
Overview of the IESO Administered Markets

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AN IESO 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 the IESO makes reasonable efforts to ensure that the provisions of this guide are accurate and up to date, users must be aware that the specific provisions of the Market Rules and applicable Market Manual govern the rights and obligations of market participants and the IESO.

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1. Introduction

This overview provides an introduction to Ontario's IESO-administered markets, including discussions of:

- The wholesale electricity market in Ontario
- The roles of the IESO and market participants in the wholesale markets
- The IESO –controlled grid
- The real-time energy markets
- Financial aspects of the wholesale markets

For more in-depth information, please refer to the materials available in the Training section of the IESO web site.

2. The Wholesale Electricity Market in Ontario

Ontario's wholesale electricity market opened on May 1, 2002, moving our province from a monopoly-based electricity system to a competitive wholesale electricity market.

- The **wholesale** price of electricity is determined in a competitive market. The wholesale price applies to most consumers using more than 250,000 kilowatt-hours per year.
- Prices for certain classes of retail consumers are regulated. The Regulated Price Plan (RPP) took effect April 1, 2005 and is administered by the Ontario Energy Board. Currently, RPP rates apply to residential customers, qualifying farms, and customers who consume less than 250,000 kilowatt-hours per year.

Historically, only the former Ontario Hydro along with municipal utilities provided power to Ontario, and all electricity prices were set by the provincial government.

The Ontario Electricity Act of 1998 re-organized Ontario Hydro into five successor companies. As of April 1, 1999, the following companies came into existence:

2.1 Two commercial companies:

- **Ontario Power Generation Inc. (OPG)** - generates electricity and competes with other, new generating companies in the new marketplace (website: www.opg.com)
- **Hydro One** - transmits and distributes electricity (website: <https://www.hydroone.com>)

2.2 Two not-for-profit companies:

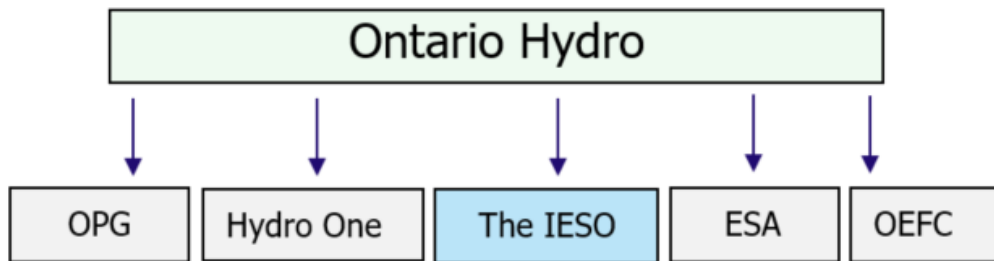
- The **Independent Electricity System Operator (IESO)** – originally called the Independent Electricity Market Operator (IMO) - oversees the wholesale markets to ensure fair competition, and ensures the reliability of the electrical system (website: <https://www.ieso.ca>). The Ontario Power Authority (OPA) was created by the Electricity Restructuring Act, 2004. The OPA was to provide long term adequacy in Ontario by:
 - Assessing the adequacy and reliability of electricity resources.
 - Forecasting future demand and the potential for conservation and renewable energy
 - Preparing an integrated system plan for generation, transmission, and conservation
 - Procuring new supply, transmission and demand management

The IESO and the OPA have merged, operating as one organization since January 2015. The IESO is now responsible for all of the former OPA accountabilities listed above. (website: <https://www.ieso.ca>)

- **The Electrical Safety Authority (ESA)** - sets safety standards for wiring installations; responsible for equipment and appliance certification (web site: www.esainspection.net)

2.3 One crown agency:

- **The Ontario Electricity Financial Corporation (OEFC)** - responsible for servicing and paying down the 'stranded debt' of the former Ontario Hydro, that is, the debt in excess of the debt assigned to the other successor companies (website: www.oefc.on.ca)



3. The Role of Ontario's IESO

3.1 What is Ontario's IESO?

The IESO is a non-profit, regulated corporation without share capital. The Ontario Energy Board (OEB) regulates the IESO, and the Ontario government appoints its directors.

3.2 The IESO has two distinct roles

3.2.1 **Overseeing and Running the IESO-administered Wholesale Markets**

The IESO administers a set of rules (the Market Rules) that govern the operation of the wholesale electricity market. The IESO monitors market activity to ensure compliance with these rules, and performs surveillance of market activity to ensure fair market competition.

The IESO itself does not buy or sell electricity. It administers the wholesale electricity market by authorizing market participants, publishing system forecasts and market information, producing statements and invoices, and performing financial settlement transactions for the markets.

The IESO also runs the wholesale energy market. Based on bids and offers from consumers and suppliers, the IESO determines the amount of energy to be consumed or supplied by each company, and the price for that energy.

