

Communicating with the IESO – Self-Scheduling and Intermittent Generators

IESO Training

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Communicating with the IESO: Guide for Self-Scheduling and Intermittent Generators

AN IESO MARKETPLACE TRAINING PUBLICATION

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.

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1. Introduction

Effective communication is the most important tool we¹ have in maintaining the reliability of the IESO-controlled grid² and operating the markets. Information exchange is key. Although we receive thousands of bits of data every few seconds, there are many situations that only you can see. Your information can alert us to something we are unaware of or can confirm the seriousness of a situation and help us 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 we communicate with each other in real-time

¹ In this document, 'we', 'us' and 'our' refer to the IESO. 'You' refers to the market participant.

² 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 we experience an unexpected event on the power system (a 'contingency'), the system is not as strong as it was before the event. We need to re-prepare, i.e., get ready to face the next event as soon as possible.

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

Reliability standards

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

Your role

We may direct you to take an action 'promptly' or 'immediately'. When we use 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.³

We will communicate this type of direction to you by telephone.

³ As outlined in the *Market Rules: Chapter 5, Section 1.2.5*.

3. Communications Principles and Protocols

Our goal is to facilitate open, timely communication. Clear communication is paramount during both normal and abnormal conditions. It is important that we understand what you have said to us and we must ensure that our messages are correctly understood.

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

Guidelines

- Avoid using first names when you participate 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 your call.
- Give the call your complete attention.
- To avoid any misunderstandings, use official industry operating terminology.
- Avoid using jargon that may only be understood within your own company. Please refer to *Market Manual 7.6: Glossary of Standard Operating Terminology* for a list of approved operating terms.
- Be sure to identify yourself, your company and the location you are calling from. (Some participants have more than one location.)

Where can 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

You may also have protocols with your transmitter or distributor defined in the transmission system code, operating agreements and connection agreements.

4. Communicating During a Normal Operating State

What are normal operating conditions?

We are in a normal operating state when we have:

- 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.

What should you communicate to your transmitter?

You have communication obligations with your transmitters, as outlined in your connection agreement. These obligations include coordination of switching or outage timing requirements and work protection. We may also be involved in some of these discussions.

And what should you communicate to us?

There are things that you must communicate directly to us – even if you also communicate them to your transmitter – such as:

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

We encourage you to contact us whenever you have something relevant to communicate.

Should you call Markets or System?

Our 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

Just a reminder that Markets and System have different phone numbers. We supply them to you upon market registration—you can also get them by contacting your account manager.

Markets

Call our Market operators immediately for the following events:

- You are unable to follow your schedule — there are times when processes or equipment may limit you from following your schedule. When this happens, our 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 your generator (follow the timelines on page 13).
- Potential operating concerns such as ice build-up in your forebays that could potentially limit your future generation output if outdoor air temperatures continue to drop — another example is higher ambient temperatures that will reduce your maximum output.

System

Call our System operators immediately for the following events:

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

Remember that often you are the only one who knows of a situation. Your prompt communication to us can help avert an event that would otherwise adversely affect the grid.

5. Communicating During an Abnormal Operating State

What are abnormal operating conditions?

An abnormal operating state exists any time we are not in a normal condition, including when:

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

Who should you communicate with?

In abnormal operating conditions, such as after a contingency, we are your first point of contact.

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

Should you call Markets or System?

Markets

During abnormal conditions, contact Markets immediately whenever you experience:

- Delays in your plans to synchronize or de-synchronize because of process or equipment problems

System

During abnormal conditions, contact System whenever you experience:

- 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 you experience a frequency excursion outside the range of 59.8 Hz to 60.2 Hz

(frequencies outside this range usually indicate that you are part of an electrical island)

In abnormal operating conditions, we are your first point of contact. You may contact your own authority control centre as long as doing so does not delay the phone call to us.

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

Multi-party communications

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

As an involved party, it is essential that you remain 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 you are fed off a two line supply, and one of them is automatically removed from service. For safety reasons, we cannot restore the circuit until we have spoken with all the tapped participants.

If you do not call us and we cannot reach you, the line will remain out of service, subjecting all the participants, including yourself, to increased risk as you will remain on single line supply until we can reach you.

Communicating with us during a contingency

Who should you call?

- Call our system control room operator promptly when a grid disturbance occurs, and provide information on the cause (if known) and effect of the contingency on your facility and equipment.
- We will conference you as necessary with all affected parties. During phone conferencing, please remain on the line until we end the call. Remember that your information is important to us in building the plan for recovery to normal operation.

What do you say?

Whether you speak with our operator or are re-directed to a voice mailbox⁴, we need key information from you:

- Identify yourself
- Identify your company and facility location
- Identify the reason for your call
- Have key information available (as outlined below)

What information should you provide?

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

What if you get voice mail?

Our telephone system prioritizes calls during disturbances. When this happens, your call may be re-directed to voice mail:

- It is important to leave all your information on the recording and we will return your call as soon as possible. Please note that due to the volume of calls we receive during disturbances, unless your conditions change, one phone message is sufficient.
- You may elevate yourself in our phone queue if you have urgent information concerning public safety, danger to the environment, or risk of equipment damage.

⁴ You may be directed to a voice mailbox only during large-scale or widespread disturbances.

Your message should include:

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

Be prepared for our follow-up call.

What happens next?

