* to a *transmitter* relating to an owned *facility* of a Resource.
Metering Service Provider (MSP)	Provides, installs, commissions, registers, maintains, repairs, replaces, inspects and tests *metering installations* associated with a Resource. For more information, refer to Market Manual 3.8.
Meter Data Associate	A service provider appointed by a *MMP* to access *metering data* pertaining to the Resource's *delivery point.* For more information, refer to Market Manual 3.8.
Registered Market Participant (RMP)	The *market participant* who has market control of the Resource under the definition of the *market rules*. The *RMP* (assigned by the owner) is authorized to submit *dispatch data*, and since *dispatch data* is actually submitted on each Resource, the *RMP* must be designated for each Resource. The *RMP* defines the users that will have the right to submit *dispatch data* for each Resource[18].

3.2   Registering Facility, Equipment, and Resource Data

Depending the on the "equipment change" and in order to complete the Register Equipment procedures, certain supporting documents and equipment data (as described in Section 3.1.1) may need to be submitted by the ERS via Online IESO. Some supporting documents are required of all facilities to be registered, others are only required under certain circumstances. Online IESO will guide

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[18] Removing a user as a Dispatch Data Submitter will also remove any standing Dispatch Data the user may have submitted. See Market Manual 4.2 for more details.

the ERS as to what needs to be submitted. The *IESO* will review and assess all submitted data. If any data is determined to be inaccurate, incomplete or missing, the *IESO* will reject it and the ERS would need to resubmit updated data.

> ⚠️ **Important**   It is critical that *market participants* review their registered data in Online IESO to ensure that it is accurate and current. The procedures for changing *market participant*, *facility*, equipment, and Resource data are contained in [Section 4](#).

The required data attributes that need to be submitted when completing the Register Equipment procedures through Online IESO are detailed in the [Register Facility Help File](#). The *IESO* ensures that all *facility* data provided by owners is referenced appropriately in Online IESO in the *facility* records that contain technical data related to the physical equipment within the *facility*.

Sections 3.4 through 3.11 identify additional registration data that the *IESO* may require depending on the *facility* and participation type.

3.2.1   Metering Requirements

Once a *market participant* has applied to register a *facility* with the *IESO,* and one or more Resource records have been created in [Online IESO](#), the *market participant* needs to identify the *metered market participant (MMP)* for each Resource record.

Information on processes relating to metering registration can be found in the [Meter Registration](#) section of the IESO website, as well as in the Market Manual 3: Metering series, available at the [IESO Market Rules & Manuals Library](#).

The metering registration procedures cannot be completed until the *MMP*/Resource relationship is created (see [Section 3.1.5](#)) and the *IESO* has issued an RAN via Online IESO.

3.2.2   Data Monitoring Requirements

All facilities must comply with the applicable data monitoring requirements, which are listed in the [Market Rule Chapter 4 Appendices](#). Data monitor testing is explained in [Section 3.3.3](#).

3.2.3   Market Rule Exemptions

The procedure for applying for an *exemption* from any applicable *market rule* requirement is contained in [Market Manual 2.2: Exemption Application and Assessment](#).

3.2.4   Facility Registration Status

An ERS can track the progress of their *Register Equipment procedures* by emailing [market.registration@ieso.ca,](#) or by contacting the IESO Market Registration Specialist assigned to their *equipment change*.

A Register Equipment change is considered to be officially registered when the *ERS* receives a final Registration Approval Notification (RAN) email from [Online IESO](#) verifying that the equipment change is completed and is registered with the *IESO*. A new Physical Facility cannot participate in the *IESO-administered markets* – nor cause or permit electricity or any *physical service* to be conveyed into, through or out of the *integrated power system* – unless a RAN has been issued by the *IESO*.

Interim RANs

Prior to issuing the final RAN, the *IESO* may issue interim RANs that allow certain register equipment change milestones to proceed. For example, for an equipment change involving a new Physical Facility, an interim RAN may be issued to allow the *facility* to:

- *Connect* and energize on potential only, or
- *Connect* and energize as a load, or
- *Connect* for commissioning purposes.

The IESO Market Registration Specialist assigned to the register equipment change can provide assistance/guidance on when an interim RAN is needed.

RAN Extensions

A RAN may include conditions that are mandatory and must be met by an expiry date. If a condition cannot be met due to circumstances beyond the *market participant's* control, the ERS may request a RAN extension by emailing either their *IESO* Market Registration Specialist or market.registration@ieso.ca, providing the reason for the extension request and a plan for meeting the RAN conditions. If a RAN extension is not granted by the *IESO,* or if the *market participant* does not apply for an extension, the currently issued RAN will expire and is no longer valid. If a RAN extension is granted by the *IESO*, the RAN version number will increment by one.

3.3   Market Participant and Facility Testing

For a new or modified Physical Facility, the *IESO* may conduct tests during the Register Equipment procedures to confirm that the *operational aspects* of the *facility* can interoperate with *IESO* systems and tools. Tests include, but are not limited to:

- Confirming capability of transmitting to the *IESO* interface,
- Ensuring the connectivity of the *dispatch workstation*,
- Confirming that appropriate voice communications are in place,
- If applicable, verifying that the *facility* responds to the *IESO* control signals,
- Assessing whether the *facility* complies with all applicable *market rules* and *NERC* and *NPCC reliability standards*, and
- Performing (at various Equipment Registration stages described in Sections 3.4 through 3.10) data monitoring tests of the required telemetry points with the *IESO* to ensure that statuses, magnitudes, and sign conventions are correct. All anomalies must be fixed and retested before the first energization of the *facility*.

Tests are scheduled as mutually agreed between the *IESO* and the *market participant*. In order to complete the Register Equipment procedures, all *market participant* and *facility* tests must be verified and approved by the *IESO.*

⚠️ **Important**   *Market participants* are responsible for ensuring that their staff receive appropriate training for all of the testing activities conducted by the *IESO* to ensure that they are able to interoperate with all applicable *IESO* systems. *Market participants* shall have the appropriate employee training and procedures in place to ensure they are prepared for participation in the *IESO-administered markets* as soon as they are authorized.

3.3.1   Participant Workstation Testing

Transactions involving data exchanged with *IESO* systems are processed through the *participant workstation* via Online IESO, except for the transfer of real-time data, which is done through the *dispatch workstation* (see Section 3.3.2). *Market participants* are required to install the necessary hardware and software infrastructure in accordance with the technical requirements contained in Section 2 of Market Manual 6: *Participant Technical Reference Manual (PTRM)*.

Market participants are required to test and confirm that their *participant workstation* is functional and can interoperate and meet *IESO* technical requirements for non-real time data transfers. *Market participants* receive "Assign Contact Role(s)" and "Confirm System Access Role(s)" tasks from Online IESO, for which they self-confirm. Completion of these tasks, along with the rest of the Equipment Registration procedures through Online IESO is usually sufficient to prove that the participant workstation can interact with Online IESO and the IESO Gateway.

3.3.2   Dispatch Workstation Testing

Real-time data transactions are processed through the *market participant's dispatch workstation*. The technical requirements for the *dispatch workstation* are contained in Section 3 of the *PTRM*. Testing of the *dispatch workstation* is conducted in the *IESO* Sandbox. *IESO* Information & Technology Services issues test dispatch instructions for which *market participants* are required to respond. The combined time required to set up the Sandbox test and to complete the actual test is approximately one month.

3.3.3   Data Monitor Testing

Real-time data (i.e., telemetry point data) is required by the *IESO* to monitor and model the power system and operate the real-time market. Market Rule Appendix 4, Sections 4.15 through 4.18 specifies the points required and Sections 4.19 through 4.23 indicate the required timing performance. The data link must be configured and concurrently, the *IESO* Market Registration Specialist will prepare a point list with the *market participant*. The link and points will be added to the *IESO* systems. The *market participant* will have to successfully test the link and points with the *IESO* before the facility is approved and a final RAN is issued. Incorrect or incomplete telemetry from *market participants* shall invalidate the facility's approval.

3.4   Day-Ahead Commitment Process – Registration Requirements

In order for a Physical Facility to participate in the Day-Ahead Commitment Process (DACP), it must be registered with the *IESO* to participate in the *real-time markets*. There are specific registration requirements for *facilities* participating in the DACP, which are explained in Section 2 of the Guide to the Day-Ahead Commitment Process (DACP).

Technical data, new or modified, will be processed during regular *business days* and within 10 *business days* of receipt. *IESO* requires a minimum of two *business days* for changes to become effective.

As part of the registration procedures for DACP, the ERS submits specific technical data through Online IESO, which the *IESO* uses to determine the *facility*'s:

- Day-ahead commitments and schedules, while respecting the *facility's* technical data,
- Eligible energy limited Resource (EELR) status,
- Eligibility for Day-Ahead Production Cost Guarantee (DA-PCG), and

- DA-PCG *settlement amounts*

The ERS must also indicate to the *IESO* whether the *facility* is intended for submitting three-part *offers*, and whether it is intended for participation in Real-Time Generation Cost Guarantee (RT-GCG). RT-GCG is covered is Section 3.8 of this market manual, Market Manual 4.6, and in Section 7 of the Guide to the Day-Ahead Commitment Process (DACP).

Note: Submission of combined cycle plant (CCP)[19] and pseudo unit (PSU) modeling technical data is covered in Section 3.5.

The applicability of these procedures to specific Resources is shown in Table 3-3:

Table 3-3: Applicability of Procedures

Resource Type	Bid/Offer Type	Facility Type	Submit DACP Technical Data	Submit CCP and PSU Data
Generation	Dispatchable	Non-quick Start	X	X[20]
Generation	Dispatchable	Pseudo Unit Modeling	X	X
Generation	Dispatchable	Quick Start	X	
Load	Dispatchable		X	
Generation	Intermittent			
Generation	Self Scheduling			
Generation (Dispatchable, Injecting Electricity Storage Resource)	Dispatchable	Quick Start	X	
Load (Dispatchable, Withdrawing Electricity Storage Resource)	Dispatchable		X	
Generation (Self-Scheduling Electricity	Self Scheduling[21]			

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[19] Combined cycle plant (CCP) is identified in Chapter 11 of the Market Rules as *enhanced combined cycle facility*.

[20] Required for CCPs.

[21] Only the injecting resource of an *electricity storage unit* that is self-scheduling submits schedules in the DACP. The withdrawing resource does not submit self-schedules into the DACP.

