PUBLIC

PROCEDURE

Connecting Today.
Powering Tomorrow.

Market Manual 7: System Operations

Part 7.2: Near-Term Assessments and Reports

Issue 49.2-MRP
March 13, 2024

This *market manual* is provided for stakeholder engagement purposes. Please note that additional changes to this document may be incorporated as part of future engagement in MRP or other *IESO* activities prior to this *market manual* taking effect.

This procedure describes the process by which the IESO undertakes short-term weekly and daily forecasts and assessments of expected system conditions on the IESO-controlled grid.

IMP_PRO_0033

Document Change History

Issue	Reason for Issue	Date
For changes prior to 2011, refer to versions 26.0 and prior. For changes from 2012 through 2014, refer to versions 38.0 and prior. For changes from 2015 through 2017, refer to version 44.0 and prior.		
40.0	Issue released for Baseline 39.0	March 7, 2018
41.0	Issue released for Baseline 39.1	June 6, 2018
42.0	Issue released for Baseline 41.0	March 6, 2019
43.0	Issue released for Baseline 42.1	December 4, 2019
44.0	Issue released for Baseline 43.0	March 4, 2020
45.0	Updated to meet accessibility requirements pursuant to the *Accessibility for Ontarians with Disabilities Act.*	December 2, 2020
46.0	Issue released in advance of Baseline 45.0. Updated to include electricity storage participation.	February 26, 2021
47.0	Updated to include changes in the calculation methodology of the IESO Public Adequacy Report	March 29, 2021
49.0	Issue released for Baseline 48.0	September 14, 2022
49.1	Updated for stakeholder engagement to reflect Market Renewal Program	July 14, 2023
49.2	Updated after considering external stakeholder review	March 13, 2024

Related Documents

Document ID	Document Title
IMP_PRO_0035	Market Manual 7.3: Outage Management

Table of Contents

List of Tables

Table of Changes

Reference	Description of Change

Market Manuals

Market manuals set out procedural and administrative details with respect to *market rule* requirements. Where there is a conflict between the requirements described in a *market manual* or appended document, and those within the *market rules*, the *market rules* shall prevail.

Market Manual Conventions

This *market manual* uses the following conventions:

- the word 'shall' denotes a mandatory requirement;
- references to *market rule* sections and sub-sections may be appreviated in accordance with the following representative format: '**MR Ch.1 ss.1.1-1.2'** (i.e. *market rules,* Chapter 1, sections 1.1 to 1.2);
- references to *market manual* sections and sub-sections may be appreviated in accordance with the following representative format: '**MM 1.5 ss.1.1-1.2'** (i.e. *market manual* 1.5, sections 1.1 to 1.2);
- internal references to sections and sub-sections within this manual take the representative format: 'sections 1.1 – 1.2';
- terms and acronyms used in this *market manual* in its appended documents that are italicized have the meanings ascribed thereto in **MR Ch.11**;
- all user interface labels and options that appear on the *IESO* gateway and tools are formatted with the bold font style;
- data fields are identified in all capitals; and
- references to "Day 0" mean the current day, references to "Day 1" mean the day immediately after the current day, references to "Day 2" mean the day two days after the current day, and so on.

– End of Section –

1 Introduction

1.1 Purpose

This *market manual* describes how the *IESO* prepares and *publishes* the reports it uses to inform *market participants* of expected conditions on the *IESO-controlled grid* and in the *IESO-administered markets* in the near-term through the following reports and advisories:

- Adequacy Reports (Day 0 to Day 34);
- Ontario Near-Term Demand Forecast Report (Day 0 to 10) for the Northeast, Northwest, Southeast and Southwest *demand* forecast areas;
- Ontario Mid-Term Demand Forecast Report (Day 11 to 34) for the legacy East and West *demand* zones;
- Transmission Facility All-in-Service Limits Report;
- Transmission Facility Outage Limits Report (Day 0 to 2);
- Transmission Facility Outage Limits Report (Day 3 to 34);
- Advisory notices, *published* as required; and
- Surplus Baseload Generation (SBG) Report (Day 1 to Day 10).

The procedures for preparing and *publishing* long-term (18-month) forecasts and assessments are described in **MM 2.8** and **MM 2.11**.

1.2 Scope

This *market manual* supplements the following *market rules*:

- MR Ch.5 s.4.4.2
- MR Ch.5 s.7.1: Forecasts Prepared by the IESO
- MR Ch.5 s.7.3.1.4
- MR Ch.5 s.7.4: Purpose of Assessments
- MR Ch.5 s.7.5: Information Requirements
- MR Ch.7 s.12.1: IESO System Status Reports and Advisory Notices
- MR Ch.7 s.12.2: Over-Generation and Under-Generation Advisories

1.3 Contact Information

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

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

– End of Section –

2 Market Participant Data Submission Instructions

(MR Ch.5 s.7.5.1)

Pre-schedules – Each Tuesday by 17:00 EST, *market participants* that operate *energy*-limited *resources* must, in accordance with **MR Ch.5 s.7.5.1**, provide the *IESO* with a pre-schedule of these *resources* for the period beginning on Day 1 and going out to Day 34. The pre-schedule defines the total hourly and daily *energy* content of all aggregated *energy*-limited *resources*. *Market participants* must update the *energy*-limited *resource* pre-schedule if there are any changes to information previously provided.

Energy limited resources – *Market participants* who operate energy-limited *resources* must submit these pre-schedules via Online IESO:

- a forecast of the daily aggregated *energy* production of all *resources* for the days of week 4 (i.e. from Day 28 to Day 34); and
- an updated forecast of the daily aggregated *energy* production for all other days of the period.

– End of Section –

3 Adequacy, Demand Forecast, and Transmission Limits Reports

(MR Ch.7 s.12.1.1)

Near-term reports – In accordance with **MR Ch.7 s.12.1.1**, the *IESO* regularly produces and *publishes* the following near-term reports relating to the *security* and *adequacy* of the *IESO-controlled grid*. These reports are listed in section 1.1 of this *market manual*.

3.1 Adequacy Reports

(MR Ch.7 s.12.1.1.6)

Content and granularity – Adequacy Reports cover Day 0 to 34 and have hourly granularity.

3.1.1 Adequacy Report for Day 0 to Day 1

(MR Ch.7 s.12.1.1.6)

Publication schedule – In accordance with **MR Ch.7 s.12.1.1.6,** the *IESO* prepares and *publishes* Adequacy Reports daily for Day 0 and Day 1, according to the following schedule:

- two times per hour, for [each of the remaining hours in] Day 0;
- by 05:30 EPT [of Day 0], for Day 1;
- by 09:00 EPT [of Day 0], for Day 1;
- after successful completion of the *day-ahead market* on Day 0, for Day 1; and
- hourly after 20:00 EST [of Day 0], for Day 1.

