Communicating with the IESO – Self Scheduling and Intermittent Generators

IESO Training

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This guide has been prepared to assist in the IESO training of market participants and has been compiled from extracts from the market rules or documents posted on the web site of Ontario's Independent Electricity System Operator. Users of this guide are reminded that they remain responsible for complying with all of their obligations under the market rules and associated policies, standards and procedures relating to the subject matter of this guide, even if such obligations are not specifically referred to herein. While every effort has been made to ensure the provisions of this guide are accurate and up to date, users must be aware that the specific provisions of the market rules or particular document shall govern.

Attention: Customer Relations

The Independent Electricity System Operator Box 4474, Station A

Toronto, Ontario M5W 4E5

Customer Relations: Tel: (905) 403-6900

Toll Free 1-888-448-7777

Website: www.ieso.ca

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1. Introduction

Effective communication is the most important tool the IESO has in maintaining the reliability of the IESO-controlled grid[1] and operating the markets. Information exchange is key.

Although the IESO receives thousands of bits of data every few seconds, there are many situations that only Market Participants (MPs) can see. The MPs information can alert the IESO about, or confirm the seriousness of, a situation and help the IESO make the right decision as quickly as possible. Examples of this type of information include local electrical storms, grass fires, high winds, and ice build- up on structures. It is also essential for you to tell us about circumstances that have the potential to impact the future operation of your facilities.

This guide covers:

- Timelines and reasons for these timelines
- Communication principles and protocols
- Communication requirements during normal and abnormal operating states
- How the IESO and Market Participants communicate in real-time

[1] In this document, 'grid' means the IESO-controlled grid. 'Markets' means the IESO- administered markets.

2. Communications Timelines

Events on the power system happen quickly. When there is an unexpected event on the power system (a 'contingency'), the system is not as strong as it was before the event. The IESO needs to re-prepare, i.e., get ready to face the next event as soon as possible.

The longer the system spends time in a degraded state, the more vulnerable it is to the effects of another contingency. Often, contingencies take place during severe weather, so the likelihood of another event is higher than normal.

2.1 Reliability standards

Reliability standards require the IESO to re-prepare the system within 30 minutes during normal conditions and within 15 minutes during high-risk conditions, such as an electrical storm. In these short periods, the IESO must gather information from MPs, make a plan and execute it. As you the user can see, timely communication from the involved MPs is vital if the IESO is to meet required re-preparation times and minimize exposure to this increased risk.

2.2 The Market Participants role

The IESO may direct an MP to take an action 'promptly' or 'immediately'. When the IESO uses these terms, we mean:

- As soon as possible, but no longer than 5 minutes after receiving direction or recognizing the need to take an action[2].

The IESO will communicate this type of direction to an MP by telephone.

[2] As outlined in the Market Rules: Chapter 5, Section 1.2.5.

3. Communications Principles and Protocols

The IESO's goal is to facilitate open, timely communication. Clear communication is paramount during both normal and abnormal conditions. It is important that both the IESO and MPs understand all Communications.

Because of unconscious editing, technical term misunderstanding, or technical problems, the receiver (whether the IESO or the MP) must repeat the message back to the sender to ensure that the message has been received and is understood.

3.1 Guidelines

- Avoid using first names on a conference call - address individuals by station or site name.
- Be concise and precise - provide only the information that is related to the purpose of the call.
- Give complete attention to the call.
- To avoid any misunderstandings, use official industry operating terminology.
- Avoid using jargon that may only be understood within the MP's own company. Please refer to Market Manual 7.6: Glossary of Standard Operating Terminology for a list of approved operating terms.
- An MP should identify their company and the location they are calling from. (Some participants have more than one location.)
- Avoid discussions about real-time price, market conditions, and other confidential/sensitive information

3.2 Where to you find communications protocols

Communication protocols with the IESO are in the market rules and market manuals:

- Market Manual 7.1 contains much of the material covered in this guide
- Market Manual 7.6 lists approved operating terms

Note: An MP may also have protocols with their transmitter or distributor defined in the transmission system code, operating agreements and connection agreements.