Resource Type	Bid/Offer Type	Facility Type	Submit DACP Technical Data	Submit CCP and PSU Data
Storage Resource - injecting)				

The Day-Ahead Calculation Engine (DACE) respects the technical data of generation Resources. Static technical data (as defined in Appendices 4.5A and 4.6 of the Market Rules) are registered through Online IESO. Variable technical data are recorded as daily generation data (DGD) and may be overwritten daily if equipment or regulatory conditions warrant. Table 3-4 shows the technical data elements the ERS must provide prior to participating in the DACP, as determined by Resource or *facility* type.

Table 3-4: Registration Requirements to support DACP by Resource Type

Data Description	Unit of Measure	Non-quick Start	CCP	PSU	Quick Start	Injecting Electricity Storage Resource (Dispatchable)	Hydroelectric	Dispatchable Load	Withdrawing Electricity Storage Resource (Dispatchable)
	MW	X							
	Hours	X							
	Minutes	X			X	X			
	Yes or No						X[22]		
	Yes or No	X	X	X	X	X	X		
	Relationship		X	X					
	MW		X	X					

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[22] DCHD submission is only required for hydroelectric facilities with a cascading dependency. See Section 3.4.5.

[23] Unlike the other data elements in this table, which have only associated one daily value, the ST MLP has multiple values – one for each CT configuration at the combined cycle plant (1-on-1 MLP, 2-on-1 MLP, 3-on-1 MLP, etc.).

Data Description	Unit of Measure	Non-quick Start	CCP	PSU	Quick Start	Injecting Electricity Storage Resource (Dispatchable)	Hydroelectric	Dispatchable Load	Withdrawing Electricity Storage Resource (Dispatchable)
	%			X					
	MW			X					
	Yes or No		X						
	Type	X	X	X	X		X		
	Type	X	X	X	X		X		
	Yes or No	X	X	X					

The registered values of the *minimum loading point (MLP)* and *minimum generation block run-time (MGBRT)* that the ERS provides are assumed by the *IESO* to be relatively static. They represent the baseline that the IESO uses to validate changes through the DGD submissions. Submitted DGD values are used to schedule non-*quick start* Resources, determine the DA-PCG commitment actions, and to calculate the DA-PCG. For more information on DGD, refer to Section 5 of the Guide to the Day-Ahead Commitment Process (DACP).

The ERS can view the Resource's registered *MLP*, *minimum run time (MRT)*, and *MGBRT* values in Online IESO.

Figure 3-2 shows an overview of the *dispatchable generator* technical data required for the DACP.
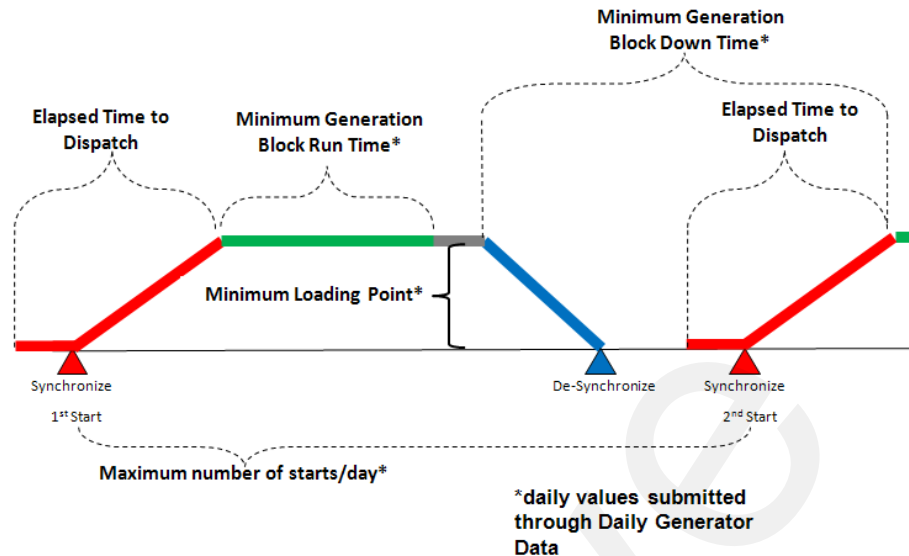
Figure 3-2: Dispatchable Generator Technical Data

3.4.1   Minimum Loading Point

M*arket rules* Chapter 11 defines the *minimum loading point* (*MLP*) as the minimum output of *energy* specified by the *market participant* that can be produced by a *generation facility* under stable conditions without ignition support. Only *dispatchable* non-quick start *generation facilities* can submit an *MLP* and its value must reflect the actual performance of the *generation facility*.

The *MLP* reflects the level of output where the unit is stable while meeting the emissions performance standards of the Ontario government.

For registration purposes, the ERS must submit a single *MLP* value for each *dispatchable* non-quick start *generation* Resource. For a steam turbine (ST) at a combined cycle plant (CCP), the ERS may submit multiple *MLPs,* as described in Section 3.5.2. During registration, the *IESO* uses the registered *MLP* in determining DA-PCG eligibility.

The *IESO* validates the submitted MLP data based on the following validation rules:

- The *facility* type is *dispatchable generation,*
- The *facility* must NOT be *quick start,*
- Number format xxxx – unit is MW,
- 0 =< *MLP* =< Maximum generator capacity (MGC),
- Ontario government emissions standards for the *facility*, and
- Supporting data showing minimum loading (MW) meeting emissions levels allowed by the Ontario government.

3.4.2   Minimum Generation Block Run Time

M*arket rules* Chapter 11 defines *minimum generation block run time (MGBRT)* as the number of hours, specified by the *market participant*, that a *generation facility* must be operating at *minimum loading point* in accordance with the technical requirements of the *facility*. Only *dispatchable* non-quick start *generation facilities* can submit a *MGBRT*.

For registration purposes, the ERS must submit a single value of *MGBRT* for each *dispatchable* non-quick start *generation* Resource, and the value must reflect the technical characteristics of the *generation facility*. During registration, the *IESO* uses the registered *MGBRT* in determining DA-PCG eligibility.

The IESO validates the data based on the following validation rules:

- The *facility* type is *dispatchable generation*
- The *facility* must NOT be *quick start*
- Number format xx – unit is hours
- 0 =< MGBRT =< 24

3.4.3   Elapsed Time to Dispatch

Elapsed time to dispatch (ETD) is the minimum amount of time, in minutes, between the time when a *dispatchable generator* or dispatchable that intends to inject initiates its start-up sequence and the time when it can respond to *IESO dispatch* signals under a hot start. For a non-quick start *generation unit*, this means that the *generator* has reached its *MLP*. The ETD must be submitted by all *dispatchable generation facilities* and *electricity storage facilitie*s and must reflect the technical characteristics of the *Resource*.

During registration, the *IESO* uses ETD only in determining DA-PCG eligibility*. A dispatchable generator* that submits an *ETD* value equal to or less than 60 minutes will not be DA-PCG eligible.

3.4.4   Day-Ahead Production Cost Guarantee

The Day-Ahead Production Cost Guarantee (DA-PCG) program is described in Section 7 of the [Guide to the Day-Ahead Commitment Process (DACP)](). If a *generation facility* meets all of the criteria listed in that section, the *IESO* will register *it* in the DA-PCG program.

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

3.4.5   Daily Cascading Hydroelectric Dependency

A *dispatchable* hydroelectric *generation facility* has a *daily cascading hydroelectric dependency (DCHD)* if the *facility* has a Minimum Hydraulic Time Lag[24] of less than 24 hours to or from an adjacent cascading hydroelectric generation facility controlled by the same *registered market participant*.

The *DCHD* is used to determine whether a *generation unit* is an EELR. Once defined as an EELR, a *generation unit* is deemed eligible to resubmit *dispatch data* after the initial run of the DACE, provided that a Daily Energy Limit (DEL) was submitted as part of the day-ahead *offer*. For registration purposes, the ERS must submit the following data for each *dispatchable* hydroelectric *generation unit*:

- A self-declaration that the *generation unit* has a DCHD

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[24] Minimum Hydraulic Time Lag is the minimum amount of time, in hours (rounded down to the nearest whole hour), that is required for water to travel to, or from, an adjacent hydroelectric *generation facility* on the same water system.

- The Resource Name and Resource ID of the cascading hydroelectric dependent *generation facility* (when a DCHD is declared)

The *IESO* validates the data based on the following validation rules:

- The *facility* is *dispatchable generation facility*
- The Primary Fuel Type is 'WATER' (i.e., a hydroelectric *facility*)
- Cascading hydroelectric dependent *generation facility* is controlled by the same *RMP*

3.4.6   Quick Start Flag

For registration purposes, the ERS must submit a *quick start facility* declaration for each *dispatchable generation facility* and *electricity storage facility* with respect to its injection capability. The declaration is mandatory for all *dispatchable generation facilities* and *electricity storage facilities* and must reflect the actual capability of the *facility*. The *IESO* uses this data to determine which *generation facilities* and *electricity storage facilities* are set as quick start in the SCADA model (these generation Resources are eligible to provide *10-minute reserve* when their breaker is open).

The ERS determines if the *dispatchable generation facility* or *electricity storage facility* is a *quick start facility* based on the definition in Chapter 11 of the *market rules*. The IESO validates the data based on the following validation rules:

- The *facility* is *dispatchable generation* or is a dispatchable *electricity storage facility*
- Operating characteristics of the *dispatchable generation facility* have been specified by the *market participant*

The *IESO* records the *quick start facility* flag along with a start date in order to handle time dependent revisions based on the following rules:

- If the *dispatchable generation facility* or dispatchable *electricity storage facility* is deemed to be a non-quick start *facility*

  Quick Start Facility Flag = NO[25]

- If the *dispatchable generation facility* or *electricity storage facility* is deemed to be a *quick start facility*

  Quick Start Facility Flag = YES

3.4.7   Generator Primary and Secondary Fuel Type

The *IESO* records the Generator Primary and Secondary Fuel Type for reference by downstream processes.

It is mandatory for the ERS to submit a single Generator Primary Fuel Type via Online IESO for each *generation unit*, for registration purposes. There is also an option to submit a single Generator Secondary Fuel Type. The fuel type must reflect the actual characteristic of the *generation unit*, and is not required for facilities that are not *generation facilities*.

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[25] For an *electricity storage facility*, this flag is set on the generator resource representing its injection capability

3.4.8   Three-Part Offer Eligibility Declaration

Three-part *offers* are the incremental *energy* and fixed offered costs for operating a non-quick start *facility* during DACP.