Updates – These reports are updated according to the publication schedule to provide *market participants* with any new information since the previous scheduled publication. This may include changes in *demand*, *generation capacity, electricity storage capacity* and *variable generation* forecast.

Offers, bids and schedules – Reports *published* on Day 0 and *published* for Day 1 after successful completion of *day-ahead market scheduling* will include aggregated values of the capacity *offered* and *bid* for the *dispatch day* and the aggregated day-ahead market or *pre-dispatch schedules*.

3.1.2 Adequacy Report for Day 2 to 34

(MR Ch.5 s.7.3.1.4)

Publication schedule – In accordance with **MR Ch.5 s.7.3.1.4**, the *IESO* prepares and *publishes* Adequacy Reports for Days 2 to 34. Reports are *published* twice daily at approximately 8:45 EST and 15:00 EST.

Updates – These reports are updated twice daily to provide *market participants* with any new information since the previous scheduled publication. This may include changes in *demand*, *generation capacity, electricity storage capacity* and *variable generation* forecast.

3.2 Transmission Facility All-in-Service Limits Report

(MR Ch.7 s.12.1.1.7)

Publication schedule – Each day by 17:00 EST, the *IESO* prepares and *publishes* the Transmission Facility All-in-Service Limits Report to provide *market participants* with information on *available transfer capabilities* on major interfaces, assuming all critical elements are in-service.

3.3 Transmission Facility Outage Limits Reports

(MR Ch.7 s.12.1.1.8)

Reports – Each day the *IESO* prepares and *publishes* the Transmission Facility Outage Limits Report (Day 0 to 2) and the Transmission Facility Outage Limits Report (Day 3 to 34), in accordance with **MR Ch.7 s.12.1.1.8**, which provide *market participants* with information on *available transfer capabilities* for internal interfaces and *interties,*[1] considering anticipated *outage* conditions.

Publication schedule and updates – The *IESO publishes* the Transmission Facility Outage Limits Report (Day 0 to 2) will be *published* by approximately 15 minutes and 45 minutes past the top of the hour. , and the Transmission Facility Outage Limits Report (Day 3 to 34) day will be *published* by approximately 8:45 EST; and *published* by approximately 17:07 EST , to provide *market participants* with updates on *available transfer capability* since the previous report.

– End of Section –

[1] The lists of internal interfaces and *interties* are in Appendix D.

4 Advisory Notices

(MR Ch.7 s.12.1.3)

Purpose – Advisory notices provide information to *market participants* that is not captured in the regularly scheduled Adequacy Report and the Transmission Limits Reports. Advisory notices are dependent on circumstances and are *published* as needed in accordance with **MR Ch.7 s.12.1.3**.

IESO assessment – The *IESO* will perform an assessment of occurring or expected system events and conditions to determine if an advisory notice is required. *IESO* will issue the advisory notices as required as soon as practicable.

Example – For example, the *IESO* will *publish* an advisory notice if it needs to identify that an external jurisdiction has made a *reliability* declaration calling upon Ontario capacity for firm *energy* exports, or to communicate the disabling or re-enabling of the five-minute *variable generation* forecasting tool.[2]

Three levels – In accordance with **MR Ch.7 s.12.1.2**, the *IESO* may *publish* three levels of advisory notices for the benefit of *market participants* and/or neighbouring jurisdictions:

- an Alert Notice to notify of changes or expected changes in system or market conditions to allow time for advanced preparations.
- a Warning Notice to notify that the *IESO* is likely to take or direct future actions in the near term if the *IESO-administered market* does not or cannot respond sufficiently to eliminate a problem associated with either a system or market condition.
- an Action Notice to notify that the *IESO* is, or *market participants* as directed by the *IESO* are, taking actions to eliminate an identified or potential problem associated with either a system or market condition.

Content – Any advisory notice will clearly indicate the level of the notice, Alert Notice, Warning Notice, or Action Notice.

Sequence – Typically, the *IESO* will *publish* advisory notices in the following sequence: first an Alert Notice, next a Warning Notice, and then an Action Notice. The *IESO* has the discretion to *publish* one level of advisory notice without issuing the preceding level.

[2] At its discretion, the *IESO* may disable the five-minute Variable Generation forecasting tool when the forecast differs from the actual output by at least 50 MW.

– End of Section –

5 Surplus Baseload Generation

(MR Ch.7 ss.12.1.1, 12.1.3 and 12.2.1)

Definition – Surplus baseload generation (SBG) is a condition that occurs when baseload generation is expected to exceed Ontario *demand*. During SBG, the system is balanced via market mechanisms that may include *intertie* scheduling, dispatching hydroelectric generation, dispatching *variable generation*, and nuclear manoeuvring or shutdown.

5.1 Baseload Generation

Definition – Baseload generation is typically considered to be[3] the sum of the expected generation of all available:

- nuclear *generation resources*;
- must-run hydroelectric generation *resources*;
- *self-scheduling generation resources* (including commissioning units), and *self-scheduling electricity storage facilities*;
- intermittent *generation resources*;
- *variable generation resources* (including wind and solar *generators*); and
- other *resources* that typically offer their output at a value lower than the highest offer for nuclear generation.

5.2 Surplus Baseload Generation Reports

Purpose – The SBG Report identifies times when the output of Ontario's baseload *generation resources* is expected to be greater than the forecast Ontario *demand*.

Publication schedule and content – Each day, the *IESO* prepares and *publishes* the SBG Report on the *IESO* website by 17:00 EST

- The report spans the period from Day 1 to 10.
- SBG is calculated by subtracting the forecast Ontario *demand* from the forecast baseload generation. Exports are not factored in the calculation.
- The SBG Report will include the amount of exports we reasonably estimate will be scheduled during the highest SBG period for the day.

[3] Depending on the time frame of assessment, there may be slightly different definitions of baseload generation. This definition is used in the operational time frame.

- The *IESO* uses the forecast Ontario *demand* based on forecast weather and the embedded *variable generation* forecast for *resources* ≥ 5 MW.
- The *IESO* uses the centralized *variable generation* forecast for Ontario's *variable generators* for Day 1 to 7.
- Minimum Generation Alerts are issued as per the conditions set out in section 5.3.

5.3 Minimum Generation Alerts and Events

Context and purpose of advanced notice – Some Ontario nuclear *generators* have the ability to reduce their output. Typically, this is accomplished by having some steam bypass the turbine, reducing the electrical output of the *generator* while keeping reactor power constant. However, due to the characteristics of nuclear station design and operation, the reduction often must be accomplished in a single block, and held at that level for some amount of time before being reloaded in a single block.