3.2.2 **Ensuring the Reliability of the Integrated Power System**

The IESO and all market participants are jointly responsible for ensuring the reliability of the power system.

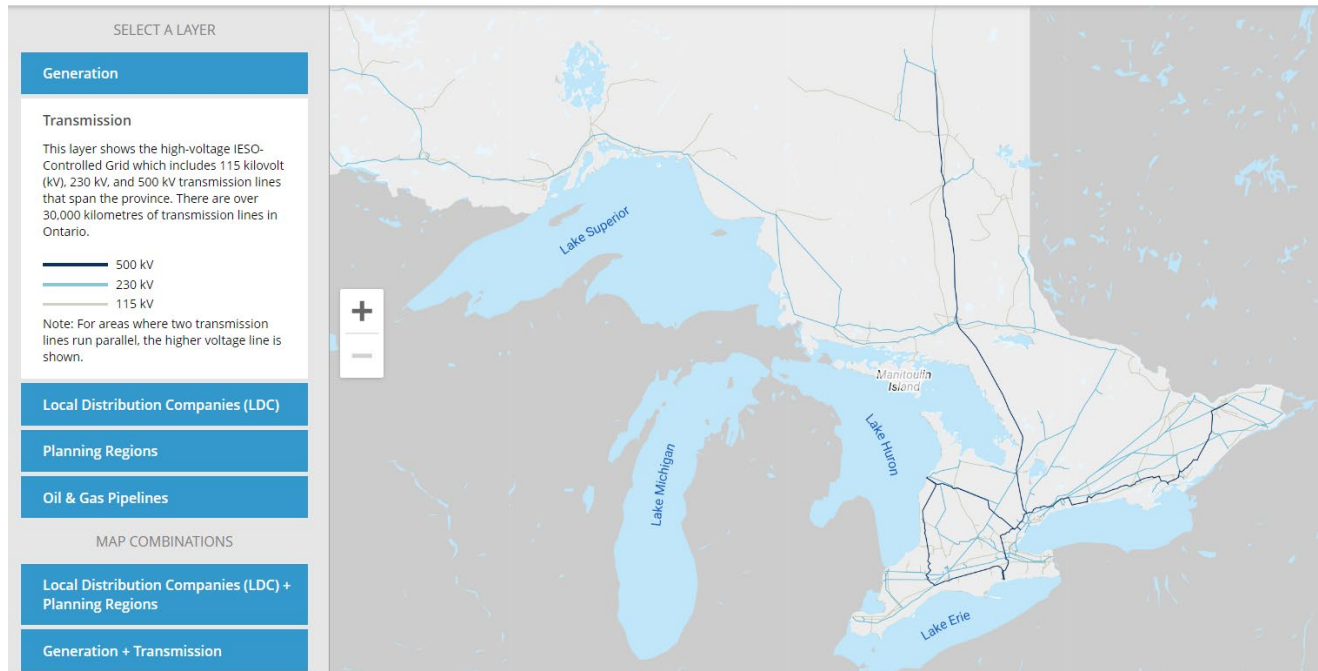
From its system control centre, Ontario's IESO manages the power system. The IESO ensures that the system adheres to reliability standards set by standards authorities such as the North American Reliability Council (NERC) and the Northeast Power Coordinating Council (NPCC). In addition, the IESO provides input to both of these reliability organizations to ensure that appropriate reliability standards are set.

The IESO gathers real-time information on voltage levels, power flows, and equipment status. Trained and certified IESO staff monitor this information and manage the security and adequacy of the power system 24 hours a day, every day of the year.

4. Ontario's Physical Power System

The introduction of competition into the wholesale electricity market has not changed Ontario's well-established electric power system.

This physical power system is made up of a network that transmits electricity from suppliers (generators) to consumers (loads). To explore more of Ontario's physical power system, please see the [IESO's Interactive Ontario Electricity System Map](#).



4.1 Ontario's Transmission System

Electric power is transmitted across the province on 30,000 kilometres of high-voltage transmission lines. Hydro One owns most of the transmission system. Transformers are used to link electric power from the high-voltage lines to low-voltage lines. Hydro One, several municipally-owned utilities, and private companies then distribute the electric power at low voltage to end-use customers.

The Ontario high-voltage lines interconnect with lines from Manitoba, Quebec, New York, Michigan and Minnesota. These interconnection lines (or interties) allow electricity to be imported into and exported out of Ontario.

Ontario currently has the installed capacity to generate more than 35,000 megawatts of electric power. The available capacity changes throughout the day and year according to how many plants are in maintenance outage. Ontario Power Generation Inc. (OPG) is the largest provider of generating capacity to the Ontario market. OPG's generating plants include nuclear, hydroelectric, biomass, oil and natural gas-fired stations. In addition, a number of independently owned generators supply power to the system.