Market participants intending to submit *dispatch data* for a Resource requiring new day-ahead *offer* attributes for the three-part *offer* (for *speed no load cost (SNL)* and *start up cost (SUC)*) must submit a declaration through [Online IESO](#). The declaration includes positive confirmation that the *market participant* is a *registered market participant* participating in the *real-time energy market*, and intends to submit three-part *energy offers.* The IESO will 'Enable' a flag as part of registration that will allow the *market participant* to access the appropriate submit/retrieve features. A 'Disabled' flag allows the participant to submit/retrieve *offer* attributes that exclude *SNL* and *SUC*. The IESO will also assign a start date in order to handle time dependent revisions.

Any status change of the Day-Ahead Offer Template Use Flag from 'Disabled' to 'Enabled', will be communicated via Online IESO, along with instructions to the *market participant* to use the *offer* template file version that allows for the submission of the day-ahead *offer* attributes.

3.5   Day-Ahead Commitment Process – Combined Cycle Plants Registration Requirements

This section applies to combined cycle plants (CCPs) whose units are represented by individual Resources and do not have physically aggregated Resources. Aggregation is explained in [Section 3.7](#).

In addition to any applicable registration requirements in Section 3.4, CCPs are required to submit data listed in Sections 3.5.1 and 3.5.2. *Market participants* intending to utilize pseudo unit (PSU) modeling to schedule their CCP in the day-ahead must also register the data specified in Sections 3.5.3 and 3.5.4.

To deregister *pseudo uni*t Resources, the *market participant* must submit a written request to the *IESO*, at market.registration@ieso.ca. Deregistration must include all of the pseudo unit Resources at the *facility* (i.e., all of the PSUs associated with the CTs that share the same ST). For *facility* deregistration procedures, see [Section 5.1](#).

3.5.1   Combustion & Steam Turbine Configuration Relationships

Potential *dispatch* configuration relationships between combustion turbines (CTs) and a steam turbine (ST) at a combined cycle plant (CCP) must be established in order to ensure that ST constraints, as a result of a DACP commitment, are applied to the correct *minimum loading point* (*MLP)* amount based on the ST schedule, and the scheduled configuration of associated CTs in the day-ahead.

For registration purposes, the ERS must provide the Resource Name and Resource ID of up to four physical CTs and one physical ST, which make up the CCP. From this submission, the *IESO* will be able to derive relationships between the CT(s) and the ST and record their associations.

For participation in PSU modeling, PSU Resources are created and their relationship to a CT and ST is recorded. Each CCP will consist of one ST and at least one CT. The number of PSUs to be registered is equal to the number of CTs at the CCP (see Figure 3-3 below). For more information on PSU modeling, refer to Section 3 of the [Guide to the Day-Ahead Commitment Process (DACP)](#).

Combined cycle relationship data for CCPs participating in PSU modeling are used to:

- Calculate PSU DGD values from physical unit submissions,
- Allocate physical unit derating and transmission limitations to the PSU level,

- Translate the PSU day-ahead schedule to physical unit (PU) level, and
- Enable DA-PCG *settlement* of PSUs on the PU level.

The *IESO* validates the data for all physical Resources (CTs and ST) based on the following rules:

- Each Resource has been registered individually,
- Each Resource is part of the same *registered facility,*
- Each Resource has a Resource *bid* type of '*Dispatchable*',
- The Resources are not part of a physically aggregated Resource,
- All Resources are under the operational control of a single *market participant*, and
- All Resources are assessed a *settlement* under a single *metered market participant.*

For participation in PSU modeling as part of day-ahead scheduling of the CCP, further validation by the *IESO* includes:

- The number of PSUs registered is equal to the number of CTs registered to the CCP
- Each PSU will have a unique CT
- All CTs at a CCP that register as a PSU must share the same ST
- DA-PCG eligibility for each PSU Resource will be based on physical CT unit technical data
- PSU market type participation (i.e., *energy market*, *operating reserve markets*) shall be identical to that of the physical CT unit registration data
- PSU administrative relationships (i.e., *RMP*, *MMP*, as well as *RMP* user eligibility to submit *dispatch data*) shall be identical to that of the physical CT unit technical data
- PSU Maximum Generator Capacity (MGC) will be calculated and recorded based on the MGC of the CT and ST, and the parameter registered in [Section 3.5.3](#). Computed parameters need to be rounded to the nearest single decimal value.
  PSU MGC = (ST Share% * ST MGC) + CT MGC
- PSU Maximum Ramp Rate will be calculated and recorded based on the sum of the Maximum Ramp Rate of the CT and ST.

The CCP relationships and registration requirements are summarized in Figure 3-3:

Legend: *Combined cycle plants* require all "**red line**" relationships shown to be established.
Combined cycle plants that elect to use the pseudo unit model require all "**red line**" and "**blue line**" relationships shown to be established.
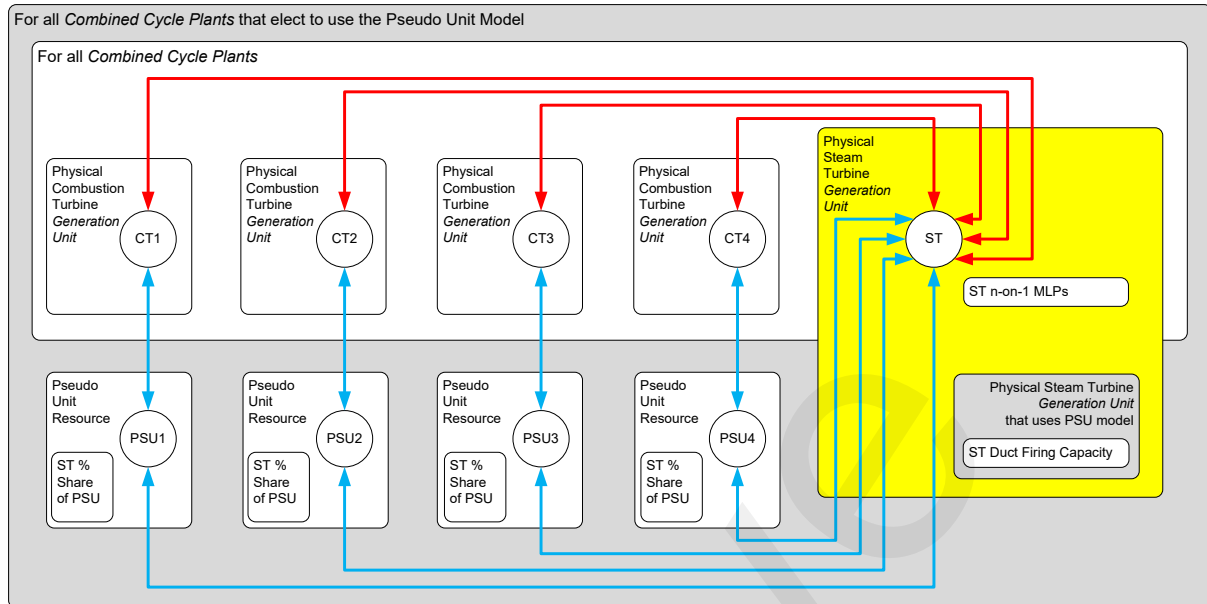
Figure 3-3: Combined Cycle Plant Relationships and Registration Requirements

3.5.2   Steam Turbine Minimum Loading Point

The *MLP* of an ST at a CCP may differ depending on the number of CTs that obtain a schedule from the DACP. For registration purposes, *n*-1 additional ST MLPs are required for all combined cycle configurations on top of the *MLP* submitted for a 1 CT on 1 ST configuration, where *n* is equal to the number of CTs at the CCP. Each value must reflect the actual capability of the *generation unit*. In the day-ahead timeframe, the additional registered ST MLPs will be used to validate DGD submissions of ST MLPs.

The *IESO* will validate the submission based on the following validation rules:

- Must be an ST part of a CCP,
- Number format xxxx.x – unit is MW, and
- $0 < MLP(i-1)\text{-on-}1 < MLP(i)\text{-on-}1 =< MGC$

In the above formula, "i" represents an index for the ST MLP to indicate its relationship to the CCP configuration. The" i" is defined as a variable $2 =< i =< n$, where "n" is the number of CTs at the CCP.

3.5.3   Steam Turbine Percentage Share of a Pseudo Unit

The ST percentage share of a PSU is the amount of ST capacity associated with each PSU, expressed as a percentage. For the purpose of registration, the number of share percentage values to be submitted by the *market participant* is equal to the number of CT Resources in the CCP being registered.

The values are captured only for *market participants* intending to use PSU modeling and must reflect the technical characteristic of the *generation unit*. The registered ST Percentage Share of a PSU value is used to calculate the Maximum Generator Capacity (MGC) and Duct Firing Operating Region of a PSU.

The data will be validated by the *IESO* on submission based on the following validation rules, which are mandatory for all PSUs:

- Number of share percentage values provided must equal the number of CT Resources in the CCP being registered for PSU modeling

- Each value must have number format xxx.x%

- Each value must be a non-negative value

- Each value (of ST Share %) multiplied by the ST MGC must be greater than or equal to the ST MLP1-on-1 [ST Share % * ST MGC >= ST MLP1-on-1]

- Sum of all share percentages must equal 100.0%

3.5.4 Steam Turbine Duct Firing Capacity

Duct firing capacity is the capacity available from the duct firing of a physical ST. For registration purposes, a single value of duct firing capacity will be provided and captured for an ST Resource associated with a CCP that has indicated the desire to use PSU modeling.

The value must reflect the actual capability of the *generation unit*. The registered ST duct firing capacity value will be used to calculate the duct firing operating region of a PSU.