Given the unique operating characteristics of nuclear generation, the *IESO* provides advance notice where possible of potential reductions of the output of nuclear *generators* for surplus baseload generation management – both for the benefit of the nuclear *resource* operators and for other *market participants*.

Conditions justifying publication – The *IESO publishes* advisory notices for Minimum Generation Alerts and Events under the following conditions:

- If the *IESO* forecasts a nuclear manoeuvre of at least 50 MW for four or more contiguous hours in Day 3 or Day 4, the *IESO* will *publish* an advisory notice with a Minimum Generation Alert for each impacted day. The alert will identify the potential for a nuclear manoeuvre and will include a forecast of expected export quantities during the SBG event. The *IESO* may issue these System Advisory notices beyond Day 4 for holiday weekends or as necessary.
- If the *IESO* forecasts a nuclear manoeuvre of at least 50 MW for two or more contiguous hours for Day 1 or Day 2, they will *publish* an advisory notice with a Minimum Generation Alert for each impacted day.
- If pre-dispatch shows a nuclear maneuver of 50 MW or more, the *IESO* will *publish* an advisory notice indicating a Minimum Generation Alert.[4]
- In real-time, if a nuclear manoeuvre is imminent or in progress, the *IESO* will *publish* an advisory notice indicating a Minimum Generation Event.

[4] After the *day-ahead market* process completes, the *IESO* will assess pre-dispatch results on an hourly basis. If the *IESO* determines, with reasonable certainty, that a baseload generation manoeuvre exceeding 50 MW is likely for a future hour, they will issue a Minimum Generation Alert.

Conditions relevant to SBG events – Conditions that may exacerbate or lessen forecast SBG events include:

- *demand* is different (lighter or heavier) than forecast;
- *forced outages* with forced or urgent Priority Code of *dispatched* generation resources, *dispatched electricity storage resources*, or transmission *facilities*;
- short notice changes of hourly export transactions (increase or decrease); and/or
- *intermittent generators*, *self-scheduling generation resources, self-scheduling electricity storage resources,* and *variable generators* producing more or less than anticipated.

The *IESO* will *publish* an advisory notice canceling a Minimum Generation Alert if conditions change such that the *IESO* no longer expects nuclear manoeuvres. Table 5-1 provides a summary of the Minimum Generation conditions.

Table 5-1: Minimum Generation Status

Time Frame	Forecast Condition	Minimum Generation Status
Day 3 or Day 4	A nuclear manoeuvre of at least 50 MW is forecasted for four or more contiguous hours.	**Alert**
Day 1 or Day 2	A nuclear manoeuvre of at least 50 MW is forecasted for two or more contiguous hours.	**Alert**
Pre-dispatch	Pre-dispatch shows a nuclear manoeuvre of 50 MW or more.	**Alert**
Real-Time	A nuclear generation manoeuvre is imminent or in progress	**Event**

– End of Section –

Appendix A: Method to Prepare Demand Forecasts

(MR Ch.5 s.7.1.3)

This appendix describes the method used to prepare the hourly average and peak *demand* forecasts in each *demand* forecast area. These *demand* forecasts are used as an input to the near-term *adequacy* assessments and presented in the:

- Adequacy Report;
- Ontario Near-Term Demand Forecast Report (Day 0 to 11); and
- Ontario Mid-Term Demand Forecast Report (Day 11 to 34).

The *IESO* uses a load forecast tool to prepare near-term hourly Ontario *demand* forecasts from Day 0, including pre-dispatch, to Day 34.[5] The tool uses models consisting of linear regressions and/or neural network analysis to produce the forecasts.

A.1 Input Drivers for Demand Forecasting

The following items are used as input drivers by the *demand* forecasting tool:

- Weather parameters
    - Dry-Bulb Temperature
    - Wet-Bulb Temperature
    - Dew-Point Temperature
    - Wind Speed
    - Wind Direction
    - Illumination
    - GHI (Global Horizontal Irradiance in W/m^2)
    - Cloud Cover
- Historical Demand Data

[5] At its discretion, the *IESO* may manually adjust the Ontario *demand* forecasts provided by the load forecast tools to account for conditions such as, but not limited to, actual weather that differs from forecast weather.

- Embedded Variable Generation Data
    - Historical
    - Forecast

– End of Appendix –

Appendix B: Method to Assess Generation and Transmission Adequacy

(MR Ch.7 s.12.1.1)

The *IESO* compares forecasted *demand* to available *resource capacity* and *energy*, including available generation external to Ontario when assessing generation *adequacy*. The *IESO* uses the following *adequacy* criteria for *normal operating states*:

1. For the *dispatch day* and two days following the *dispatch day*, an acceptable level of *adequacy* is achieved if:
    - available *resources*, based on installed capacity, estimated imports and outage information, exceed forecasted Ontario *demand* by at least the *operating reserve* requirement; and
    - available *resources*, based on energy production of *energy*-limited *resources*, installed capacity of non-*energy*-limited *resources*, energy forecast from centralized forecasting of renewable *resources*, estimated imports and *outage* information, exceed forecasted Ontario *demand* in MWh.

    The *IESO* takes necessary actions if there are inadequate *resources* in the short-term, including but not limited to:
    - *publishing* information necessary to allow the market to react to *adequacy* concerns;
    - including incremental import transactions in pre-dispatch beyond the standard T+2 timeline.
    - activating *reliability must-run contracts* to address local area *adequacy* only (i.e. not permitted to address lack of overall system generation *adequacy*);
    - rejecting, revoking, and recalling *outages*; and
    - issuing system advisory notices with the expected actions to be taken (e.g., voltage reductions, public appeals, *load* shedding).
2. For the balance of daily and weekly assessment out to the end of week 4 following the *dispatch* week, an acceptable level of *adequacy* is achieved if:

- available *resources*, based on installed capacity, estimated imports, and outage information exceed forecasted Ontario *demand* by at least the Generation Reserve Holdback[6]; and
- available *resources*, based on *energy* production of *energy*-limited *resources*, installed capacity of non-*energy*-limited *resources*, energy forecast of renewable *resources*, estimated imports and outage information, exceed forecasted Ontario *demand* in MWh.

3. For *reliability* assessments, an acceptable level of *adequacy* is achieved if forecast available *resources* exceed forecasted *demand* by an amount such that the loss of load expectation is less than 0.1 days per year, consistent with *NPCC* requirements.