5. The IESO Controlled Grid

The portion of the Ontario transmission system that is controlled by the IESO is called the 'IESO-controlled grid'. It includes all transmission lines equal to or greater than 50 kiloVolts. These are not the lines that go directly into your home. They are the high voltage transmission lines that provide wholesale electricity to large industrial consumers, and to distributors who then provide electricity at the retail level.

The IESO-controlled grid lies within the Ontario Control Area, which also includes the distribution lines and energy consumers (loads) within Ontario.

The IESO is responsible for balancing the supply and demand of energy so that supply always equals demand.

5.1 Energy Supply

Energy is supplied to the market by generators located within Ontario and by imports from neighbouring jurisdictions.

5.2 Energy Demand

Consumers of energy in Ontario are called loads. There is also demand from neighbouring jurisdictions for energy produced in Ontario. Ontario's IESO must consider both the requirements of loads within Ontario and those of energy exports when balancing supply and demand.

5.3 Measuring the Flow of Energy

Meters are used to measure the flow of energy at any point where energy flows into or out of the IESO-controlled grid. The meters must be capable of measuring energy at specific time intervals. The resulting meter readings are the basis of settling energy charges in the wholesale market.

6. Participating in the IESO-administered Market

6.1 The IESO-Administered Markets, Services and Auctions

6.1.1 Energy Markets

It is also called as the physical market, serves as a platform for matching the supply and demand of electricity in Ontario.

The IESO sends Dispatch Instructions to Market Participants based on their accepted bids and offers in **real-time market**. This affects the actual delivery, use of electricity and Market Clearing Price.

6.1.2 Ancillary Services

Services used to help ensure the reliable operation of the power system. Ancillary Services make up a relatively small component of all power system costs but are a critical part of the overall power system.

6.1.3 Operating Reserve Markets

Stand-by power or demand reduction that can be called on with short notice to deal with an unexpected mismatch between generation and load. The IESO ensures that additional supplies of energy are available should an unanticipated event take place in the **real-time energy market**.

6.1.4 Capacity Auction

Serves as the short term balancing mechanism in the framework, securing the capacity needed to meet Ontario's short-term resource adequacy needs.

6.1.5 Transmission Rights Auction

Prices in Ontario may be different from prices in other jurisdictions. The use of Transmission Rights, or TRs, allows importers and exporters to reduce the price risk associated with trading between Ontario and jurisdictions outside of Ontario. Transmission Rights Auction is settled in the **Financial Market**.

6.2 Becoming a Market Participant

In order to participate in any of Ontario's IESO-administered markets, a company must first apply to the IESO and pay an application fee. When the company has met all the requirements, the IESO will authorize it as a 'market participant'.

Participants with physical connections to the grid must register their facilities with the IESO, and are also required to have registered interval meters to measure energy that flows into or out of the IESO-controlled grid. In addition, participants must obtain appropriate licenses from the Ontario Energy Board. For more details, please refer to [Overview of the Connection Process \(ieso.ca\)](https://ieso.ca/Overview-of-the-Connection-Process).

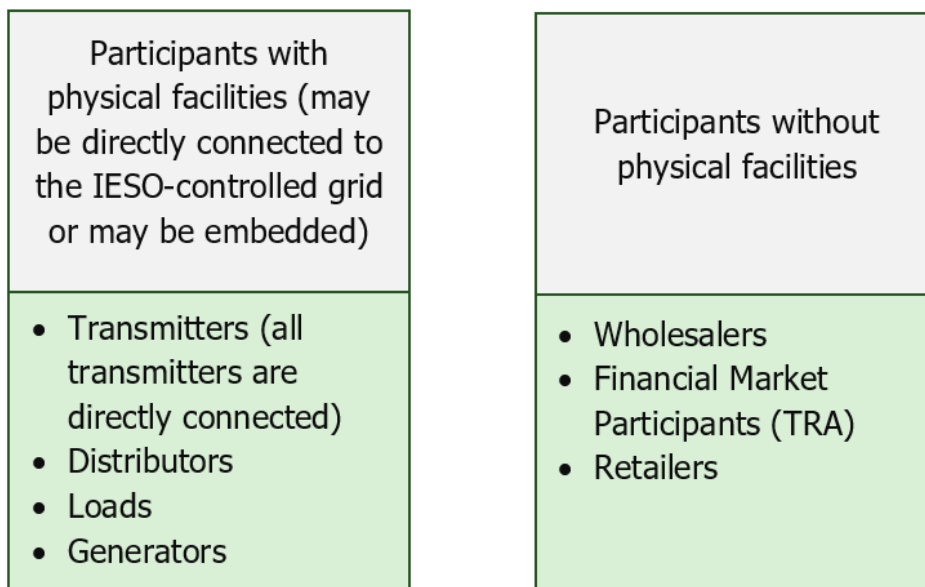
As a condition of authorization, market participants must meet credit requirements, called 'prudential' requirements. This guarantee of creditworthiness ensures that if any market participant encounters financial difficulties and is unable to pay, other market participants will not suffer undue losses. Prudential requirements are based on the market participant's activities in the market - the requirements are not the same for all market participants. For more details, please refer to [MM5.4](#). For additional information on the authorization process, refer to [MM1.3 section 8.1.2](#).