4. Communicating During a Normal Operating State

4.1 Normal operating conditions

The grid is in a normal operating state when the IESO has:

- Fair weather conditions
- No security limits or thermal limits being exceeded
- Sufficient energy and capacity to meet the forecast demand
- No emerging reliability concerns within Ontario or in neighbouring jurisdictions that could affect our area

The grid is in the normal operating state most of the time.

4.2 Communicating with the transmitter

The MP has communication obligations with their transmitters, as outlined in their connection agreement. These obligations include coordination of switching or outage timing requirements and work protection. The IESO may also be involved in some of these discussions.

4.3 Communicating with the IESO

There are things that an MP must communicate directly to the IESO – even if you the MP also communicates them to your transmitter – such as:

- System reliability information
- Outage notification
- Approvals for switching equipment in and out of service
- Market impactive information

The MP is encouraged to contact the IESO whenever they have something relevant to communicate.

4.4 when to call Markets or System

The IESO's control room has two broad areas of responsibility. Both sides of the room deal with different aspects of operating the markets and power system, but work together to ensure they are integrated:

- **Markets:** maintains the balance between supply and demand through market mechanisms and manages generator outages

- **System:** maintains transmission system reliability and/or recovery following disturbances and manages transmission equipment outages

Note: Markets and System have different phone numbers. The IESO supplies them to the MP upon market registration — the MP can also get them by contacting their Business Advisor.

Markets

The IESO Market operators should be called immediately for the following events:

- An MP is unable to follow their schedule — there are times when processes or equipment may limit an MP from following their schedule. When this happens, the IESO's algorithm needs to dispatch other resources up or down to make up the difference.
- To derate equipment.
- To request final approval for a generator planned outage.
- To request final five-minute approval to synchronize or de-synchronize.
- To request advanced approval to synchronize or de-synchronize the MP's generator (follow the timelines on page 13).
- For potential operating concerns such as ice build-up in the MP's forebays that could potentially limit their future generation output if outdoor air temperatures continue to drop — another example is higher ambient temperatures that will reduce their maximum output.

System

Call our System operators immediately for the following events:

- Unscheduled generation step changes due to equipment problems or malfunctions.
- To request final approval for a planned outage to your main transformer. Recall that MP's communicate generator outage information to the Markets side of the room, but the System side assesses and approves transmission system elements such as directly connected main transformer outages.
- To report any reliability-related information, such as grass fires, electrical storms, ice build-up.

Note: Often MP's are the only ones who know the specifics of a situation. An MP's prompt communication with the IESO can help avert an event that would otherwise adversely affect the grid.

5. Communicating During an Abnormal Operating State

5.1 Abnormal operating conditions

An abnormal operating state exists any time the IESO is not in a normal condition, including when:

- The IESO declares an emergency, or
- The IESO declares a high risk operating state, or
- After a contingency (i.e., an unexpected event on the power system).

5.2 Who to communicate with

In abnormal operating conditions, such as after a contingency, the IESO is an MP's first point of contact.

The IESO will assess, co-ordinate and direct the restoration of equipment when it is safe to do so, conferencing all involved parties.

5.3 When to call Markets or System

Markets

During abnormal conditions, MPs should call the IESO Market operators immediately for the following events:

- Delays in the MP's plans to synchronize or de-synchronize because of process or equipment problems.

System

During abnormal conditions, MPs should call the IESO System operators immediately for the following events:

- Partial or total loss of potential
- Any degradation of auxiliary equipment that reduces grid reliability (such as automatic voltage regulator problems)
- Abnormal or fluctuating system voltage
- Unexpected step changes to your reactive power output (MVARS) Operation of any special protection systems
- If the MP experiences a frequency excursion outside the range of 59.8 Hz to 60.2 Hz (frequencies outside this range usually indicate that the MP is part of an electrical island)

In abnormal operating conditions, the IESO is the MP's first point of contact. The MP may contact their own authority control center as long as doing so does not delay the phone call to the IESO.