The *IESO* compares forecast transmission flows with the applicable system operating limits under a range of *load* conditions and *generator, electricity storage participant* and transmission *facility* availability conditions when assessing transmission *adequacy*. An acceptable level of *adequacy* is achieved if forecast *loads* can be supplied without exceeding applicable system operating limits and acceptable system voltages can be maintained.

– End of Appendix –

[6] Generation Reserve Holdback is an amount of generating capacity that is needed to be held in reserve. Refer to Appendix E for details.

Appendix C: Terms Used in Adequacy Reports

(MR Ch.5 s.7.1.3)

This appendix describes the terms used and presented in Adequacy Reports. In addition to the terms in this appendix, all reports *published* on Day 0 and reports *published* on Day 1 will include aggregated values of the capacity *offered* and *bid* by *market participants* and the aggregated *day-ahead market* or *pre-dispatch schedules* for the *dispatch day*

C.1 Forecast Supply

The *IESO* forecasts the following elements of supply:

Energy (MWh) – the amount of *energy* available from generation and storage sources in Ontario plus imports from other *control areas.*[7] This quantity is calculated from the relationship:

[generating and storage capacity in-service (MW)] * 1 hr

- [capacity unavailable due to *outages* (MW)[8]] * 1 hr

- [capacity of *energy*-limited *resources* (MW)] * 1 hr

- [capacity of *variable generation resources* (MW)] * 1 hr

+ *energy* (forecast) of *variable generation resources* (MWh)

+ *energy*-limited *resource energy* for the hour (MWh)

+ [imports from other *control areas* (MW)] * 1 hr

The *Adequacy* Report includes *energy* quantities for each hour.

Capacity (MW) – the net amount of *generation capacity, storage capacity* in-service in Ontario, including *capacity generation and capacity storage resources* from the *capacity auction,* subdivided by fuel type. Storage *resources* are included in the Other fuel type. This number may be revised lower if a material quantity of capacity is bottled. The Adequacy Report includes capacity quantities for each hour.

Intermittent generation resource schedules (MWh/hr) – *market participants* provide *dispatch data* for *intermittent generation resources* that represent the forecast *energy* output for these *resources*. For the days of the Adequacy Report in

[7] An estimated value of imports is used prior to the initial pre-dispatch run on Day 1.

[8] Excludes *outages* to *energy*-limited *resources* and *variable generation resources*.

which *intermittent generation resource* schedules are not available, the *IESO* will use an estimate of these schedules in the *adequacy* assessment.

Self-scheduling generation and storage resource schedules (MWh/hr) – *market participants* provide *dispatch data* for *self-scheduling generation resources* and *self-scheduling electricity storage resources* that represent the forecast *energy* output for these *resources*. For the days of the Adequacy Report in which *self-schedules* are not available, the *IESO* will use an estimate of these schedules in the *adequacy* assessment.

Energy-limited energy (MWh) – the *IESO publishes* the aggregate forecast amount of *energy* available from *energy*-limited *resources*. An *energy*-limited *resource* is a *generation resource* or an *electricity storage resource* that is unable to supply *energy* equal to the capacity for each of the hours of the day (e.g. a hydro-electric *resource* with limited water in the forebay that does not allow it to produce *energy* at its rated output for each of 24 hours in the day). *Market participants* use Online IESO to provide the *IESO* with an *energy*-limited forecast of hourly granularity (i.e. the total forecast daily quantity of *energy* available) for all relevant *resources*. The *IESO publishes* the aggregate hourly energy profile of *market participant* forecasts for each day of the Adequacy Report.

Energy-limited capacity (MW) – the *IESO publishes* the nominal capacity of those *resources* that are *energy*-limited. On any day, the list of *resources* that may be *energy*-limited may change. To place the *energy*-limited *energy* quantity in context, the nominal capacity of these *resources* are provided to the *IESO* by the *market participants*, and the *IESO publishes* these quantities in the assessment reports. The Adequacy Report includes *energy*-limited capacity quantities for each hour.

Variable generation energy (MWh) – the *IESO publishes* the aggregate *variable generation* forecast amount of *energy* available from *variable generation* whose owners/operators are *registered market participants*. *Variable generation* means all wind and solar photovoltaic *resources* with an installed capacity of ≥ 5 MW, or all wind and solar photovoltaic *resources* that are directly connected to the *IESO-controlled grid*. For Days 0 and 1 of the Adequacy Report, the *IESO* uses and *publishes* the aggregated hourly quantities of forecast wind and solar generation produced by a *forecasting entity*[9]. For Days 2 to 7, the *IESO publishes* the lesser of the forecast provided by the *forecasting entity* and a forecast produced by the *IESO*

[9] At its discretion, the *IESO* may manually adjust the *variable generation* forecast provided by the *forecasting entity* to account for conditions such as, but not limited to, actual weather that differs from forecast weather.

using a set of seasonal capacity factors.[10] For Days 8 to 34, the *IESO publishes* a forecast of wind and solar generation, using seasonal capacity factors.

Variable generation capacity (MW) – the *IESO publishes* the nominal capacity of *variable generation* whose owners/operators are registered *market participants*. On any day, the list of *variable generation* may change. The Adequacy Report includes the aggregated quantities of wind *generation capacity* and solar generation capacity, for each hour.

Estimated imports (MW) – the *IESO* will include an amount in its *adequacy* assessments to account for potential imports from other *control areas*, as follows:

- For Days 0 and 1, a value of zero will be used,
- For Days 2 to 10, an estimate of up to 700 MW of imports will be used, along with the forecasted Ontario *demand* for this period,
- Beyond Day 10, an estimate of up to 2,000 MW of imports will be used, along with the forecasted extreme weather Ontario *demand* firm scenario.

These estimated import MW amounts are based on *IESO* experience with interchange transactions and are the MW amounts reasonably assumed to be available from the *interconnections*[11]. More conservative numbers will be used where available *interconnection* information indicates that less than 700 or 2,000 MW *imports* would be available. The total amount attributed to potential interchange assistance will be reviewed on a periodic basis. This quantity will be provided for each hour of each day of the Adequacy Report period.

For *outages* planned for Days 2 to 10, the *IESO* may increase *imports* above 700 MW to reflect *outage* replacement energy *imports.* The amount in excess of 700 MW may be an aggregate of *generators* arranging for replacement *energy*.

Capacity imports (MW) – the *IESO publishes* the quantity of capacity imports (including *system-backed capacity import resources* and *generator-backed capacity import resources* from the *capacity auction*) that can be relied upon from other *control areas*. This quantity is included in capacity excess (shortfall) calculations for all days in the near-term assessment period.