The data will be validated by the *IESO* on submission based on the following validation rules:

- Must be an ST from a CCP,

- Number format xxxx.x – unit is MW, and

- 0 =< Duct Firing =< ST MGC – [(Registered Number of Combustion Turbines at a Combined cycle plant) * (Registered ST MLP1-on-1)]

3.6 Operating Reserve - Dispatchable Load

3.6.1 Eligibility Criteria for Participation in the Operating Reserve Markets

Dispatchable load Resources must have a predictable, periodic consumption cycle, and meet the eligibility criteria for participation in the *10-minute* and *30-minute reserve* market as described in Table 3-5:

Table 3-5: Dispatchable Load Eligibility Criteria

	Criteria	Rationale
1	Must demonstrate a **load cycle of more than 0.75** (total minutes consuming divided by total minutes of the cycle period)	This allows the *IESO* to make assumptions about the availability and consumption level of the load Resource. A lower duty ratio means that the *IESO* has to carry more *10-minute or 30-minute reserve* or *regulation* to compensate for a higher uncertainty of the ability of the load to comply with the *10-minute* or *30-minute reserve* activation request.
		This also limits the exposure of that load in the event it's scheduled for *10-minute or 30-minute reserve* but not able to activate because it would be down 10 or 30 minutes after receipt of the activation message.
		For instance, for *10-minute non-spinning reserve*, if a load were down six (6) minutes then up four (4) minutes, it would meet

Criteria		Rationale
		criterion #2, but have a duty cycle of 40%. However, if it were activated in minute 3, then ten minutes later (i.e., minute 13) it would have been down anyway. Criterion #2 combined with criterion #4 limits this exposure.
2	Must **NOT be at zero consumption for more than 10 minutes** at a time (exceptions are allowed for unplanned events)	Required to ensure that the load Resource will be able to respond to a *10-minute reserve* activation and reduce load within 10 minutes (i.e., the Resource 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 *30-minute reserve* activation and reduce load within 30 minutes (i.e., the Resource 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 *10-minute* or *30-minute reserve*	*NPCC* Directory 5 Reserve
5	Must be able to respond to the *IESO*'s activation request for *10-minute reserve* and reduce load within **10 minutes**	• *IESO market rules*, definitions of 10- and 30-minute reserve • *NERC* Glossary of Terms
6	Must be able to respond to the *IESO*'s activation request for *30-minute reserve* and reduce load within **30 minutes**	• *IESO market rules*, definitions of 10- and 30-minute reserve • *NERC* Glossary of Terms

3.6.2 Batch Type Dispatchable Loads

Most of the *dispatchable loads* participating in the *energy market* are of the continuous process type. However, some loads are batch type processes, meaning that there are cyclical periods during the *bidding* hour in which they are operating at 0 MW in order to refuel or unload.

Batch type loads may be considered for participation in the *energy market* as *dispatchable loads* provided:

- The batch type load has an hourly consumption schedule that is predictable at least two (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*, and
- The batch type load exhibits 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.

3.7   Aggregation

At or subsequent to their initial registration, *market participants* may apply to aggregate *generation units* or load equipment for *bid/offering* purposes. However, the IESO will only grant the request if the aggregation will NOT affect *system operating limits*, and will NOT affect *security* or resource *adequacy* assessments.

3.7.1   Resource Compliance Aggregation

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

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

The request for aggregation will be considered based on:

- Whether the Resources to be aggregated are *quick-start* Resources or non-*quick-start* Resources. Where a *market participant* wishes to register non *quick-start* Resources, such Resources will be subject to ramp rate restrictions when exercising compliance aggregation in real-time. These restrictions are outlined in [Market Manual 4.3: Real-Time Scheduling of the Physical Markets](#), Section 10,
- Whether the Resources are related Resources (e.g., river systems), and
- The likelihood that the Resource will be sent to Unit Specific Dispatch (USD) for *security* reasons.

If the request for aggregation is approved, the *market participant* will be notified. The in-service activities of the aggregated Resources are coordinated by the *IESO* in the same way as for any new or modified *facility*.

3.8   Real-Time Generation Cost Guarantee

Any non-quick start *generation facility* can also opt to register their Resource in the Real-Time Generation Cost Guarantee (RT-GCG) program by submitting a request online and providing technical data and supporting documentation to validate such data. To be applicable, the *market participant* must also meet the requirements specified in [Market Rules Chapter 7](#), Section 2.2B.1.

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 they believe that the technical data does not support the request.

Initial registration in the program or changes will be processed during regular *business days* and within 10 *business days* of receipt. Updates such as registration, deregistration or changes to *MRT*, will always become effective two days after the change is approved.

Market participants may choose to deregister their *facilities* from the RT-GCG program by submitting a request through Online *IESO*. For facility deregistration procedures, see [Section 5.1](#).

3.9   Variable Generation Facility Registration

All *variable generators* having wind and solar photovoltaic *generation facilities* with an installed capacity of 5 MW or greater, and all wind and solar photovoltaic *facilities* that are directly connected to the *IESO-controlled grid* are required to:

- Authorize as a program participant for centralized forecasting service (see Section 2.3.2),

- Register via Online IESO to provide operational and meteorological monitoring data for centralized forecasting service, then (after being registered) provide the data via Online IESO (see Sections 3.9.1 through 3.9.4),

- Submit *facility* data for their equipment and supporting documentation for their meteorological equipment via Online IESO. See Appendix C (wind) and Appendix D (solar) for complete listings of the required *facility* data. Submitted data is reviewed and (if the data meets requirements) approved by the *IESO*, and

- Coordinate with the *IESO* for scheduling and performing data monitoring (operational and meteorological) tests.

3.9.1   Operational and Meteorological Monitoring

As *market participants*, *variable generators*[26] must provide operational telemetry to the IESO and are subject to the operational monitoring requirements outlined in *Market Rules Appendix 4.15 and to the performance required outlined in Market Rules Appendix 4.19*. These requirements are based on a per *facility* basis. All operational monitoring shall be provided to the *IESO* as per the specifications defined in Section 4 of the *Market Manual 6: Participant Technical Reference Manual (PTRM)*.

Meteorological monitoring that measures local weather at the *facility* shall be provided to the *IESO* at least once every 30 seconds and shall not be modified in any way (i.e., the provided value is not an averaged value).

3.9.2   Meteorological Monitoring - Wind Generation Facilities

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

Each wind turbine must be no further than 5 km from the nearest meteorological data collection point. A wind *generation facility* may collect and send meteorological data from as many points at the *facility* as are available.

Data is collected through the use of meteorological towers, sodar or lidar technology, nacelle mounted equipment, or a combination of these methods[27]. However, the minimum number of meteorological towers or sodar/lidar units per *facility* must be met, as per Table 3-8, prior to considering any other technology (i.e. nacelle mounted equipment). Multiple *facilities* can provide data from the same data collection points if they are within the 5 km range.

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[26] As per Market Rules Appendix 4.19, the *IESO* considers medium performance to be acceptable for embedded *variable generators* (i.e., program participants).

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

3.9.3   Meteorological Towers and Sodar/Lidar Technology

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

If a wind *facility* provides weather data using sodar or lidar technology, supplementary nacelle mounted wind speed and direction data shall be provided. Meteorological monitoring using nacelle mounted equipment shall comply with the requirements as stated in Table C-4 of Appendix C.

Table 3-6: Met Tower or Sodar/Lidar Unit Requirement for Wind Facilities

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

3.9.4   Operational Monitoring - Solar Generation Facilities

At the time of registration the *IESO* will provide the ERS with a list of applicable monitoring based on the requirements in Appendix D (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 12 km 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.

3.10   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 markets* can submit *facility*-specific data stating the number of *forbidden regions*. Up to three sets of *forbidden region* values, and a *period of steady operation* can be submitted through the Manage Resource tab in Online IESO.

3.10.1 Period of Steady Operation

The *period of steady operation* is specifically for non-quick start *facilities* (e.g., nuclear *generation*) and may also include combined cycle and *cogeneration facilities*. This value is stated in number of five-minute intervals (0, 1, or 2), and is used to ensure that units do not reverse direction without a minimum *period of steady operation*. Depending upon the data submitted by *market participants*, it may be necessary for the *IESO* to adjust the *period of steady operation* value for some units if there is a negative impact on overall system operation. *Market participants* will be notified through Online IESO of any changes to this value.

3.10.2 Forbidden Regions

Forbidden regions are specifically for hydroelectric *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, NOT economic operation. Forbidden region values allow the *IESO* to not schedule *facilities* within these predefined operating ranges. If applicable, *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 submitted data and may request additional technical data to support the values submitted. The *IESO* may deny registration of the submitted values if they believe that the technical data does not support the request.

If no values are submitted or approved, then the *IESO* shall assign through Online IESO default values of zero for the number of *forbidden regions* and the *period of steady operation*.

3.11 Electricity Storage Facility Registration

All *electricity storage participants* are required to submit *facility* data and provide operational monitoring to the *IESO*. This includes: (i) *electricity storage participants* intending to participate in the IESO-*administered markets* and (ii) *embedded electricity storage participants* that are not *market participants* but are program participants.

Electricity storage participants intending to participate in the *IESO-administered markets* are required to register in accordance with this *market manual*.

In accordance with Market Rules Chapter 7, Section 21, the evolution of the participation framework for electricity storage in Ontario to potentially provide for fuller integration of electricity storage into the Ontario wholesale electricity markets and grid is under consideration by the *IESO*.

Some or all of the requirements set out herein may change as a result of such evolution, and the IESO may, in connection with such changes, require *electricity storage participants* to modify their registration and operational arrangements in accordance with future *market rule* amendments which may supplant the requirements stated herein.

An *electricity storage participant* can register its *facility* in one of three ways:

- Dispatchable *electricity storage facility*.
- *Self-scheduling electricity storage facility* providing *regulation*[28] service only
- *Self-scheduling electricity storage facility* not providing *regulation* service

An *electricity storage participant* participating in the *energy market*, *operating reserve market*, or capacity auction must register its *facility* as a dispatchable *electricity storage facility.* Further details

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[28] *Regulation* is an *ancillary service* that is currently contracted by the *IESO*. A contracted *electricity storage facility* may not exceed an *electricity storage facility size* of 50 MW as per Market Rules Chapter 7, Section 21.3.2

on *electricity storage facility* participation in the *capacity auction* can be found in [Market Manual 12.0: Capacity Auctions](#).

An electricity storage participant participating in the *energy market* only (not the *operating reserve market* or *capacity auction) may register as a self-scheduling energy storage facility,* if its *electricity storage facility size* is less than 10 MW.

A *self–scheduling electricity storage facility* registered to provide *regulation* service will not be permitted to participate in the *energy market* or the *operating reserve market*.

Prior to registering with the IESO*, electricity storage participants* may be required to complete a *connection assessment* as described in Market Manual 1.4: Connection Assessment and Approval Procedure.

3.11.1 Registering Resources

Electricity storage facilities are modelled within the *IESO* tools as a combination of separate generation and load Resources representing their injection and withdrawal capabilities.

As such, *electricity storage participants* will need to register Resources associated with their *facilities* as per Table 3-7.

Table 3-7: Electricity Storage Registration Type versus Resource Mapping

Type	Resources
Dispatchable Electricity Storage Facility	Dispatchable generation Resource(s) Dispatchable load Resource(s)
Self-Scheduling Electricity Storage Facility (providing *regulation*)	Self-scheduling generation Resource(s)
Self-Scheduling Electricity Storage Facility (not-providing *regulation*)	Self-scheduling generation Resource(s) Non-dispatchable load Resource(s)
Embedded Electricity Storage Facility (not a *market participant*[29])	Self-scheduling generation Resource(s) Non-dispatchable load Resource(s) only if required by IESO

3.11.2 Facility Data

Electricity storage participants shall submit *facility* data via Online IESO for their equipment and Resources.