6.3 Types of Market Participants

There are different ways to classify the types of companies that participate in the IESO-administered markets. One classification is based on the company's physical assets. Some companies have their own equipment that produces or uses electricity; some companies participate in the market without actually producing or using electricity.

Companies with physical assets may be connected directly to the IESO-controlled grid, or they may be 'embedded'. Embedded companies are connected to a distributor's lines, which are themselves connected to the IESO-controlled grid.

A market participant may play more than one role in the market. For example, a market participant could be both a generator and a wholesaler.



6.4 Physically Connected Market Participants

While many companies may choose to participate in Ontario's IESO-administered markets, any company with equipment directly connected to Ontario's IESO-controlled grid to convey electricity into, through or out of the grid must become a market participant.

Market participants who are connected to the grid can be further classified according to their interaction with the IESO. It is also important to know how they are compensated or charged. In the case of generators and loads, we also need to know if they are dispatchable or non-dispatchable.

6.4.1 Transmitters

The term transmitter refers to the market participants who own the equipment that makes up the IESO-controlled grid. Transmitters do not buy or sell energy; rather, they add value by building and maintaining the grid that connects generators and wholesale loads throughout the province.

Transmitters are compensated by an approved uplift (overhead) charge applied to all electricity purchased through Ontario's IESO-administered market. Hydro One is an example of a transmitter.

6.4.2 Distributors

The term distributor refers to the local distribution company (LDC) which takes electricity from the IESO-controlled grid and distributes it to retail consumers. Distributors add value by delivering electricity directly to retail consumers, at the appropriate voltage for their needs. Distributors are compensated by payments made to them by their own customers.

The Ontario Energy Board is responsible for licenses and regulations related to distributors. Your local municipal utility is an example of a distributor.

6.4.3 Generators

6.4.3.1 Dispatchable Generators

Dispatchable generators must be able to adjust the amount of their energy generation in response to instructions from the IESO. These instructions are called 'dispatch' instructions, and the generators are called 'dispatchable'.

The IESO issues dispatch instructions for each 5-minute interval of the day. Dispatchable generators must be equipped to receive and respond to dispatch instructions from the IESO 24 hours a day, 365 days a year.

The dispatch instructions to reach a specific level of generation are based primarily upon the generator's offers to sell electricity at specific prices relative to the bids and offers from other facilities. For example, a generator may agree to sell 50 megawatts of energy if the price is \$22/megawatt or higher, but may not wish to sell if the price is lower than \$22. If there is demand for energy priced at \$22 or more, the generator will receive dispatch instructions from the IESO telling it the amount to generate. If the only demand is for energy priced below \$22, the IESO will not dispatch the generator to produce electricity. The dispatch instructions also take into account the facility's ability to adjust its generation levels.

Most of the energy supply in Ontario is provided by dispatchable generators.

6.4.4 Non-Dispatchable Generators

Non-dispatchable generators do not submit offers to provide energy; instead, they submit estimates or forecasts of energy production. They agree to be paid the current market price when they generate electricity, regardless of what that price might be.

There are two types of non-dispatchable generators - self-scheduling and intermittent:

An example of a self-scheduling generator is a hydro-electric generator situated on a small river with no ability to store the water. This generator might not always be able to increase or decrease energy output in response to the IESO's dispatch instructions. This type of generator would register as self-scheduling. Self-scheduling generators submit schedules to the IESO indicating the amount of energy they will be providing for each hour of the day. Self-scheduling generators are restricted by size - in order to be classified as self-scheduling, a generator must be rated between 1 and 10 megawatts. ('Cogeneration' facilities are producers of another form of energy, such as steam, with electricity as a by-product. They may be self-scheduling even if they exceed 10 megawatts.)

6.4.5 Loads

6.4.5.1 Dispatchable Loads

As with dispatchable generators, dispatchable loads must be able to adjust their power consumption in response to instructions from the IESO. These instructions are called 'dispatch' instructions, and the loads are called 'dispatchable'. The IESO issues dispatch instructions to dispatchable loads for each 5-minute interval of the day, and the loads must be equipped to receive and respond to dispatch instructions from the IESO 24 hours a day, 365 days a year. (Dispatchable loads account for only a small portion of the energy consumed in Ontario at this time.)