If the MP's call is due to a contingency, the IESO will assess, co-ordinate and direct the restoration of any equipment. Typically, the IESO will conference call with all affected parties, including the MP's transmitter or distributor if necessary.

5.4 Multi-party communications

Due to the integrated nature of the power system, there are many situations where the IESO needs to speak with a number of different participants at the same time via conference call.

As an involved party, it is essential that the MP remains on the line while these discussions take place. Failure to do so may delay restoration or prevent resolution of the operating problem.

For example, assume an MP is fed off a two-line supply, and one of them is automatically removed from service. For safety reasons, the IESO cannot restore the circuit until all of the tapped participants have been spoken with.

If an MP does not call the IESO and the IESO cannot reach them, the line will remain out of service, subjecting all of the participants, including the directly impacted MP, to increased risk as the MP will remain on single line supply until the IESO can reach them.

5.5 Communicating with the IESO during a contingency

Who to call

- Call the IESO System control room operator promptly when a grid disturbance occurs and provide information on the cause (if known) and effect of the contingency on the MP's facility and equipment.
- The IESO will conference all affected parties. During phone conferencing, MPs should remain on the line until the IESO ends the call. Remember that your information is important to the IESO in building the plan for recovery to normal operation.

Communicating with the IESO

Whether an MP speaks with the IESO operator or are re-directed to a voice mailbox[3], the IESO needs key information from the MP:

- Identify the callers name
- Identify the MP's company and facility location
- Identify the reason for the call
- Have key information available (as outlined below

[3] An MP may be directed to a voice mailbox only during large scale or widespread disturbances

The information the MP should provide

- Time of the event
- Status of the MP's facility and equipment
- What the MP observed – were there any indications prior to the trip that something was happening on the grid
- If the MP has any indication of likely cause
- Any concerns about returning equipment to service
- Other urgent equipment, safety, or environmental concerns

What to leave on the IESO voice mail

The IESO telephone system prioritizes calls during disturbances. When this happens, an MP's call may be re-directed to voice mail:

- It is important to leave all relevant information on the recording. The IESO will return the MP's call as soon as possible. Please note that due to the volume of calls the IESO receives during disturbances, unless the MP's conditions change, one phone message is sufficient.
- An MP can elevate themselves in the IESO phone queue if they have urgent information concerning public safety, danger to the environment, or risk of equipment damage.

The MP's message should include:

- The MP's identity, company and facility location
- The reason for the MP's call
- Information on the cause or impact of the disturbance and the status of the MP's equipment

Be prepared for the IESO's follow-up call.

Next Steps

The IESO will use all available information from an MP and other affected participants to build a plan for recovery to restore the system to normal operation as soon as possible:

- Follow the IESO's directions to restore equipment
- Resume normal operation when the IESO confirms it is safe to do so
- Call the IESO if an MP knows of any post-event issues that may affect the grid or the markets or if the MP discovers anything that could help reveal the cause of the disturbance

The MP's information is a very important part of building the IESO's restoration plan. It is important that the IESO is able to communicate with every participant on a circuit before re-energizing that circuit.

If the IESO cannot speak with an MP, restoration may be delayed. That is why it is important that MPs' contact numbers are up to date in the IESO's registration database. If an MP's information is not up-to-date, the MP should contact their Business Advisor and update the information in Online IESO. An Applicant Representative of the registered organizations can add or remove contract roles in Online IESO. To update contact roles, please refer to the Step By Step For Adding a Contact Role document.

5.6 Communicating with us if you have a loss of potential

What happens if an MP's facility loses all potential? The blackout could be localized or could affect a large area. Regardless of the extent, the MP must call the IESO immediately.

Call the IESO System control room operator promptly, following the same steps as for a contingency. Keep in mind that:

- During a widespread disturbance MPs will probably be unable to talk with the IESO directly.
- The IESO telephone system prioritizes calls during disturbances. When this happens, the MP's call may be re-directed to voice mail. As with contingencies, it is important that the MP leave all their information on the recording and the IESO will return the MP's call as soon as possible. The MP can also elevate themselves in the IESO phone queue if they have urgent information concerning public safety, danger to the environment, or risk of equipment damage.
- In the meantime, MPs should take their pre-approved independent actions on loss of potential following the Ontario Power System Restoration Plan.