In addition to the equipment data that is required in Online IESO, the IESO will require the following additional data:

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[29] *Embedded electricity storage facilities* that are *market participants* will register in the other three categories stated above.

Table 3-8: Additional Required *Electricity Storage Facility* Data

Parameter	Description
Certified Duration of Service (injecting)	The certified time an *electricity storage facility* can inject continuously until it reaches its Certified Lower Energy Limit, assuming the *electricity storage facility* operates at its Upper Power Operating Limit (injecting).
Certified Duration of Service (withdrawal)	The certified time an *electricity storage facility* can withdraw continuously until it reaches its Certified Upper Energy Limit, assuming the *electricity storage facility* operates at its Upper Power Operating Limit (withdrawing).
Cycle Efficiency	The percentage of withdrawn *energy* that is re-injected over one full cycle of the *electricity storage facility*. During any certification or recertification test, *energy* withdrawals occur at the Lower Power Operating Limit (withdrawing) and *energy* injections occur at the Upper Power Operating limit (injecting).
Certified Upper Energy Limit	The highest certified energy amount to which an *electricity storage unit* can be consistently charged without damage beyond expected degradation from normal use.
Certified Lower Energy Limit	The lowest certified energy amount to which an *electricity storage unit* can be consistently discharged without damage beyond expected degradation from normal use.
Upper Power Operating Limit (injecting)	The maximum active power output (MW) for operation when injecting.
Lower Power Operating Limit (injecting)	The minimum active power output (MW) for operation when injecting.
Upper Power Operating Limit (withdrawing)	The maximum active power consumed (MW) when withdrawing.
Lower Power Operating Limit (withdrawing)	The minimum active power consumed (MW) when withdrawing.

3.11.3   Data Monitoring

As *market participants*, *electricity storage participants* are subject to the operational data monitoring requirements outlined in Market Rules Appendix 4.24. These requirements are on a *facility* basis.

Note, those that are providing *regulation* will need to provide a Basepoint, which is an economic dispatch value (in MW) as determined by the *IESO* or the *market participant*.

Within the required monitoring data outlined in Market Rules Appendix 4.24 of Chapter 4 Appendices, there are several additional monitoring data unique to electricity storage which *electricity storage participants* are required to provide to support the evolution of the permanent framework and are summarized in Table 3-9.

Table 3-9: Electricity Storage Data Monitoring – Evolving Framework for Electricity Storage

Telemetry Point	Description
Economic Maximum Power Mode (ECO_$P_{max,g}$)	The dynamic, current maximum active power output for operation as provided by the *market participant*.
Economic Minimum Power Mode (ECO_$P_{min,g}$)	The dynamic, current minimum active power output for operation as provided by the *market participant*.
Economic Minimum Charge Limit (ECO_$SOC_{min,g}$)	The dynamic, current minimum energy limit (MWh) that is provided by the *market participant*.
Economic Maximum Charge Limit (ECO_$SOC_{max,g}$)	The dynamic, current maximum energy limit (MWh) that is provided by the *market participant*.

All operational monitoring shall be communicated to the *IESO* in accordance with *IESO* approved methodologies and standards as set out in the [*Market Manual 6: Participant Technical Reference Manual*](), Section 4.

3.11.4   Requirements for Operating Reserve Market Participation

Electricity storage participants may elect to register to provide *operating reserve:* (i) with its injection capability only (i.e., as a generation Resource), (ii) with its withdrawal capability only (i.e., as a load Resource), or (iii) with both its injection and withdrawal capabilities (i.e., as both a generation and a load Resources)

Electricity storage participants wishing to provide *operating reserve* must meet the eligibility criteria for participation in either the *ten-minute operating reserve* or *thirty-minute operating reserve* markets, or both markets, as described in Table 3-10. *Operating reserve* offers and operational requirements for *electricity storage facilities* are described in Market Manual 4: Market Operations Part 4.2: Submission of Dispatch Data in the Real-Time Energy and Operating Reserve Markets.

Table 3-10: Requirements for Operating Reserve Market Participation

	Requirement	Purpose and/or Applicable Rule, Standard, etc.
1	To offer *operating reserve* from the load Resource: Electricity storage must be able to withdraw continuously for at least 70 minutes at or above the minimum *operating reserve* capability (withdrawal). The minimum *operating reserve* capability (withdrawal) must be at least 1 MW.	This is to ensure that the *facility* has the capability to withdraw continuously at the minimum *operating reserve* capability for an adequate duration before reducing to zero consumption should an activation be called at the end of a *dispatch hour*. For more details, please refer to Appendix A of Market Manual 4: Market Operations Part 4.2: Submission of Dispatch Data in the Real-Time Energy and Operating Reserve Markets.

	Requirement	Purpose and/or Applicable Rule, Standard, etc.
2	To offer *operating reserve* from the generating resource: Electricity storage must be able to inject continuously for at least 130 minutes at or above the minimum *operating reserve* capability (injection). The minimum *operating reserve* capability (injection) must be at least 1 MW.	This is to ensure that the *facility* has the capability to inject continuously at the minimum *operating reserve* capability for an adequate duration should an activation be called at the end of a *dispatch hour*. For more details, please refer to Appendix A of Market Manual 4: Market Operations Part 4.2: Submission of Dispatch Data in the Real-Time Energy and Operating Reserve Markets.
3	To provide *operating reserve* from the load Resource: Must be able to maintain **a zero consumption level for at least one hour** when activated for *ten-minute* or *thirty-minute operating reserve*	Comply with *NPCC* Directory 5 Reserve
4	To provide *operating reserve* from the generating resource: Must be able to sustain level of *operating reserve* provided for at least one hour when activated for *ten-minute or thirty-minute operating reserve*	Comply with *NPCC* Directory 5 Reserve
5	Must be able to respond to the *IESO*'s activation request for *ten-minute operating reserve* and provide *offering reserve* within **10 minutes**	• Market Rules, Chapter 11, definitions of *ten-minute operating reserve* and *thirty-minute operating reserve* • *NERC* Glossary of Terms
6	Must be able to respond to the *IESO*'s activation request for *thirty-minute operating reserve* and provide offering reserve within **30 minutes**	• Market Rules, Chapter 11, definitions of *ten-minute operating reserve* and *thirty-minute operating reserve* • *NERC* Glossary of Terms

3.12   Next Steps

Although not always mandatory, once the Stage 5: Register equipment process is complete, the next stage in connecting to Ontario's power system is Stage 6: Commission equipment and validate performance. This process is outlined in the Commission equipment and validate performance process diagram.

3.12.1 Commission Equipment

During the Commission Equipment stage, the *market participant* conducts commissioning tests of the equipment installed at their *facility.* These tests are scheduled according to the procedures in [Market Manual 7.3: Outage Management](#).

The purpose of the commissioning tests is to confirm whether the equipment:

- Meets the requirements and expectations established during the *connection assessment* process and defined in the Notice of Conditional Approval to Connect (NoCA),

- Is impactive on the *reliability* of the *IESO-controlled grid*, and

- Should be included in the *outage* reporting requirement.

    All exclusions from the *outage* reporting requirement are subject to periodic review by the *IESO* and may be revoked at any time as a result of such a review and/or changes to *registered facilities*.

Commission testing consists of four (4) steps, which are described in full on the [Stage 6: Commission equipment and validate performance](#) webpage:

1. Submit commissioning request
2. Submit commissioning test plan
3. Complete commissioning test
4. Submit commissioning test report

3.12.2 Performance Validation

The primary purpose of performance validation is to mitigate risks that equipment will not be suitable for connection to the IESO-controlled grid. Performance validation applies to new equipment, as well as to equipment that has been modified such that it causes a change to its performance characteristics.

During the Register Equipment procedures, the ERS will receive notification from Online IESO if performance validation is required. For more information, refer to Market Manual 1.6: Performance Validation.

– End of Section –

4.   Maintain IESO Registered Data

The purpose of *the* Maintain IESO Registered Data procedures is to maintain data such that the *IESO* retains current and accurate information on Participants and their *facilities*, equipment, Resources, and people and their contact information and system accesses registered with the IESO.

Changes to registered data should be made in [Online IESO](#) as soon as possible before they take effect. However, some proposed changes must be identified to the *IESO* well before they take effect.

> ⚠️ **Important**   It is the responsibility of the Participant to review and maintain their *IESO* registered data and submitted supporting documentation on an enduring basis, to ensure that they all are correct.

4.1   Maintain Organization/Participant Registered Data

Market participants, via their [Applicant Representatives](#), are required to maintain *IESO* registered data, including supporting documentation, by reviewing and updating them as necessary in Online IESO. Examples of IESO registered data include (but are not limited to):

- Organization name, address, contact information, etc.,
- Access to IESO systems
- Market or program participant authorization type
- Bank account data
- Supporting documentation (e.g., *prudential* support, OEB licence, CER permit)

Market Rules Chapter 9, Section 6.18 requires that Participants provide details of changes to bank details or *settlement account* details at least 60 *business days* before the change takes effect.

4.1.1   Change Organization Name

When a Participant is seeking to change their organization name, as stated in the original *participation agreement*, then the Authorized Representative must initiate a change by sending a request to market.registration@ieso.ca as soon as possible after the name change date has been officially set. The request should include the reason for the name change. The Participant will be instructed to upload applicable supporting documents through Online IESO (e.g., official statement of merger or buyout).

After the supporting documents are reviewed by the *IESO*, including a possible *IESO* Legal review, the IESO will contact the Authorized Representative to advise on whether any additional supporting documents are needed. If no additional supporting documents are needed, the Participant will then re-register the organization, using the procedures in [Section 2: Authorize Market and Program Participation. A](#) new *Participant Agreement* will be generated, [printed, and issued for signature as described in Section 2.1.1.](#)

The Participant must also update their *prudential support* information, as well as update and submit *OEB Licence* and (if applicable) CER permit (see [Section 2.2.1](#)).

4.1.2   Change Participant Type

Upon receiving a request from a *market participant* to change their participant type, the *IESO* is required to verify any possible impact the requested class change may have on the *market participant's facility* information, and whether the change has any real or potential impact on the *security* and *reliability* of the *IESO-controlled grid*.

4.1.3   Access Additions/Changes to IESO Systems

The Participant's Rights Administrator may need to update, add, and/or delete users to access to the *IESO* systems used for exchanging data between themselves and the *IESO* (e.g., Online IESO, IESO Gateway). For these situations, refer to Market Manual 1.3: Identity Management Operations Guide for information on system access.