The dispatch instructions to reach a specific level of consumption are based primarily on the load's bids to purchase electricity at specific prices relative to the bids and offers from other facilities. For example, a load may submit a bid to purchase 20 megawatts of energy if the price is \$25/megawatt or below, but may not wish to purchase if the price is higher than \$25. If there is available energy that costs \$25 or less, the load will receive dispatch instructions from the IESO telling it how much energy to withdraw from the grid. If the only available energy costs more than \$25, the IESO will send dispatch instructions telling the load not to withdraw the 20 megawatts from the grid. The dispatch instructions must also take into account the facility's ability to adjust its energy consumption levels.

6.4.5.2 Non-Dispatchable Loads

Non-dispatchable loads consume electricity in much the same way as you do at home. They simply draw electricity from the IESO-controlled grid as needed for their equipment. They agree to pay the wholesale market price for electricity at the time of consumption, regardless of what that price might be. Wholesale prices for non-dispatchable loads are set on an hourly basis.

A distributor is another example of a non-dispatchable load. The distributor takes electricity from the IESO-controlled grid and distributes it to retail consumers at a lower voltage. Your local municipal utility is an example of a distributor. Non-dispatchable loads account for most of the energy consumed in Ontario.

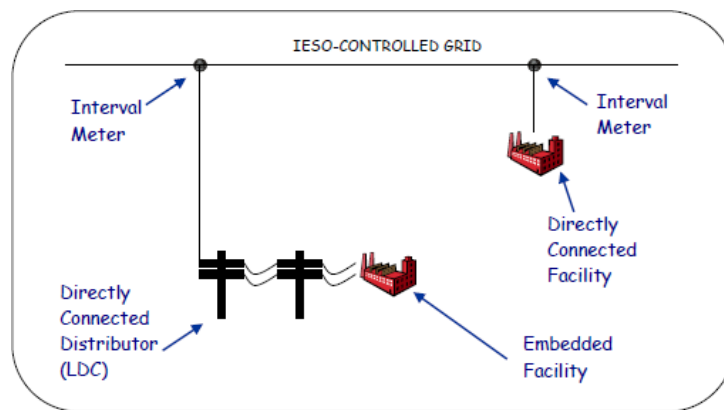
6.5 Embedded Facilities

Embedded facilities are not connected directly to the IESO-controlled grid. Instead, they are connected to a distributor, who, in turn, is connected to the grid.

Rules regarding embedded consumers vary according to the volume of electricity consumed.

Electricity consumers using less than 250,000 kWh per year and qualifying farms pay set rates for the electricity they consume. The Ontario Energy Board (OEB) reviews these rates and may change them from time to time. Consumers with 'smart meters' pay set rates depending on the time of day. See the Ontario Energy Board web site for details.

Large volume embedded facilities have a choice as to how they interact with the wholesale electricity market. They may contract with the distributor to buy or sell electricity, or they may choose to become a market participant. If the embedded facility becomes a market participant, it may buy or sell energy through the real-time markets and may also enter into physical bilateral contracts (see Section 9).



6.6 Market Participants without Physical Facilities

Some companies participate in Ontario's IESO-administered markets without having physical facilities that produce or consume electricity. These companies may participate in both the real-time markets and the financial markets.

6.6.1 Wholesalers and Retailers

Wholesalers buy energy on the wholesale market, and sell energy and services to other market participants; retailers sell energy and services to consumers at the retail level (that is, they may sell to non-market participants). Both wholesalers and retailers are re-selling electricity rather than producing electricity themselves. They may also act as importers or exporters. Importers bring energy products into Ontario from one of the five neighbouring jurisdictions: Quebec, Manitoba, Michigan, Minnesota and New York. Exporters export electricity from Ontario into these neighbouring jurisdictions.

6.7 Financial Markets

Market participants may also participate in the IESO-administered financial markets. These markets do not affect the actual delivery of electricity. The financial markets allow market participants to reduce price risks. They involve the transfer of funds only; they do not involve the transfer of energy.

At this time, the transmission rights auction is the only IESO-administered financial market.

6.7.1 The Transmission Rights (TR) Auction

Prices in Ontario may be different from prices in other jurisdictions. The use of Transmission Rights, or TRs, allows importers and exporters to reduce the price risk associated with trading between Ontario and jurisdictions outside of Ontario.

6.8 Day-Ahead Commitment Process

The DACP improves the efficiency of the electricity market through the advanced scheduling and commitment of resources required to provide electricity on a daily basis, and by optimizing existing and anticipated generation more effectively, while ensuring reliability.

The DACP is not a 'day-ahead market' – however, the day-ahead commitment helps address reliability concerns.

7. The Real-Time Energy Market

Ontario's IESO continually balances generation (supply) and load (consumption).

7.1 Supplying Energy to the Ontario Market

Energy is supplied by generators in Ontario and by imports into Ontario from neighbouring jurisdictions. As we have seen, dispatchable generators submit offers to supply energy, and self-scheduling and intermittent generators submit schedules and forecasts.