Outages (MW) – the *IESO publishes* the quantity of *generation resource* and *electricity storage resource* MWs, by fuel type, that are unavailable due to *outage* or derating. These quantities will be provided for each hour of each day of the

[10] Due to increased forecast uncertainty for wind quantities below 500 MW for Days 2 to 7, the forecasts provided by the *forecasting entity* will be reduced by 10% to reduce the likelihood of over-forecasting.

[11] For more details, see the Methodology to Perform Long Term Assessments document available at the Reliability Outlook page of the *IESO* website.

Adequacy Report. *Electricity storage resources* are included in the 'other' fuel type category.

Bottled capacity (MW) – the *IESO* will include, in its *adequacy* assessments, an amount to account for the estimated quantity of bottled *generation capacity* . This amount will be the sum of all regional *generation capacity* in excess of regional *demand* that cannot be transferred to other internal areas as a result of transmission limitations.

Regulation – the *market rules* require the *IESO* to determine the quantity of *regulation* capacity needed for each hour of the following day. As a minimum the requirements shall be ± 100 MW, with a ramp rate of 50 MW/minute (**MR Ch.5 s.4.4.2**). For the purpose of the near-term *adequacy* assessments for Days 2 to 34, the *IESO* will consider the *regulation* requirement and rate to be the minimum requirements specified in the *market rules.* Due to operability needs the *IESO* may determine the need to schedule more than the minimum *regulation* requirement. The *IESO* will identify the *regulation* amount scheduled day-ahead, and *publish* this amount in the *adequacy* assessments for Days 0 and 1.

Adjusted capacity in the Adequacy Reports – For all days of the Adequacy Report, an adjustment is made to the available *dispatchable* capacity i.e. the "Total *Outages*" value is increased by 2% of available *dispatchable generation resources* and *dispatchable electricity storage resources*. This adjustment is applied to compensate for the *outage* reporting deadband of the greater of 2% or 10 MW, and to better represent available capacity and reduce discrepancies between the forecast in the Adequacy Report and pre-dispatch. The adjustment factor of 2% may be varied by the *IESO* from time-to-time if considered appropriate for the above purposes.

C.2 Forecast Demand

The *IESO* will forecast the following components of *demand* in the *Adequacy* Report:

Ontario demand (MW) – the *IESO* will forecast the Ontario *demand* (*non-dispatchable load* + *dispatchable load* + losses) and provide the total of these three quantities for each hour of each day of the Adequacy Report. The *dispatchable load* component of Ontario *demand* is the *dispatchable load* that is expected to be supplied. The "Forecast Ontario *Demand*" quantity in the Adequacy Report for Day 0 (current day) and Day 1 (tomorrow) represents the forecast used in pre-dispatch scheduling, and is the average *demand* forecast in all hours, with the exception of the *IESO* Ramp Hours[12], in which it is the peak *demand* forecast.

[12] *IESO* Ramp Hours are defined as any hour in which the peak demand forecast exceeds the average demand forecast by at least 300 MW.

Dispatchable load (MW) – the *IESO* will forecast the amount of *dispatchable load* that is expected to be available to be dispatched off. This information is presented for each hour of the Adequacy Reports for Days 2 to 34, and the Adequacy Reports for Day 1 *published* prior to the *day-ahead market* process. *Dispatchable load* forecasts are included in capacity excess (shortfall) calculations.

Hourly demand response (MW) – the *IESO* will forecast the amount of *Hourly Demand Response* that is expected to be available to be curtailed off. This information is presented for each hour of the Adequacy Reports for Days 2 to 34, and the Adequacy Reports for Day 1 *published* prior to the *day-ahead market* process. *Hourly Demand Response* forecasts are included in capacity excess (shortfall) calculations.

Capacity exports (MW) – the *IESO publishes* the quantity of capacity exports that the *IESO* is obligated to provide to other *control areas*. This quantity is included in capacity excess (shortfall) calculations for all days in the near-term assessment period.

Generation reserve holdback (MW) – the *IESO* will forecast the Generation Reserve Holdback Requirements - *operating reserve*, load forecast uncertainty (LFU) and additional contingency allowance (ACA) - in accordance with the principles listed in Appendix E: Generation Reserve Holdback Requirements.

Minimum 10-minute operating reserve requirement (MW) – the *IESO* will forecast its *10-minute operating reserve* in accordance with *NPCC* Directory 5: Reserve. This information is presented for each hour of each day of the Adequacy Report. Minimum *10-minute operating reserve* requirements are not included in excess (shortfall) calculations.

Minimum 10-minute spinning operating reserve requirement (MW) – the *IESO* will forecast its 10-minute spinning *operating reserve* in accordance with *NERC Reliability* Standard BAL-002 (Disturbance Control Standard) and *NPCC* Directory 5: Reserve. This information is presented for each hour of each day of the Adequacy Report. Minimum 10-minute spinning *operating reserve* requirements are not included in excess (shortfall) calculations.

C.3 Total Supply and Total Requirement

The *IESO* will include in the Adequacy Reports:

- Total supply, quantified by calculating and presenting the total forecasted amount of available *resources*, and
- Total requirement, quantified by calculating and presenting the total forecasted amount of *demand*.

The Total Supply (MW) for each hour is calculated from the following formulation:

- generating capacity in-service (MW) – capacity unavailable due to *outages* (MW) – bottled capacity (MW) + estimated imports (MW) + capacity imports (MW)

The Total Requirement (MW) for each hour is calculated from the following formulation:

- total hourly Ontario *demand* forecast (MW) + generation reserve holdback (MW) + capacity exports (MW) – *dispatchable load* (MW)

C.4 Energy and Capacity Excess (Shortfall)

The *IESO* will include in the Adequacy Reports:

- *Energy adequacy*, quantified by calculating and presenting the *energy* excess (or shortfall when there is insufficient *energy*); and
- Capacity *adequacy*, quantified by calculating and presenting the capacity excess (or shortfall when there is insufficient capacity).

The *Energy* Excess (MWh) for each hour is calculated from the following formulation:

[generating capacity in-service (MW) + estimated imports (MW) + capacity imports (MW) +*dispatchable load*] * 1 hr

- [total hourly Ontario *demand* forecast (MW) + capacity unavailable due to *outages* (MW) + capacity of *energy*-limited *resources* (MW) + capacity of *variable generation resources* (MW)] * 1 hr

+ *energy*-limited *resource energy* for the hour (MWh)

+ *energy* (forecast) of *variable generation resources* (MWh)

IF (*energy* excess < 0), then there is a shortfall of *energy*.