4.1.4   Changes to Mandatory Organization Contacts

A Participant may request a change to one of their mandatory organization contacts (see Section 2.1) by submitting a task through Online IESO on the day before the change is to take effect, or as soon as possible after. The change must be requested by another mandatory organization contact:

- A request to change an **Applicant Representative** may be submitted any mandatory organization contact who is registered in Online IESO.

- A request to change a **Rights Administrator** may be submitted by either an Authorized Representative, Primary Contact, or another Rights Administrator who is registered in Online IESO and is still in that role.

- A request to change a **Primary Contact** may be submitted either by an Authorized Representative or another Primary Contact who is registered in Online IESO and is still in that role.

Online IESO sends an automatic annual email notification to each participant on the anniversary date of their registration requesting they confirm that their mandatory organization contacts are still accurate, or to make any necessary changes.

Changing an Authorized Representative

A request to change an **Authorized Representative** may be submitted through Online IESO by any mandatory organization contact. However, the request must be accompanied by a letter (on company letterhead) from either the new Authorized Representative, or from another Authorized Representative who is registered in Online IESO and is still in that role. The letter must include the following information:

- Name (legal and if applicable, known name), email address, and phone number of the new Authorized Representative,

- Attestation either from self (if the new Authorized Representative is to be the only Authorized Representative) or from the Authorized Representative writing the letter that the person identified is now an Authorized Representative,

- Attestation that the new Authorized Representative has the authority to contractually bind the company,

- Attestation that any registered Authorized Representatives who are no longer in that role should be removed from that role,

- The effective date of the Authorized Representative change, and
- Printed name and signature of the Authorized Representative writing the letter.

Changing all Mandatory Organization Contacts

In a situation where all of a participant's registered mandatory organization contacts have changed (e.g., a complete management turnover), a representative of the organization's new management who has the authority to contractually bind the company should contact *IESO* Customer Relations (customer.relations@ieso.ca) to begin the process of registering their new mandatory organization contacts.

4.2   Facility and Equipment Data Maintenance

After approval of a *facility* for participation in the *IESO-administered markets*, the *IESO* uses the maintenance procedures to ensure that all *facilities* continue to meet the minimum requirements defined by the *market rules*. In addition, the maintenance procedures ensure that any changes or additions to *facilities* participating in the *IESO-administered markets* or their related data stored in Online *IESO* do not negatively impact the *security* or *reliability* of the *IESO-controlled grid*. For example, *facility* maintenance is required in the following circumstances:

- Market participation changes, such as:
    - Resource type (*generator*, load, etc.)
    - *Bid* type (*dispatchable* [regular][30], non-dispatchable, *self-schedule*d, intermittent)
    - *Operating reserve* (10-minute or 30-minute) changes
    - *Facility* type (*generator*, load, etc.)
    - Combined cycle *facility* modelling changes (pseudo unit model, etc.), and
- Physical site modifications (e.g., changes in MW output, ramp rates, governor models, data monitoring, and voice communication equipment, etc.),
- Changes in operational control, as defined by the *registered market participant (RMP)*.

Market participants manage their *facility*, Resource, and equipment data, and relationship data using Online IESO. *Market participants* are required to submit a change request through Online IESO to notify the *IESO* about any changes, additions, or deletions to data concerning their Physical Facilities*.* These changes may impact the data stored in Online *IESO,* or supporting documentation relating to the *facility*.

Any changes that the *market participant* cannot make through Online IESO must be emailed to market.registration@ieso.ca. The *IESO* will update the relevant data in Online IESO, which the *market participant* can then confirm by accessing their Online IESO registration data.

Depending on the nature of the change request*,* the *IESO* may need to prepare and issue a Registration Approval Notification (RAN) to the *market participant* in order to approve the change. As a guideline to participants with existing facilities, the IESO will issue a RAN for changes such as, but not limited to:

- Resource attribute changes:

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[30] Sandbox testing, facilitated by the *IESO*, is required for new *RMPs* going *dispatchable* for the first time.

- o *Operating reserve* type,
- o Decease/increase in maximum capacities,
- o *Bid/offer* type (i.e., from non-dispatchable to *dispatchable*),
- o Minimum run time (MRT), *minimum generation block run time (MGBRT)*, *minimum loading point (MLP)*, and
- o Participation in an *IESO* program (e.g., Real-Time Generation Cost Guarantee [RT-GCG], *Demand Response [DR]*, Capacity Auction).

- Physical equipment changes (including operating nomenclature changes):
  - o Breaker, transformer, and switch replacements,
  - o Static VAR Compensator (SVC), STATCOM, capacitor and reactor,
  - o Remedial Action Scheme (RAS),
  - o Modifications to *Automatic Voltage Regulator* (*AVR)*, Power System Stabilizer (PSS)

- Relationships changes for equipment at a *facility* or Resource (i.e., ownership, operation, or RMP changes)

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

It is recommended that the participant email market.registration@ieso.ca early in the change process to determine if a RAN is required.

The following subsections cover specific types of *facility* data changes.

4.2.1   Data Monitoring and Voice Communications Changes

Any change to a *market participant's* data monitoring or to voice communications *facilities* requires re-submission via Online IESO and, if necessary, revised single-line diagrams (SLDs). Changes to this data may require the *market participant* to redo certain *facility* tests (see Section 3.3). After assessment of the requested changes, the *IESO* will notify the *market participant* through Online IESO whether the requested changes have been approved or denied.

4.2.2   Assessments for Operating Reserve Market Participation

Requests to change a *facility*'s registration data 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 registration data indicates that there may be difficulty in providing *10-minute* vs. *30-minute reserve*, and

- Whether the *dispatchable load facility* or *electricity storage facility*   is eligible to provide *10-minute* or *30-minute reserve*.

4.2.3   Changes to Self-scheduling Generators

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

- 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*.

4.2.4   Changes to Intermittent Generators

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

4.2.5   Changes to Electricity Storage Facilities

Any request for a change to an *electricity storage facility* will be assessed ensuring that the change to the *facility* will not affect *security* of the *IESO-controlled grid*. The participant shall submit sufficient documentation relating to the requested change and this documentation must be approved by the *IESO*.

4.2.6   Changes to Cogeneration Facilities

A *cogeneration facility* that is currently deemed to be 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)](#)*.

4.2.7   Transfer of Facility Registration

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

- The identity of the transferee and whether or not they are or intend to be a *market participant*, and

- The date on which the proposed transfer is to take place.

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

- Confirmation that it is willing and able to assume control of the *facility* to be transferred and to comply with all provisions of the *market rules* related to *facilities* and any *reliability must-run contract* or *contracted ancillary services* contract applicable to the *facility*,

- A new Connection Agreement,

- A new *OEB licence*,

- A new or revised *Restoration Participant* Attachment (if applicable),

- Any changes related to the operational control of the *facility* (e.g., new *Registered Market Participant* data),

- 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*.

In a rare case, where the *facility* and Resources refer to the prior *market participant's* name, the new *market participant* will be required to register a new *facility* and Resource names in Online IESO to ensure they do not negatively impact the *security* or *reliability* of the *IESO-controlled grid*. The new *facility* owner is also expected to complete this registration change with their applicable *transmitter* or *distributor*.

If the proposed transferee is not a *market participant* at the time the request for transfer is made, the *IESO* will not approve the transfer until such time as the transferee has completed the Participant Authorization Procedures (see Section 2). All obligations will remain with the current *market participant*.

4.3   Document Changes

Market participants are required to resubmit the following documentation to the *IESO* any time the content of the original document changes:

- *OEB licence*
- Connection Agreement
- Restoration Participant Attachment
- Single-Line Diagram
- Protection Description Document
- Operational Philosophy Document
- *Facility* Description Documents
- Technical data, such as capability curves, protection document, operational philosophy, etc.

Once an updated document has been stored in Online IESO, the previous version is archived in the IESO document management system, where it can be accessed if required.

– End of Section –

5.   Facility Deregistration / Market Participant Withdrawal

5.1   Facility Deregistration

Market participants who wish to deregister one or more facilities are required to file a Notice of Request to Deregister with the *IESO* Manager, Operations Integration by email ([market.registration@ieso.ca)](mailto:market.registration@ieso.ca).

The request to deregister should include, at a minimum, the following information:

- *Market participant* name
- *Facility* name
- *Facility* ID
- Resources
- Reason for deregistration
- The expected deregistration date
- Confirmation that deregistration of the *facility* will not potentially:
  - o Endanger the **safety** of any person,
  - o Damage **equipment**, or
  - o Violate any ***applicable law*** (e.g., environmental)

The *IESO* will review the request and may ask the *market participant* to provide additional data if required.

As stated in [Market Rules Chapter 7](#), Section 2.4.8, *generators* that are *registered facilities* must provide the *IESO* with at least six months' notice of plans to retire a *facility*, as well as notification of any plans the *generator* may have to construct replacement facilities for those being retired. This notice is necessary so that the *IESO* has sufficient time to assess the impact the deregistration could have on the *reliability* of the *IESO-controlled grid*, and whether a full technical assessment is required.

5.1.1   Determining whether Technical Assessment Is Required

Within *10 business days*[31] of receiving a *market participant*'s request to deregister a *facility*, the *IESO* will inform the *market participant* and *the transmitter* to whose *transmission system* the *registered facility* is connected (if applicable) as to whether or not an *IESO* technical assessment of the impact of the *facility's* disconnection on the *reliability* of the *IESO-controlled grid* is required.

5.1.2   When Technical Assessment Is NOT Required

If the *IESO* determines that a technical assessment of a deregistration is not required, they will email the *market participant* and inform them of this decision. The *market participant* will then inform the *IESO* of the date they wish to have the deregistration take effect. The deregistration date:

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[31] The deregistration of a generator, for example, may require a sufficiently longer time period to determine whether a technical assessment is required.

- May not be less than five (5) *business days* after the date on which the *market participant* received the *IESO*'s notification that the deregistration would not require a technical assessment, and
- As applicable, is subject to the date on which the *registered facility* has been disconnected as confirmed to the *IESO* by the relevant *transmitter*.

5.1.3   When Technical Assessment Is Required

If the *IESO* determines that a technical assessment is required, they will notify the *market participant* and the *transmitter* of the anticipated completion date of the assessment, which can be no more than 45 days from the notification date, unless a longer timeframe is mutually agreed upon by the *IESO* and the market participant.