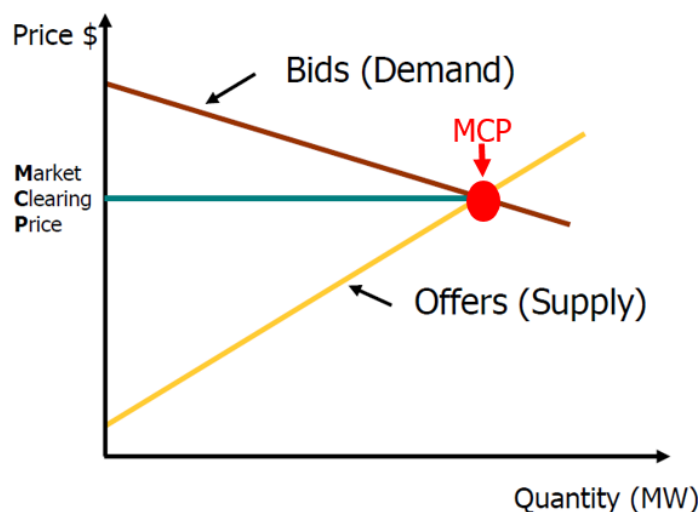
Facilities in neighbouring jurisdictions are not under the control of Ontario's IESO, but their energy offers must be taken into account when prices and dispatch instructions are set. The actual generators in other jurisdictions do not have to be registered with Ontario's IESO. Instead, Ontario's IESO has set up 'boundary entities' to enable importers to submit offers into the IESO-administered market. Boundary entities are not actual physical facilities. They are created so that the IESO computer software can consider and schedule energy imports and exports.

7.2 Consuming Energy in the Ontario Market

Energy is consumed by loads and by exports from Ontario to neighbouring jurisdictions. Non-dispatchable loads draw electricity as they need it; dispatchable loads submit bids to buy energy. Facilities in neighbouring jurisdictions are not under the control of Ontario's IESO. As with energy imports, 'boundary entities' have been set up by Ontario's IESO to enable exporters to submit bids to export energy, and to allow the IESO computer software to schedule successful export bids.

7.3 Determining Market Clearing Prices for Energy

The competitive wholesale price for electricity in Ontario (called the market clearing price, or MCP) is based on bids and offers into the market from dispatchable facilities and boundary entities, and on supply and demand from non-dispatchable facilities. The market clearing price for energy is set for each five-minute interval.



7.4 Determining Dispatch Instructions

The IESO issues dispatch instructions to each dispatchable facility in Ontario for each five-minute interval of every day, and to boundary entities for each hourly interval of every day. The dispatch instructions specify the required amount of energy that is to be injected or withdrawn for each interval.

As previously discussed, these specified amounts are determined by the facility's bids or offers:

- In most cases, a generator or importing boundary entity is sent dispatch instructions to inject energy into the IESO-controlled grid whenever the market clearing price for a given interval is equal to or exceeds the price offered by the generator or boundary entity for that interval.
- In most cases, a load or exporting boundary entity is sent dispatch instructions to withdraw energy from the IESO-controlled grid whenever the market clearing price for a given interval is equal to or less than the price bid by the load or boundary entity for that interval.

Dispatch instructions cannot always follow this formula. If there are physical or security constraints on the lines, or if there are physical limitations at the facility itself, dispatch instructions may be different from what we would expect if we just considered bids and offers.

7.5 Constraints and Transmission Limits

The market clearing price for Ontario is determined using an ideal system where there are no physical limitations on the transmission of power. Unfortunately, the physical behaviour of the power system can prevent this ideal dispatch from being realized. There may be constraints on the lines. For example, on a very hot day with little wind the limit on the transmission lines will drop.

In order to preserve the integrity of the power grid, the IESO's dispatch instructions must take these constraints on the transmission lines into account. When there are constraints on the lines (congestion), actual dispatch instructions may be different from what we would expect, but the market clearing price does not change. However, in order to maintain fairness in the market, generators and loads are paid 'constrained-on' and 'constrained-off' payments if they are affected by transmission line limitations.

7.6 Constrained-On and Constrained-Off Payments

Constrained-on and constrained-off payments compensate market participants whose dispatch instructions are different from what they would be if there were no limitations on the lines or physical limitations in adjusting energy consumption or generation levels at the facility itself.

For example, a generator may offer energy at a price below the market clearing price, and would expect to be 'dispatched on' to inject that amount of energy. If there are constraints on the transmission lines, the IESO may have to send 'dispatch off' instructions, telling the generator not to inject the energy. This would result in the generator not realizing the profit that would have been realized if there had been no congestion. In a case such as this, the generator is paid a 'constrained-off' payment to return them to the profit that would have been realized had there been no constraints.

Other constrained-on or constrained-off payments for generators and loads work in a similar fashion.