The Capacity Excess (MW) for each hour is calculated from the following formulation:

[generating capacity in-service (MW) + estimated imports (MW) + capacity imports (MW) + *dispatchable load*]

- [total hourly Ontario *demand* forecast (MW) + capacity unavailable due to *outages* (MW) + generation reserve holdback (MW) + capacity exports (MW)]

IF (capacity excess < 0), then there is a shortfall of capacity.

The Adequacy Reports for Day 0, and Day 1 reports *published* after successful completion of the *day-ahead market* process, also include *offered* capacity excess

(or shortfall when there is insufficient *offered* capacity). The Offered Capacity Excess (MW) for each hour is calculated from the following formulation:

[total internal generation *offered*/forecasted (MW/MWh) + total *offered* imports (MW) – linked wheels + *dispatchable load bid*]

- [total peak hourly Ontario *demand* forecast (MW) + generation reserve holdback (MW)]

IF (*offered* capacity excess < 0), then there is a shortfall of *offered* capacity.

C.5 Over-Generation and Under-Generation

Over-Generation – An over-generation situation is deemed to occur when the amount of dispatched generation exceeds the Ontario *demand* and net *interchange schedule*. This would likely occur in real-time *operation* in low *demand* periods when one or more *generators* are *dispatched* to their minimum amounts and are unable to respond to the *IESO*'s subsequent *dispatch instructions* for immediate corrective actions.

Minimum Generation Alert – In the event of an actual, imminent or expected over-generation situation, the *IESO* will issue a Minimum Generation Alert/Event via an advisory notice, including the remedial actions that the *IESO* intends to take. The subsequent publication of the Adequacy Report will indicate the amounts of over-generation.

Under-Generation – An under-generation situation is expected to occur when a potential *energy* and capacity shortfall (see Appendix C.4) is identified in the *adequacy* assessment process for the Day 2 to 34 period. In the event of an expected under-generation situation, the *IESO* will issue an advisory notice, including the remedial actions that the *IESO* intends to take. The expected amounts of under-generation will be included in the Adequacy Reports.

Maximum Generation – If the *IESO* determines that there will be potential difficulty meeting *energy* and/or *operating reserve* requirements due to lack of *market participant offers*, the *IESO* will issue an advisory notice, requesting *market participants* to consider placing additional *offers* into the electricity market.

– End of Appendix –

Appendix D: Transmission Interfaces

The Transmission All-in-Service Limits Report provides deviations in transmission limits for major internal interfaces and all *intertie* interfaces (**MR Ch.5 s.7.4.4**). These are the interfaces on which flows must be restricted below the limit specified to ensure *reliable* operation of the *IESO-controlled grid*.

Tables D-1 and D-2 contain lists of internal interfaces and external interfaces for which the *IESO* will *publish* limits for all elements in-service and *outage* conditions (**MR Ch.5 ss.7.4.4.1.2** and **7.4.4.1.3**). These interfaces are consistent with those included in long-term forecast publications (**MR Ch.5 s.7.4.2**). The Maximum Interface Limits posted are representative of *available transfer capability* values. At any time, the actual maximum interface limits may deviate from these values.

Tables D-1 and D-2 provide the basis for interface reporting; additional interfaces may be included in the actual reports.

Note 1: Interface Limit may be lower than the maximum limit indicated due to dependencies on other interface flows or factors such as the number of generating units and injecting *electricity storage units* online, amount of generation rejection armed, amount of *load* rejection armed, voltage levels, etc.

Note 2: Limits based on thermal restrictions for pre-contingency flow or post-contingency flow are monitored online and are not included in the above list. Thermal limitations indicated above for external interfaces are estimated values based on specified assumptions.

Table D-1: Operating Security Limits – Internal Interfaces

Interface	Description of Interface	Notes
TEK	Transfer East of Kenora	Voltage violation
TWK	Transfer West into Kenora	Voltage violation
MMW	Mackenzie Moose Lake Flow West	No limit under normal conditions; voltage violation under outage or high risk conditions
DAI	Dryden Area Inflow	No limit under normal conditions; voltage decline at the Dryden bus during outage conditions

Interface	Description of Interface	Notes
FAI	Fort Frances Area Inflow	No limit under normal conditions; voltage decline at the Dryden bus during outage conditions
LFE	Lakehead Flow East	No limit under normal conditions; voltage violation under outage or high risk conditions
EWTE	East-West Transfer East	Voltage violation
EWTW	East-West Transfer West	Voltage violation
TEM	Transfer East of Mackenzie	Voltage violation
TWM	Transfer West into Mackenzie	No limit under normal conditions; voltage violation/transient limit under outage or high risk conditions
WMFE-230-115	Wawa-MacKay Flow East on the 230 kV and 115 kV system	Voltage stability limit
WMFE-230	Wawa-MacKay Flow East on the 230 kV system	Voltage violation
MissE	Transfer East of Mississaugi	Voltage violation
MissW	Transfer West into Mississaugi	Voltage violation
D501P+H9K (South)	Flow South on Circuits D501P plus H9K	No limit with G/R available, limit reduced to zero with D501P out of service
D501P+H9K (North)	Flow North on Circuits D501P plus H9K	No limit with L/R available, limit reduced to zero with D501P out of service
P502X+D3K (South)	Flow South on Circuits P502X plus D3K	No limit with G/R available, limit reduced to zero with P502X out of service
P502X+A8K+A9K (North)	Flow North on Circuits P502X plus A8K & A9K	No limit with L/R available, limit reduced to zero with P502X out of service or for high risk conditions over P502X
FS	Flow South (on Circuits X503E, X504E and D5H)	Stability limit

Interface	Description of Interface	Notes
FN	Flow North (on Circuits X503E, X504E and D5H)	Voltage decline limit
P502X (South)	Flow South on Circuit P502X	Stability limit
Canyon 115kV Output	Canyon 115kV Output	Normal system configuration / Configuration with Otter Rapids connected to 115 kV system
FABCW	Flow Away From Bruce Complex and Wind output in Bruce area.	Voltage decline and stability limit
BLIP	Buchanan Longwood Input	Transient stability limit
NBLIP	Negative Buchanan Longwood Input	Voltage decline and stability limit
FETT	Flow East To Toronto	Voltage stability limit
CLAN	Claireville North	
QFW	Queenston Flow West	Boundary limit for Southern Ontario limits. Thermal limit.
FIO	Flow Into Ottawa	Voltage Stability Limit
SLW	St. Lawrence Flow West	Stability limit during critical New York outage conditions.
FID	Flow into Dobbin	These limits are to control post-contingency voltage decline at Dobbin area. The limits can be improved based on the amount of L/R armed.
X1P Flow Into Dobbin	X1P Flow Into Dobbin	This limit is to ensure angular stability of Mountain Chute and Chenaux generators.
115 kV Dobbin Area Load	115 kV Dobbin Area Load	**** No interface limit under normal conditions
Chats Falls Area Generation	Chats Falls GS 230 kV Area Generation	