The IESO will call the MP when restoration has proceeded to the point where the IESO is able to allow load back on the system.

- Resume normal operation when the IESO confirms it is safe to do so.
- Call the IESO if the MP knows of any post-event issues that may affect the grid or the markets.

5.7 Post-contingency communications

The information an MP provides is very important for system reliability. Post contingency, the IESO needs to know:

- **Equipment status or concerns:** Has the MP's equipment been forced out of service for a long period? Does the MP have any concerns about equipment damage?
- **System status:** Does the MP have any voltage or thermal concerns? Has the MP noticed any abnormal frequency excursions? Has the MP's facility suffered any load loss?
- What annunciations can the MP provide to the IESO – such as relay protection sealed-in? This can help the IESO piece together the cause of an event.
- Has the MP had any operation of any special protection schemes or system auxiliaries (e.g., underfrequency load shedding)?
- Does the MP have any urgent environmental concerns that could become a major disaster?

- Indications of fault severity (if the MP has digital fault recorders installed within their operation, communicating this information is very important; e.g., how did the MP's equipment respond during this disturbance, etc.)
- The MP's assessment of return to service of their equipment and any potential causes, if they are known.
- Any information relevant to the security of the grid or concerns before a restoration attempt is made; e.g., equipment limitations, environmental conditions, etc.
- If the contingency involves other market participants' equipment – the IESO will discuss with all parties before a restoration attempt (this is why it is important for the IESO's facility registration database to have an MP's up-to-date contact information).

6. IESO-initiated Communications

There are circumstances when the IESO may call an MP to do something during normal or abnormal conditions.

Communications from the IESO are normally via approved communication through an MP's authority centre, if they have one, in accordance with the market rules. However, there are reasons and situations where the IESO communicates directly with the MP. For example:

- The IESO will contact an MP when they are not following their schedule (the target MPs are required to follow is their schedule or forecast). Dead-bands allow for discrepancies in plant processes that may alter an MP's ability to follow their schedule. If an MP cannot follow their schedule within the dead-band, they must call to let the IESO know. The IESO will may request that the MP update their schedule to more accurately reflect actual output.
- The IESO may call an MP to request reactive power output adjustments. Market participation stipulates that synchronous generators must respond from .9 lagging to .95 leading power factor in support of system voltage. The IESO may require additional reactive power for voltage support in the MP's area and may call to request more MVARS from their generator.
- The IESO may call an MP directly to request generation maneuvers to mitigate limit exceedances during emergency operating states or system restoration.

During these times, prompt response to the IESO's requests is important. Although it does not happen often, the IESO may request an MP to remove their unit from service immediately.

The IESO issues Advisory Notices that also alert MPs to market and system related events, such as an emergency operating state.

6.1 How we communicate with you

Telephone

The telephone is the IESO's most common means of communication.

The IESO does not physically operate equipment, rather it directs the operation of the IESO-controlled grid. It is through telephone communication with MPs that the IESO gets things done. During an MP's registration, they are provided with all of the phone numbers needed to communicate with the IESO. If an MP wishes to confirm any of these numbers, please contact Customer Relations.

Advisory Notices and Adequacy Reports

The IESO releases these reports and Advisory Notices, if required, at specific times daily throughout the day and posts them on the IESO website. These notices allow the IESO to present information to market participants that is not addressed in the Adequacy Report. They are intended to provide this information for an event that is deemed significant or any change that is not captured through regularly scheduled publication of reports.

- System Status Reports (SSRs) and Adequacy Reports list the hourly forecast demand, system capacity and energy, as well as system advisories for the IESO-administered markets.

7. Synchronizing and De-synchronizing

Self-scheduling generators with a nameplate rating equal to or greater than 10 MW

(These rules apply to self-scheduling generators that are directly connected to the transmission system, as well as to those connected within the distribution system.)