If the technical assessment indicates that deregistration of the facility…	IESO/Market Participant Actions
- Impacts, or could potentially impact the *reliability* of the *IESO-controlled grid*, or - Could potentially endanger the safety of any person, damage equipment, or violate any *applicable law* (e.g., environmental)	The *IESO* will not grant approval for the deregistration of the *facility*. *IESO* Contract Management staff and the relevant *market participant* are required by the *market rules* to enter into good faith negotiations to conclude an agreement for a **reliability must-run contract** for the applicable facility[32].
- Does NOT impact the *reliability* of the *IESO-controlled grid*, and - Does NOT endanger the safety of any person, damage equipment, nor violate any *applicable law* (e.g., environmental), and - The *facility* IS NOT directly connected to the *IESO-controlled grid*	Upon receiving the *IESO response* to the deregistration request, the *market participant* shall email *IESO* to advise of the date they want the *facility* deregistered. The deregistration date shall not be less than five (5) *business days* from the date the *market participant* receives the notification from the *IESO* that the deregistration request is approved. The *IESO* will issue a disconnection letter to the *distributor* or host customer, noting that the *facility* will be deregistered and the date of the deregistration. The distributor or host customer will notify the *IESO* when the facility is disconnected.
- Does NOT impact the *reliability* of the *IESO-controlled grid*, and - Does NOT endanger the safety of any person, damage equipment, nor violate any *applicable law* (e.g., environmental), and - The *facility* IS directly connected to the *IESO-controlled grid*	Upon receiving the *IESO response* to the deregistration request, the *market participant* shall email IESO to advise of the date they want the *facility* deregistered. The deregistration date shall not be less than five (5) *business days* from the date the *market participant* receives the notification from the *IESO* that the deregistration request is approved. The *IESO* will then: 1. **Issue** a disconnection letter to the relevant *transmitter*, directing it to *disconnect* the *registered facility* from the *IESO-controlled grid* on the date specified in the notice filed by the *market participant*.

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[32] The applicable *facility* may be either generation, transmission, or load. Market Rules Chapter 7, Section 2.4.5 refers to "*registered facility*". For more information on *reliability must-run contracts*, please refer to Market Rules Chapter 7, Section 9.6 and 9.7 and Chapter 5, Section 4.8.

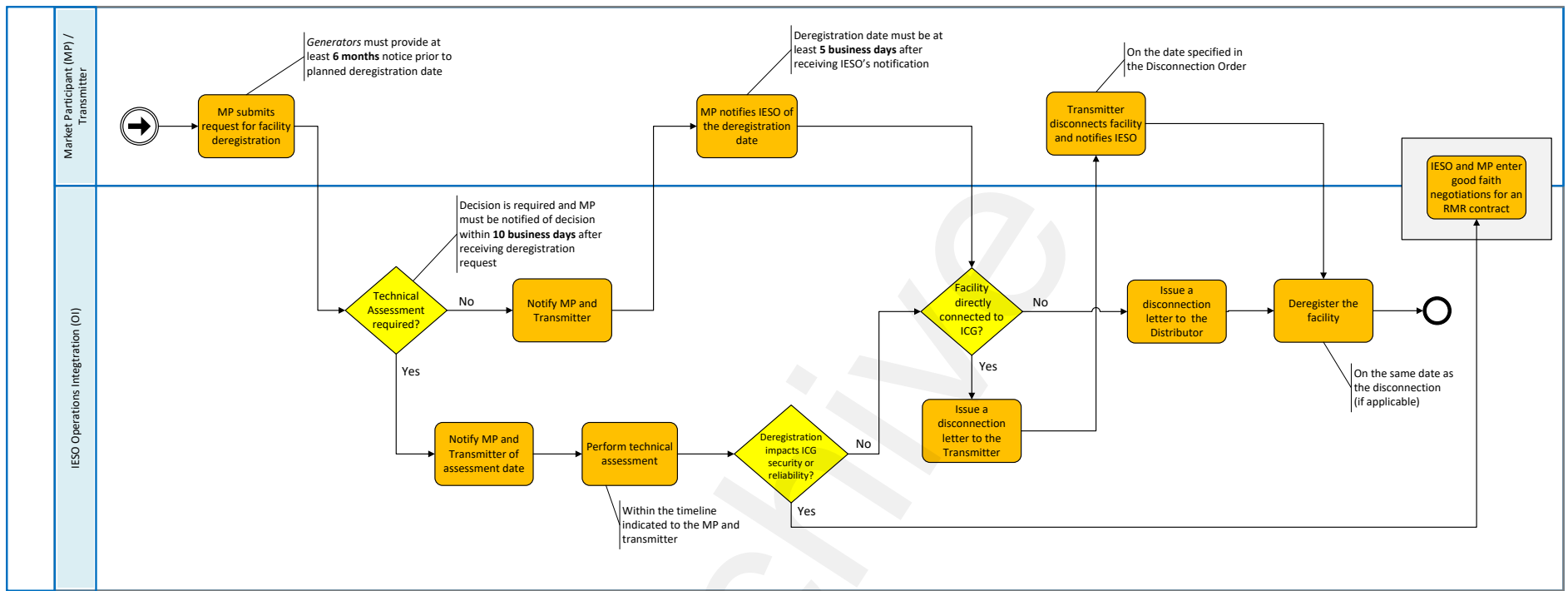| If the technical assessment indicates that deregistration of the facility…	IESO/Market Participant Actions
	2. **Deregister** the *facility* on the date they receive confirmation from the relevant *transmitter* that the *facility* has been disconnected.

Figure 5-1: Facility Deregistration Process (requested by Market Participant)

5.2　Market Participant Withdrawal

A *market participant* who no longer wishes to participate in any of the *IESO-administered markets* or programs must notify the *IESO* by completing and submitting an [Application for Withdrawal form](#). The participant is also required to submit their final contact information together with a request to revoke all user system access and digital certificates when notified by the *IESO*.

The participant withdrawal procedures are distinct from terminating participation from the *IESO-administered markets*, which is covered in Section 5.3. *Market participants* with *registered facilities* shall apply to the *IESO* to transfer or deregister their applicable *facilities* before they submit their application for withdrawal (see Section 5.1).

The Application for Withdrawal form specifies the date which the participant wishes to withdraw. The withdrawal date not be earlier than the date on which:

- The last of the *market participant's* applicable *registered facilities* is to be **deregistered** by the *IESO* and, where applicable, *disconnected* from the *IESO-controlled grid*, or

- The last of the *market participant's* applicable *registered facilities* is to be **transferred** by the *IESO* to another eligible *market participant*.

A participant's application for withdrawal will be reviewed and assessed by the appropriate *IESO* groups with respect to its potential impact on the *reliability* and *security* of the *IESO-controlled grid*, as described in Sections 5.1.1 through 5.1.3. If the *IESO* concludes that the removal from service of a *registered facility* will, or is likely to have, an unacceptable impact on the *reliability* of the *IESO-controlled grid*, the *IESO* and the *market participant* shall enter into good faith negotiations to conclude an agreement for a **reliability must-run contract** for the applicable *facility*[33]. The *registered facility* shall not be removed from service during the course of such process.

If the *IESO* determines that a participant's withdrawal can proceed as per the Application for Withdrawal, the *IESO* will send the participant a Registration Approval Notification (RAN) confirming that the company is authorized to withdraw, and will update the participant's registration record to indicate that they have withdrawn their participation in the *IESO-administered markets* or applicable programs.

A *market participant* who has given notice of their intention to withdraw from the *IESO-administered markets* will cease to be a *market participant* on the latest of the following dates:

- The withdrawal date specified on the **Application for Withdrawal** form, or

- The date the **last** of the *market participant's* applicable *registered facilities* is **deregistered** by the *IESO* and, where applicable, **disconnected** from the *IESO-controlled grid*, or

- The date the **last** of the *market participant's* applicable *registered facilities* has been **transferred** by the *IESO* to another eligible market participant, or

- The date that **all payments** due from the *market participant* have been received by the *IESO*.

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[33] The process is described in Market Rules Chapter 7, Section 9.6 and 9.7 and in Chapter 5, Section 4.8 as explained in Chapter 7, Section 2.4.5.

5.3 Market Participant Deregistration or Termination for Non-compliance

5.3.1 Termination Order

Market participants are monitored on an ongoing basis for compliance with their obligations under the *market rules*. A breach of the *market rules* may result in the *IESO* issuing to the *market participant* a financial or non-financial penalty, a *suspension order*, or a *termination order*.

The *IESO* can also issue a *termination order* if the *market participant* has been wound up, dissolved, or otherwise has ceased to exist.

A *termination order* results in the forced withdrawal (termination) of the *market participant* from the *IESO-administered markets*

For complete information on the compliance processes, including the issuance of *termination orders* by the *IESO*, refer to Market Manual 2.6: Treatment of Compliance Issues.

5.3.2 Deregistration for Non-Compliance

The *IESO* may seek to deregister 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 deregistration 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*. For more information on this process, please refer to:

- [Market Manual 2.6: Treatment of Compliance Issues](#)
- [Market Rules Chapter 3](#), Sections 6.2 and 6.2A

– End of Section –

Appendix A: Organization Contact Roles

Table A-1 lists the contact roles that may be assigned, depending on participation type, by an organization's Applicant Representative. This step-by-step guide will assist an Applicant Representative in adding and updating contact roles.

Table A-1: Organization Contact Roles

Role	Description
Bids **and** *Offers*	Person or section to be contacted regarding the *bids* or *offers* for the organization.
Capacity Auction Contact	Person responsible for all tasks related to capacity auction.
Communications and Customer Service	Person or section responsible for receiving IESO information on communications and media issues and/or delivering customer service for the organization.
Compliance and Market Surveillance	Person responsible for discussing participant conduct and activities within the *IESO-administered markets* for the organization.
Contributor Information Contact	Person responsible for all tasks related to contributor information for the organization.
Control Room Section	Control room section for the organization.
Day-Ahead *Bids* **and** *Offers*	Person or section responsible for submitting and/or changing day-ahead *bids* or *offers* for the organization.
Dispatch Data **Submitter**	Person responsible for submitting and/or changing the real-time *bids*, *offers* or schedules for the organization[34].
Dispatch Data **Viewer**	Person responsible for viewing submitted real-time *bids*, *offers* or schedules for the organization.
Dispatch Instruction Operator(s)	Person(s) responsible for receiving, accepting, or rejecting *dispatch* instructions. Each *market participant* who may receive dispatch instructions must have at least one Dispatch Instruction Operator registered with the *IESO*.
e-Tag Curtailment	Person or section responsible for receiving notifications regarding the limiting of energy flow on an arranged and/or confirmed interchange transaction for the organization.
Emergency Preparedness Plan	Person responsible for submitting and updating the *emergency preparedness plan* for the organization.