7.7 Intertie Zone Prices

Interconnection lines (or interties) allow electricity to be imported into and exported out of Ontario. Congestion can also occur on these intertie lines. Separate intertie zone prices are necessary at each of the intertie zones to account for price differences in the neighbouring jurisdictions resulting from constraints on the interties.

7.8 The Real-Time Operating Reserve (OR) Market

There may be occasions when the balance between generation and load is affected by an unanticipated event, such as equipment failure or emergency. Spare capacity that can be called upon on short notice is required to restore the balance in the case of such an event. This spare capacity is called operating reserve.

Ontario's IESO administers three separate Real-time Operating Reserve Markets to provide a market-based way for the IESO to quickly replace the supply of electricity for a short period of time until requirements can again be supplied from normal dispatch:

- 10-minute synchronized reserve (also called 10-minute spinning)
- 10-minute non-synchronized reserve (also called 10-minute non-spinning)
- 30-minute reserve (synchronized or non-synchronized)

7.9 Payments in the Operating Reserve Market

As with the energy market, a market clearing price is determined for each of the three operating reserve markets. The IESO considers the offers in order of increasing price, then selects the necessary resources to meet its requirements. (In practice, the market clearing price and dispatch instructions for operating reserve are determined jointly with the Real-time Energy Market clearing price and dispatch instructions.) Operating reserve offers are essentially stand-by offers. All accepted offers are paid the market clearing price for that class of operating reserve, regardless of whether or not the reserve is actually used. These payments are stand-by payments. For operating reserve that is actually used, the suppliers are paid for the energy provided.

7.10 Who Can Offer into the Operating Reserve Market?

10 Minute Synchronized	10 Minute Non-Synchronized	30 Minute
Dispatchable Generators Dispatchable Loads	Dispatchable Generators Dispatchable Loads Boundary Entities	Dispatchable Generators Dispatchable Loads

7.11 Energy and Operating Reserve Prices

Every five minutes the following real-time market prices are determined:

- A market clearing price for energy across Ontario
- A market clearing price for energy at each of the intertie zones with neighbouring markets

- A market clearing price for each of the three operating reserve classes across Ontario
- A market clearing price for 10 minute non-synchronized and 30-minute operating reserve at each of the intertie zones with neighbouring markets

In addition to the five-minute prices, each hour a calculation is performed to determine the Hourly Ontario Energy Price (HOEP). HOEP is determined by using the average of the five-minute Ontario energy prices. HOEP is used as the wholesale price for electricity for non-dispatchable generators and non-dispatchable loads.

8. Ancillary Services

Ancillary services are services required to maintain the reliability of the IESO-controlled grid, including:

- **Certified Black Start Facilities:** help system reliability by being able to restart their generation facility with no outside source of power following a blackout event.
- **Regulation Service:** referred to as frequency regulation, acts to match total system generation to total system load (including transmission losses) and helps correct variations in power system frequency.
- **Reactive Support and Voltage Control Service:** to maintain acceptable reactive power and voltage levels on the grid, reactive support and voltage control (RSVC) service are required by the IESO. Reactive power moves active power through the transmission and distribution system from generators to the end customer. Due to the nature of the transmission system, reactive power needs are very localized and cannot be provided over far distances.
- **Reliability Must-Run:** Reliability must-run (RMR) contracts are used to ensure the reliability of the IESO-controlled grid. An RMR contract allows the IESO to call on the counterparty to produce electricity if it is needed to maintain the reliability of the electricity system

9. Physical Bilateral Contracts

Market participants may opt to purchase or sell energy through physical bilateral contracts. A physical bilateral contract is an agreement between an energy consumer and an energy supplier to buy and sell a specified quantity of energy at a specific price. In Ontario, physical bilateral contracts are used primarily to manage price uncertainty.

9.1 Physical Bilateral Contracts and Energy Scheduling/Dispatch

In the IESO-administered markets, physical bilateral contracts are not part of the actual scheduling and dispatch of energy. Physical bilateral contracts are used only in the settlement of market charges and payments. (In many other jurisdictions, the bilateral contract information is integrated into market scheduling and dispatch decisions.)

In Ontario, as we have seen, the injection or withdrawal of energy by dispatchable participants, importers, and exporters is based on their offer/bid prices in relation to the market price for energy. Non-dispatchable facilities withdraw energy as needed, or supply energy according to their submitted forecasts and schedules. Physical bilateral contracts do not impact the way the IESO dispatches loads and generators.

9.2 Submitting Physical Bilateral Contract Data to the IESO

The parties to a physical bilateral contract may choose to submit the contract data to the IESO for settlement, or they may decide to settle the contract themselves.

If the parties submit the contract data to the IESO, they provide information about the time, amount, and point of supply for the energy under contract. The actual price and payment terms are private; there is no provision or need for the IESO to know this information. The IESO uses the contract data to adjust the energy market settlement statements for the consumer and supplier.