Interface	Description of Interface	Notes
P33C Inflow	P33C Chats Falls Inflow	P33C Chats Falls Inflow is limited to 310 MW when Chelsea generation is greater than 105 MW
P33C Inflow Plus Arnprior	P33C Chats Falls Inflow Plus Arnprior Generation	**** No interface limit under normal conditions
Madawaska Generation	Madawaska 115 kV Generation	This limit is based on Chats Falls G2 & G3 I/S and connected to C7BM or 230 kV system. The limit can be improved up to 400 MW with maximum G/R armed.
Beauharnois Delivery	Beauharnois Delivery	Beauharnois delivery is constrained by transient stability. The limit can be improved up to 800 MW with maximum G/R armed.
MacLaren D5A Import	D5A Import From Maclaren	D5A import limit is constrained by transient stability. The All I/S limit is 250 MW.
MacLaren D5A Export	D5A Export To Maclaren	The Export Limit of 200 MW is not a security based limit, but is the agreed maximum amount of load that MacLaren may connect.
Beauharnois D5A Transfer	D5A Transfer	**** No interface limit under normal conditions
TEC	Transfer East From Cherrywood	**** No interface limit under normal conditions

Table D-2: Operating Security Limits – External Interfaces

Interface	Description of Interface	Notes
OMTE	Ontario-Manitoba Transfer East	Thermal limit
OMTW	Ontario-Manitoba Transfer West	Thermal limit
MPFN	Ontario-Minnesota Transfer North	Thermal limit
MPFS	Ontario-Minnesota Transfer South	Thermal limit

Interface	Description of Interface	Notes
Ontario to Michigan Winter	Total line flow on B3N, L4D, L51D and J5D from Ontario to Michigan	This limit is based on winter thermal rating at 10 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
Michigan to Ontario Winter	Total line flow on B3N, L4D, L51D and J5D from Michigan to Ontario	This limit is based on winter thermal rating at 10 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
Ontario to Michigan Summer	Total line flow on B3N, L4D, L51D and J5D from Ontario to Michigan	This limit is based on summer thermal rating at 35 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
Michigan to Ontario Summer	Total line flow on B3N, L4D, L51D and J5D from Michigan to Ontario	This limit is based on summer thermal rating at 35 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
NY-ONT Stability Limit	New York to Ontario Stability Limit	
Ontario Niagara to New York Winter	Total line flow on PA301, PA302, PA27, BP76, L33P, and L34P from Ontario to New York	This limit is based on winter thermal rating at 10 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
New York to Ontario Niagara Winter	Total line flow on PA301, PA302, PA27, BP76, L33P and L34P from New York to Ontario	This limit is based on winter thermal rating at 10 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.

Interface	Description of Interface	Notes
Ontario Niagara to New York Summer	Total line flow on PA301, PA302, PA27, BP76, L33P, and L34P from Ontario to New York	This limit is based on summer thermal rating at 35 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
New York to Ontario Niagara Summer	Total line flow on PA301, PA302, PA27, BP76, L33P, and L34P from New York to Ontario	This limit is based on summer thermal rating at 35 degrees C with 0-4 km/hr wind. Ambient conditions will determine the applicable thermal limit of the tie lines.
Ontario to Quebec Beauharnois 230 kV Winter	Line flow on B31L from Ontario to Quebec Beauharnois (radial connection)	Thermal limit of B31L may be more restrictive.
Ontario to Quebec Beauharnois 230 kV Summer	Line flow on B31L from Ontario to Quebec Beauharnois (radial connection)	This limit is based on summer thermal rating at 30 degrees C. Ambient conditions will determine the applicable thermal limit of the tie line to a maximum of 470 MW.
Quebec Beauharnois 230 kV to Ontario Winter or Summer	Total Line flow on B5D and B31L from Quebec Beauharnois to Ontario (radial connection)	This limit is the same as the interface limit for Beauharnois Delivery. Thermal limits of B5D and B31L may be more restrictive
Ontario to Quebec Maclaren - 230 kV - Winter or Summer	Line flow on D5A from Ontario to Maclaren	This limit is the same as the interface limit for D5A Export to Maclaren. Thermal limit of D5A may be more restrictive.
Quebec Maclaren to Ontario – 230 kV - Winter or Summer	Line flow on D5A from Maclaren to Ontario	This limit is the same as the interface limit for D5A Import from Maclaren. Thermal limit of D5A may be more restrictive.
Ontario to Quebec Masson - 115 kV - Winter or Summer	Line flow on H9A from Ontario to Masson	Concurrent operation of D5A with Maclaren and H9A with Masson is not permitted

Interface	Description of Interface	Notes
Quebec Masson to Ontario - 115 kV - Winter or Summer	Line flow on H9A from Masson to Ontario	Concurrent operation of D5A with Maclaren and H9A with Masson is not permitted. Thermal limit of H9A may be more restricted
Ontario to Quebec Outaouais – 230kV – Winter or Summer	Line flow on A41T and A42T from Ontario to Outaouais	Limit is the minimum of 1 or 2 below: 1250 MW with two convertors in service or 625 MW with one convertor in service FIO limit – (Ottawa area load and losses) + (Generation in the Ottawa Zone)
Quebec Outaouais to Ontario – 230kV – Winter or Summer	Line flow on A41T and A42T from Outaouais to Ontario	Limit is the minimum of 1 or 2 below: 1250 MW with two convertors in service or 625 MW with one convertor in service FIO limit – (Ottawa area load and losses) + (Generation in the Ottawa Zone)
Ontario to Quebec Paugan 230 kV Winter or Summer	Line flow on P33C from Ontario to Paugan	
Quebec Paugan to Ontario - 230 kV Winter or Summer	Line flow on P33C from Paugan to Ontario	P33C Chats Falls Inflow is limited to 310 MW when Chelsea generation is greater than 105 MW
Ontario to Quebec Quyon 230 kV Winter	Line flow on Q4C from Ontario to Quyon	
Quebec Quyon to Ontario 230 kV Winter	Line flow on Q4C from Quyon to Ontario	
Ontario to Quebec Quyon 230 kV Summer	Line flow on Q4C from Ontario to Quyon	
Quebec Quyon to Ontario 230 kV Summer	Line flow on Q4C from Quyon to Ontario	

Interface	Description of Interface	Notes
Ontario to Quebec Bryson 115 kV Winter or Summer	Line flow on X2Y from Ontario to Bryson	
Quebec Bryson to Ontario - 115 kV Winter or Summer	Line flow on X2Y from Bryson to Ontario	
Quebec Rapide to Ontario (115kV) Import	Line flow on D4Z from Rapide-Des-Isles to Dymond	
Ontario to Quebec Kipawa (115kV) Export	Line flow on H4Z from Holden to Kipawa	

– End of Appendix –

Appendix E: Generation Reserve Holdback Requirements

Generation reserve holdback (GRH) is an amount of *generation capacity* and/or *electricity storage capacity* needed to be held in reserve, to cover for uncertainty in load forecasting, generation or electricity storage availability, and for the effects of special protection schemes and the commissioning of large *generation units and electricity storage units*, so that load may be supplied with an acceptable level of *reliability*. The distribution of the GRH throughout a year is based upon a method of mitigating the risk of unsupplied load for the peak hour of each week in a year. The probability of failure of units currently in *operation* increases as time progresses but tends to level off after about one month.