MPs need to call the IESO:

- 2 hours prior to synchronizing
- 1 hour prior to de-synchronizing
- For final approval, 5 minutes before closing or opening their generator circuit breaker

Directly connected intermittent generators and directly connected self- scheduling generators < 10 MW

MPs need to call the IESO:

- For final approval 5 minutes before closing or opening their generator circuit breaker

Unless there is a reliability concern with an MP synchronization or de-synchronization request, the IESO will approve the request. After approval, if an MP's conditions changes, they need to let the IESO know.

If an under-generation system advisory notice is in force, the IESO may reduce the required notification time.

8. Skill Check

8.1 Questions

1. Which of the following synchronizing and de-synchronizing statements for advanced and final approvals are true?

   a) All self-scheduling generators need to call the IESO 2 hours prior to synchronizing and 1 hour prior to de-synchronizing.

   b) Self-scheduling generators that have a nameplate rating of ≥10 MW need to call the IESO 2 hours prior to synchronizing and 1 hour prior to de-synchronizing.

   c) Intermittent generators need to call the IESO 2 hours prior to synchronizing and 1 hour prior to de-synchronizing.

   d) Directly connected intermittent generators and self-scheduling generators that have a nameplate rating of <10 MW need to call the IESO 5 minutes prior to synchronizing or de-synchronizing.

   e) Self-scheduling generators that have a nameplate rating of ≥10 MW need to call the IESO 5 minutes prior to opening or closing their generator circuit breaker.

2. Which of the following situations require you to call 'Markets'?

   a) Unable to follow your schedule

   b) Derate your directly connected main transformer

   c) Request final approval for a planned generator outage

   d) Advanced notices for 2 hour synchronization or 1 hour de-synchronization

   e) Final 5 minute synchronization or de-synchronization requests

   f) Schedule submission inquiries or changes

3. Your facility is without potential due to a grid contingency. You have no urgent environmental, personnel safety, or equipment concerns, but you want to know what happened and when to re-synchronize. Upon calling the IESO 'System' control room number, you get a recorded message. What should you do next?

   a) Elevate your priority in the IESO telephone queue to find out when the power will be restored.

   b) Leave a detailed message, and implement your independent control actions in preparation for our phone call.

c) Keep calling and leave as many messages as it takes.

d) Keep calling until you speak with an operator

4. It is a normal day at your facility when you receive a call from an IESO 'System' operator requesting your generation to go to zero MW to mitigate a limit exceedance. How should you respond?

   a) Begin implementing the reduction immediately unless you have any urgent personnel safety, equipment damage, or environmental issues.

   b) Get your management's approval before initiating the reduction, then call the IESO back.

   c) Look for a system status report (SSR) for verification of an emergency condition before initiating the request.

5. You are experiencing fluctuating grid voltages. You suspect the cause is from the neighbouring manufacturing facility. Who do you call for more information about the cause?

   a) Your transmitter

   b) IESO 'System'

   c) Your local distribution company

   d) The neighbouring manufacturing facility

   e) IESO 'Markets'

6. Which of the following situations require you to call 'System'?

   a) Loss of generation due to equipment problems or system events

   b) For abnormal voltage and/or frequency

   c) Derate your generator

   d) Final approval to synchronize or de-synchronize

   e) To report any reliability-related information (e.g., grass fires, electrical storms, ice build-up)

   f) Unable to follow your schedule

7. There has been a contingency resulting in a loss of potential on one of the two transmission lines you are connected to. Who do you call first?

   a) IESO 'System'

   b) Your transmitter

   c) Your authority operating centre

d) Your local distributor

e) No need to call anyone – the circuit will be returned to service as soon as possible

8. Your generator develops a limitation that prevents you from following your schedule within your deadband. You expect the situation to last approximately one hour but it has the potential to be longer. What communication, if any, should you initiate?

   a) No communication required.

   b) Call the IESO immediately. Schedule changes within the mandatory window require IESO approval.

   c) Call the IESO only if you cannot correct the problem in one hour.