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[34] Removing a user as a Dispatch Data Submitter will also remove any standing Dispatch Data the user may have submitted. See Market Manual 4.2 for more details.

Role	Description
Equipment Outage Submitter	Person responsible for submitting, updating, canceling and viewing outage requests on equipment owned or operated by the organization.
Equipment Outage Viewer	Person who can view outage information on equipment owned or operated by the organization, and equipment permitted for viewing by other organizations. **Note:** Do NOT select this role if the **Equipment Outage Submitter** is already selected for this individual.
Equipment Registration Specialist	Person responsible for submitting attributes to their equipment, *facility*, and Resources for the organization. For more information, see Section 3.1.2: Equipment Registration Specialist.
Information Technology	Person or section responsible for communicating with the *IESO* about information technology services, projects, and changes for the organization.
Invoicing and Banking	Person responsible for submitting and maintaining, or approving banking information for the organization.
***MMP* Meter Trouble Report**	Person responsible for monitoring Meter Trouble Reports, adding comments, and receiving Meter Trouble Reports status notifications.
***MSP* Meter Trouble Report**	Person responsible for responding to and initiating Meter Trouble Reports on meter issues and outages.
***MSP* Revenue Metering**	Person responsible for submitting meter registration requests, monitoring in-flight requests and data and viewing the master data for registered meter installations.
Market Participant **Compliance Contact**	Person responsible for reliability compliance under the Ontario Reliability Compliance Program for the organization. This includes preparing and submitting Self-Certifications, periodic data submittals, and data requests. In case of potential non-compliance, the compliance contact is responsible for submitting Self-Reports and providing associated mitigation plans.
Market Participant **Escalation Contact**	Person responsible for reporting reliability compliance on escalated matters (e.g., due dates are missed) under the Ontario Reliability Compliance Program for the organization. This person is preferably of **higher authority** than the person designated as the **Market Participant Compliance Contact**.
Notice of Disagreement	Person responsible for submitting Notices of Disagreement for settlement statements for the organization.
Prudential Requirements	Person responsible for submitting prudential information and is the point of contact for any issues regarding prudentials (e.g., margin calls, warnings and defaults) for the organization.
Revenue Metering	Person responsible for viewing the master data for registered meter installations and in-flight data submitted during a meter registration request. The Revenue Metering contact for a transmitter organization is responsible for approving Site Registration Reports for transmission delivery points.

Role	Description
Revenue Metering Data	Person responsible for managing meter data report profiles, as well as requesting and retrieving revenue meter data reports for the organization.
Settlements	Person responsible for issues/questions relating to settlement statements for the organization.

– End of Section –

Appendix B: Technical Requirements

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

Table B-1 contains references to technical communications requirements contained in the *market rules*. 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. The latest Market Rule Amendments (as posted on the *IESO* website) shall prevail in case of any errors or omissions.

Table B-1: Market Rule Technical Requirements

	Chapter 2 & Appendices				Chapter 4 & Appendices	Chapter 7	
	General	Voice	Data Monitoring	Workstations	Data Monitoring Requirements & Performance Standards	Communications Reliability	
						Data & Workstations	Voice
	Ch 2, Sec 6.1, 6.3 App 2.2, Sec 1.5	App 2.2, Sec 1.1, 1.1.7-11	App 2.2, Sec 1.2, 1.2.6	App 2.2, Sec 1.3 (dispatch) 1.4 (participant)	Ch 4, Sec 7.1, 7.6A, 7.7 (maintenance & repair, MTBF, response times), 7.8 (Reclassification)	Sec 12.1.1, 12.1.2, 12.1.4–6, 12.3	Sec 12.2 12.2.1–12, 12.4
		App 2.2, Sec 1.1.1, 1.1.2	App 2.2, Sec 1.2.1		Ch 4, Sec 7.3 App 4.2, item 9, 4.15, 4.19	Sec 12.1.1.2 12.1.3.1–2	
		App 2.2, Sec 1.1.3	App 2.2, Sec 1.2.4		Ch 4, Sec 7.5 App 4.17, 4.22	Sec 12.1.3.4–5	
		App 2.2, Sec 1.1.4	App 2.2, Sec 1.2.3		Ch 4, Sec 7.2, 7.4 App 4.4, item 9, 4.16, 4.20, 4.21	Sec 12.1.3.3	

		Chapter 2 & Appendices			Chapter 4 & Appendices	Chapter 7	
					Data Monitoring Requirements & Performance Standards	Communications Reliability	
	General	Voice	Data Monitoring	Workstations		Data & Workstations	Voice
		App 2.2, Sec 1.1.5	App 2.2, Sec 1.2.2		Ch 4, Sec 7.5 App 4.17, 4.22	Sec 12.1.3.1–2 12.1.3.4–5	
		App 2.2, Sec 1.1.6	App 2.2, Sec 1.2.5		Ch 4, Sec 7.6 App 4.18, 4.23	Sec 12.1.3.1–2	
		App 2.2, Sec 1.1.12	App 2.2, Sec 1.2.7		Ch 4, Sec 7.3A App 4.24, 4.25	Sec 12.1.1.2 12.1.3.1–2e	

– End of Section –

Appendix C: Wind Facility Data Requirements

Table C-1 identifies *facility* data requirements for the physical layout and details of the turbines. *Market participants* must also refer to [Section 3](#) for registration requirements.

Table C-1: Wind Facility Data Requirements

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

Table C-2 identifies operational monitoring requirements for wind *generation facilities*.

Table C-2: Wind Facility Operational Monitoring Requirements

Operational Monitoring Requirements			
Measurement Type	Unit of Measure	Height of Measurement	Precision (to the nearest…)
MW output[35] (per *facility*)	Megawatt (MW)	N/A	0.1 MW
Available Megawatts[36]	Megawatt (MW)	N/A	0.1 MW

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[35] Megawatts shall be provided as one measurement per *connection point.*

[36] 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*).

Table C-3 identifies monitoring requirements for wind *generation facilities* from Meteorological towers or sodar or lidar units.

Table C-3: Met Tower and Sodar/Lidar Unit Requirements

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

Table C-4 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).

Table C-4: Nacelle-mounted Data Collection Requirements

	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[37]	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%

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[37] 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.

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

– End of Section –

Appendix D: Solar Facility Data Requirements

Table D-1 identifies *facility* data requirements for the physical layout and details of the solar arrays. *Market participants* must also refer to [Section 3](#) for registration requirements.

Table D-1: Solar Facility Data Requirements

#	Static Plant Data	Description
1	Solar *facility* location (latitude and longitude) [38]	Physical location (GPS coordinates) of each solar array[39].
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 *generation 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)[40], 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)

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[38] 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 5 km 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.

[39] Solar array is defined as a collection of solar panels that share a *connection point* going into an inverter.

[40] If the tracking feature is disabled the *generator* shall notify the *IESO* using the address renewableforecastinfo@ieso.ca with as much notice as possible.

Table D-2 identifies operational monitoring for solar *generation facilities*.

Table D-2: Solar Facility Operational Monitoring Requirements

		Operational Monitoring Requirements			
#	**Measurement Type**	**Definition**	**Unit of Measure**	**Data Required for**	**Measurement Precision**
1	MW output[41] (per *facility*)	Current Megawatt (MW) output for the *facility*	Megawatt (MW)	All	0.1 MW
2	Available Megawatts[42]	What the *facility* can produce after deducting *outages*	Megawatt (MW)	All	0.1 MW

Table D-3 identifies meteorological monitoring for solar *generation facilities*.

Table D-3: Solar Facility Meteorological Monitoring Requirements

		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
3	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
4	Ambient temperature at the array average height	Ambient temperature at the array average height	Degrees Celsius (°C)	Crystalline, Thin-Film, CPV	0.1 °C

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[41] Megawatts shall be provided as one measurement per *connection point*.

[42] 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*).

	Meteorological Monitoring Requirements				
#	Measurement Type	Definition	Unit of Measure	Data Required for	Measurement Precision
5	Back of Module Temperature[43]	Average temperature at the back of module	Degrees Celsius (°C)	Crystalline, Thin-Film, CPV	0.1 °C
6	Barometric pressure	Barometric Pressure	Hectopascals (HPa)	Crystalline, Thin-Film, CPV	0.1 HPa
7	Wind speed at the average array height	Anemometer	Metres/Second (m/s)	Crystalline, Thin-Film, CPV	0.1 m/s
8	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 –

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[43] The GPS coordinates of the back of module temperature measurement locations shall be included.

References

Document ID & Link	Document Title
MDP_RUL_0002	Market Rules for the Ontario Electricity Market
IMP_GDE_0088	Market Manual 1.3: Identity Management Operations Guide
MDP_PRO_0017	Market Manual 2.1: Dispute Resolution
IMO_PRO_0019	Market Manual 2.2: Exemption Application and Assessment
MDP_PRO_0022	Market Manual 2.6: Treatment of Compliance Issues
MDP_MAN_0003	Market Manual 3.0: Metering Overview
MDP_PRO_0007	Market Manual 3.1: Metering Service Provider Registration, Revocation and De-registration
MDP_PRO_0013	Market Manual 3.2: Meter Point Registration and Maintenance
IMP_PRO_0047	Market Manual 3.7: Totalization Table Registration
IMP_PRO_0057	Market Manual 3.8: Creating and Maintaining Delivery Point Relationships
MDP_PRO_0027	Market Manual 4.2: Submission of Dispatch Data in the Real-Time Energy and Operating Reserve Markets
IMP_PRO_0034	Market Manual 4.3: Real-Time Scheduling of the Physical Markets
MDP_PRO_0029	Market Manual 4.4: Transmission Rights Auction
PRO-324	Market Manual 4.6: Real-Time Generation Cost Guarantee
MDP_PRO_0045	Market Manual 5.4: Prudential Support
IMO_MAN_0024	Market Manual 6: Participant Technical Reference Manual (PTRM)
IMP_PRO_0035	Market Manual 7.3: Outage Management
IMO_PLAN_0001	Market Manual 7.8: Ontario Power System Restoration Plan
IMO_PLAN_0002	Market Manual 7.10: Ontario Electricity Emergency Plan
MAN-44	Market Manual 12.0: Capacity Auctions
PRO-357	Market Manual 13.1: Capacity Export Requests
IMO_GDE_0001	Market Participant Emergency Planning Guidelines
LST-48	Register Facility Help File
	Prudential Training Guide
	Guide to the Day-Ahead Commitment Process (DACP)

– End of Document –