For parties who decide to settle the transaction on their own, the IESO bills consumers and pays suppliers in the same way as it does for parties without physical bilateral contracts. The parties themselves administer any payments required by the contract.

10. Financial Settlements for Real-time Market Transactions

Participants in the real-time markets receive payments or invoices directly from the IESO for energy sold or purchased in the real-time markets. In addition, other charges are included in the invoices sent to participants:

- Charges for transmission and distribution of energy (set by the Ontario Energy Board)

- 'Uplift' or overhead charges to cover costs incurred to supply items such as operating reserve and congestion costs

10.1 Settlement Statements

The IESO issues a preliminary settlement statement and a final settlement statement for each trading day. As of May 1, 2023, the IESO issues recalculated settlement statements if necessary to restate a trade date's original and resettled settlement charges. These statements indicate amounts of power purchased or produced, the real-time market price at the times of transactions, and the total daily charges.

Ten business days after the trading day, the IESO sends each participant a preliminary statement of transactions for that trading day. Time is allowed for the participants to verify the statement, and for the IESO to verify and recalculate charges, if necessary. Ten business days after the preliminary settlement statement is issued, the IESO issues the final settlement statement for the trading day.

Recalculated settlement statements (RCSS) is referred to as a "resettlement" statement. There can be up to Seven RCSS statements issued over a two-year time frame for the physical markets. See the figure below for the RCSS Publication Frequency.

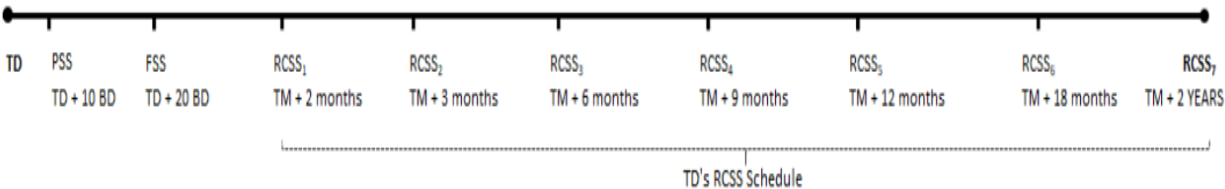


Figure 1: Settlement Statement Publication Frequency - Physical Markets

10.2 Invoices

Once a month, the IESO issues invoices to participants based on the daily statements. The monthly invoices are issued ten business days after the last billing day of the month.

These invoices must be paid within two business days, to allow the IESO to pay suppliers two business days later.



The Invoice and Payment Timeline



11. The Market Rules and Market Manuals

11.1 Market Rules

The Market Rules govern Ontario's IESO-controlled grid and Ontario's IESO-administered markets, with the goal of ensuring an efficient, competitive and reliable wholesale electricity market.

11.2 Market Manuals

In order to operate the markets, the IESO has produced procedures, forms, standards and policies. The market manuals provide the details of these procedures and policies.

11.3 Compliance with the Market Rules

Ontario's IESO is responsible for supervising, administering and enforcing the Market Rules. Both the IESO and market participants are bound to comply with the rules, and the IESO is responsible for ensuring compliance. In case of disagreement, the rules set out a procedure for resolving disputes.

11.4 Accessing the Market Rules and Market Manuals

The complete Market Rules and market manuals are available in the Documents section of the IESO [Market Rules & Manuals Library \(ieso.ca\)](https://ieso.ca) webpage. .

12. Conclusion

This guide provides an overview of Ontario's competitive electricity market. The IESO website at <https://www.ieso.ca> provides a wealth of additional information, including:

Training Materials ([Instructor-Led Courses](#), [Training Materials](#) and [Participant Tool Training](#))

- Guides are available for such topics as market entry, prudentials, dispatchable loads, connecting to the IESO, the Day-Ahead Commitment Process (DACP), the IESO portal, and information technology in the market
- In-depth training is available through Training courses (print material, face-to-face courses, and recorded presentations)

12.1 Market Rules and Manuals

The Market Rules and Market Manuals legally define the operation and administration of Ontario's IESO-administered markets. They are the source for all training material, and can be found on the [Market Rules and Manuals Library](#) webpage.

12.2 Market Information

Ontario's IESO publishes a great deal of information in the [Power Data](#) section of the website and on the [IESO Reports](#) website, including current and historical demand and prices, adequacy reports, transmission rights auction reports, and weekly and monthly market reports.

In addition, the IESO publishes 18-month outlooks, which assess the adequacy of generation and transmission capability for the Ontario electricity system.

12.3 Other Web Resources

- Ontario Energy Board at <http://www.oeb.ca>
- Ministry of Energy, Northern Development and Mines at <https://www.mndm.gov.on.ca/en>
- North American Electric Reliability Corporation at <http://www.nerc.com/>
- Northeast Power Coordinating Council (NPCC) at <http://www.npcc.org>

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