8.2 Answers

1. Which of the following synchronizing and de-synchronizing statements for advanced and final approvals are true?

   a) All self-scheduling generators need to call us the IESO 2 hours prior to synchronizing and 1 hour prior to de-synchronizing.

   b) Self-scheduling generators that have a nameplate rating of ≥10 MW need to call the IESO 2 hours prior to synchronizing and 1 hour prior to de-synchronizing. √

   c) Intermittent generators need to call the IESO 2 hours prior to synchronizing and 1 hour prior to de-synchronizing.

   d) Directly connected intermittent generators and self-scheduling generators that have a nameplate rating of <10 MW need to call the IESO 5 minutes prior to synchronizing or de- synchronizing. √

   e) Self-scheduling generators that have a nameplate rating of ≥10 MW need to call the IESO 5 minutes prior to opening or closing their generator circuit breaker. √

2. Which of the following situations require you to call 'Markets'?

   a) Unable to follow your schedule √

   b) Derate your directly connected main transformer

   c) Request final approval for a planned generator outage √

   d) Advanced notices for 2 hour synchronization or 1 hour de-synchronization √

   e) Final 5 minute synchronization or de-synchronization requests √

   f) Schedule submission inquiries or changes √

3. Your facility is without potential due to a grid contingency. You have no urgent environmental, personnel safety, or equipment concerns, but you want to know what happened and when to re-synchronize. Upon calling the IESO 'System' control room number, you get a recorded message. What should you do next?

   a) Elevate your priority in our telephone queue to find out when the power will be restored.

   b) Leave a detailed message, and implement your independent control actions in preparation for our phone call. √

   c) Keep calling and leave as many messages as it takes.

   d) Keep calling until you speak with an operator.

4. It is a normal day at your facility when you receive a call from our 'System' operator requesting your generation to go to zero MW to mitigate a limit exceedance. How should you respond?

   a) Begin implementing the reduction immediately unless you have any urgent personnel safety, equipment damage, or environmental issues. √

   b) Get your management's approval before initiating the reduction, then call us back.

   c) Look for a system status report (SSR) for verification of an emergency condition before initiating the request.

5. You are experiencing fluctuating grid voltages. You suspect the cause is from the neighbouring manufacturing facility. Who do you call for more information about the cause?

   a) Your transmitter

   b) IESO 'System' √

   c) Your local distribution company

   d) The neighbouring manufacturing facility

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6. Which of the following situations require you to call 'System'?

   a) Loss of generation due to equipment problems or system events √

   b) For abnormal voltage and/or frequency √

   c) Derate your generator

   d) Final approval to synchronize or de-synchronize

   e) To report any reliability-related information (e.g., grass fires, electrical storms, ice build-up) √

   f) Unable to follow your schedule

7. There has been a contingency resulting in a loss of potential on one of the two transmission lines you are connected to. Who do you call first?

   a) IESO 'System' √

   b) Your transmitter

   c) Your authority operating centre

   d) Your local distributor

   e) No need to call anyone – the circuit will be returned to service as soon as possible

8. Your generator develops a limitation that prevents you from following your schedule within your deadband. You expect the situation to last approximately one hour but it has the potential to be longer. What communication, if any, should you initiate?

   a) No communication required.

   b) Call the IESO immediately. Schedule changes within the mandatory window require IESO approval. √

   c) Call the IESO only if you cannot correct the problem in one hour.

9. Summary

In summary:

- We encourage you to contact us any time you have something relevant to tell us
- Your timely communication during normal and abnormal conditions allows for
- more options
- Be aware of the types of situations that require you to call us promptly
- Your participation in conference calls is an important part of a prompt recovery plan
- Provide us with key information following contingent events
- We may request you to initiate a control action during abnormal operating conditions

Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, Ontario M5H 1T1

Phone: 905.403.6900
Toll-free: 1.888.448.7777
E-mail: customer.relations@ieso.ca

ieso.ca

@IESO_Tweets
linkedin.com/company/IESO

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