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

- Follow our directions to restore equipment
- Resume normal operation when we confirm it is safe to do so
- Call us if you know of any post-event issues that may affect the grid or the markets or if you discover anything that could help reveal the cause of the disturbance

Your information is a very important part of building our restoration plan. It is important that we are able to communicate with every participant on a circuit before re-energizing that circuit.

If we cannot speak with you, restoration may be delayed. That is why it is important that your contact numbers are up-to-date in our registration database. If your information is not up-to-date, please contact your account manager.

Communicating with us if you have a loss of potential

What happens if your facility loses all potential? The blackout could be localized or could affect a large area. Regardless of the extent, you must call us immediately.

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

- During a widespread disturbance you will probably be unable to talk with us directly.
- Our telephone system prioritizes calls during disturbances. When this happens, your call may be re-directed to voice mail. As with contingencies, it is important that you leave all your information on the recording and we will return your call as soon as possible. You may also elevate yourself in our phone queue if you have urgent information concerning public safety, danger to the environment, or risk of

equipment damage.

- In the meantime, take your pre-approved independent actions on loss of potential following the Ontario Power System Restoration Plan. Call us promptly to let us know the status and capability of your generators and auxiliaries – we need to know the rate you can generate at (MW/min).

We will call you when restoration has proceeded to the point where we are able to allow your generation back on the system.

- Resume normal operation when we confirm it is safe to do so
- Call us if you know of any post-event issues that may affect the grid or the markets

Post-contingency communications

The information you provide is very important for system reliability. Post contingency, we need to know:

- **Equipment status or concerns:** Has your equipment been forced out of service for a long period? Do you have any concerns about equipment damage?
- **System status:** Do you have any voltage or thermal concerns? Have you noticed any abnormal frequency excursions? Has your facility suffered any load loss?
- What annunciations can you provide to us – such as relay protection sealed-in? This can help us piece together the cause of an event.
- Have you had any operation of any special protection schemes or system auxiliaries (e.g., underfrequency load shedding)?
- Do you have any urgent environmental concerns that could become a major disaster?
- Indications of fault severity (if you have digital fault recorders installed within your operation, communicating this information is very important, e.g., how did your generating unit respond during this disturbance, etc.).
- Your assessment of return to service of your equipment and any potential causes, if they are known.
- Any information relevant to security of the grid or concerns before restoration attempt is made, e.g., equipment limitations, environmental conditions, etc.
- If the contingency involves other market participants' equipment - we will discuss with all parties before the restoration attempt (this is why it is important for our

facility registration database to have your up-to-date contact information).

6. IESO-initiated Communications

There are circumstances when we may call you to do something during normal or abnormal conditions.

Communications from us are normally via approved communication through your authority centre, if you have one, in accordance with the market rules. However, there are reasons and situations where we communicate directly with you. For example:

- We will contact you when you are not following your schedule (the target you follow is your schedule or forecast). Dead-bands allow for discrepancies in plant processes that may alter your ability to follow your schedule. If you cannot follow your schedule within the dead-band, you must call to let us know. We will probably ask you to update your schedule to reflect your output.
- We may call you 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. We may require additional reactive power for voltage support in your area and may call you to request more MVARs from your generator.
- We may call you directly to request generation maneuvers to mitigate limit exceedances during emergency operating states or system restoration.

During these times, prompt response to our requests is important. Although it does not happen often, we may request you to remove your unit from service immediately.

We issue Advisory Notices that also alert you to market and system related events, such as an emergency operating state.

How we communicate with you

Telephone

Telephone is our most common means of communication.

We do not physically operate equipment, rather we direct the operation of the IESO-controlled grid. It is through telephone communication with you, the participant, that we get things done. During your registration, we provided you with all the phone numbers you need to communicate with us. If you wish to confirm any of these numbers, please contact [Customer Relations](#).

Advisory Notices and Adequacy Reports

We release Advisory Notices, if required, throughout the day and post them on our web site. These notices allow us to present information to the market participants that is not addressed through 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.

Adequacy Reports list the hourly forecast demand, system capacity and energy (Please refer to *Market Manual 7.2, Section 1.3.3*, available on our [Market Rules and Manuals Library](#) web page, for details.)

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.)

You need to call us:

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

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

You need to call us:

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

Unless there is a reliability concern with your synchronization or de-synchronization request, we will approve the request. After approval, if your conditions change, you need to let us know.

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

8. Skill Check

Skill Check: 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 us 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 us 2 hours prior to synchronizing and 1 hour prior to de-synchronizing.
 - c) Intermittent generators need to call us 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 us 5 minutes prior to synchronizing or de-synchronizing.
 - e) Self-scheduling generators that have a nameplate rating of ≥ 10 MW need to call us 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 our '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
 - 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 us immediately. Schedule changes within the mandatory window require our approval.
 - c) Call us only if you cannot correct the problem in one hour.

Skill Check: 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 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 us 2 hours prior to synchronizing and 1 hour prior to de-synchronizing. ✓**
 - c) Intermittent generators need to call us 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 us 5 minutes prior to synchronizing or de-synchronizing. ✓**
 - e) Self-scheduling generators that have a nameplate rating of ≥ 10 MW need to call us 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 our '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
 - 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 us immediately. Schedule changes within the mandatory window require our approval. ✓**
 - c) Call us 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