The GRH required to mitigate the risk due to *generation unit* and/or *electricity storage unit* unreliability will, therefore, increase up to a limit as time advances from the present. On occasion, some special protection schemes, and the commissioning of large *generation units or electricity storage units*, can give rise to the potential for unusually high generation contingencies. When these are taken into account, significant GRH variations from week-to-week can result, especially in the near-term.

Therefore, GRH is comprised of the combination of requirements for *operating reserve* (OR), load forecast uncertainty (LFU) and additional contingency allowance (ACA) and is dependent on the day in the assessment period. The GRH component of the *demand* forecast for any given hour or day plays an important role in the decision-making process of the *IESO* and ultimately, for *market participants*. For example, the forecast accuracy of the capacity of *operating reserve* plus the *demand* required to fulfill uncertainties and contingencies in the *operation* of the *IESO-controlled grid* impacts directly on requests for *outages* by *market participants*. A consistently adequate supply of generation to meet capacity and *energy* requirements will be maintained in the near-term.

Table E-1: Generation Reserve Holdback Requirements

Type of Report	Time Period (beginning from present)	Generation Reserve Holdback (MW)
Adequacy Report	a) Day 0-2, where Day 0 is the current day	*Operating reserve* requirement consisting of 30-minute and *10-minute operating reserve* requirements.

Type of Report	Time Period (beginning from present)	Generation Reserve Holdback (MW)
	b) Balance of the first two weeks (3-14 days out)	GRH = *operating reserve* requirement + LFU + ACA) In this period, the ACA consists of the next largest half contingency beyond the *operating reserve* requirement.
	c) Covers a total of 11-17 days from Day 15 out to the end of Week 4[13]	Linear interpolation between (b) and (d).
Period beyond the days of the Adequacy Report	d) Week 5 (this quantity is not included in the Adequacy Report, but is used to aid in the interpolation for the period from Day 15 out to the end of Week 4	The Week 5 Required Reserve is calculated and *published* in the *Resources* Adequacy Assessment Table, located in the "Reliability Outlook" as posted on the IESO website.

Total Operating Reserve – Total *operating reserve* forecast is comprised of the addition of the *30-minute operating reserve* requirement and the *10-minute operating reserve* requirement.

Load Forecast Uncertainty (LFU) – The process of creating a realistic operational *energy* plan includes taking into account uncertainty in the major forecast components, including Ontario *demand*. Sensitivity to extreme weather conditions subjects the power system to large swings in load, particularly during the summer and winter peak periods. Only weather-related uncertainties are considered. LFU is included to reflect this sensitivity in the *adequacy* assessment reports.

LFU is a statistical measure of deviations from the actual Ontario *demand* and can be considered as a target bandwidth for the forecasted error. It follows a normal distribution and is obtained from historical data. One standard deviation of error distribution becomes the factor used to determine LFU. The LFU is determined for both Day 3 and for days further out.

In the near-term, the *demand* forecast is derived using a load forecasting tool (for more information on preparing the *demand* forecast, see Appendix A). From Day 0 to 10 days out, the current weather forecast is used as the basis for characterizing the forecast day. Beyond 10 days, normal (actual past) weather is used as the basis for characterizing the forecast day.

[13] A week runs Monday – Sunday. The current week is defined as Week 0.

From Day 0 (current day) to two days out, there is less uncertainty in the weather forecast, therefore the LFU allowance is not included in this period. From three days out and beyond, the weather forecast contains more uncertainty, therefore LFU allowance is included to reflect the uncertainty. As the number of days out increases, uncertainty in the weather forecasted increases.

For three days out to Day 6, the LFU is a statistical measure of the error variability over the three to six-day period. This data set consists of a calculated error (difference) between the forecasted and actual Ontario *demand* is evaluated to determine one standard deviation for each month. This deviation represents the uncertainty of six days out. As the days out decreases, the uncertainties in the forecasted weather decrease. Therefore, the LFU decreases.

For seven days out and beyond, the LFU is a statistical measure of past monthly Ontario *demand* peaks and monthly *energy* usage. This data set consists of 30 years of recorded actual (normal) weather, Ontario *demand* peaks and *energy* usage. To use this data, the assumption is made that the weather in the future will be similar to the weather in the past. Again, this data is evaluated to determine a standard deviation for each month using the Ontario *demand* peaks. This deviation represents the uncertainty for seven days out and beyond.

Additional Contingency Allowance (ACA) – ACA is the forecast for *demand* to allow for contingencies. The GRH requirements may be increased for special considerations in near-term planning, such as uncertainties in return-to-service dates, known problems of operating units, hydraulic flexibility, levels and types of transactions and prevailing weather conditions. Therefore, operability studies considering generation contingencies may also be required to ensure *energy adequacy*.

– End of Appendix –

List of Acronyms

Acronym	Term
ACA	additional contingency allowance
CRO	control room operator
DSO	Dispatch Scheduling and Optimization
GRH	generation reserve holdback
kV	kilovolt
LFU	load forecast uncertainty
MW	megawatt
MWh	megawatt hour
NERC	*North American Electric Reliability Corporation*
NISL	net interchange scheduling limit
NPCC	*Northeast Power Coordinating Council, Inc.*
SBG	surplus baseload generation

– End of Section –

References

Document ID & Link	Document Title
MDP_RUL_0002	Market Rules for the Ontario Electricity Market
MDP_PRO_0024	Market Manual 2.8: Reliability Assessments Information Requirements
IMP_PRO_0024	Market Manual 2.11: Reliability Outlook and Related Information Requirements
IMP_PRO_0035	Market Manual 7.3: Outage Management
	NPCC Directory 5: Reserve

– End of Document –