



PROCEDURE

Market Manual 7: System Operations

Part 7.2: Near-Term Assessments and Reports

Issue 41.0

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.

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This *market manual* may contain a summary of a particular *market rule*. Where provided, the summary has been used because of the length of the *market rule* itself. The reader should be aware, however, that where a *market rule* is applicable, the obligation that needs to be met is as stated in the "Market Rules". To the extent of any discrepancy or inconsistency between the provisions of a particular *market rule* and the summary, the provision of the *market rule* shall govern.

| | |
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| Reference (Section) | Description of Change |
|------------------------|--|
| Appendix D.1 | Revised the description of Estimated Imports to reflect the use of extreme weather scenarios when assessing outage requests more than 10 days in the future. |

Archive

Market Manuals

The *Market Manuals* consolidate the market procedures and associated forms, standards, and policies that define certain elements relating to the *operation* of the *IESO-administered markets*. Market procedures provide more detailed descriptions of the requirements for various activities than is specified in the “Market Rules”. Where there is a discrepancy between the requirements in a document within a *market manual* and the *market rules*, the *Market Rules* shall prevail. Standards and policies appended to, or referenced in, these procedures provide a supporting framework.

The “System Operations Manual” is Series 7 of the *market manuals*, where this document forms “Part 7.2: Near-Term Assessments and Reports”.

– End of Section –

1. Introduction

1.1 Purpose

The *market rules* describe long-term (18-month) forecasts and assessments as well as near-term (up to 34 days out) forecasts and assessments (C. 5, S.7.11 of the *market rules*). The *market rules* also require us to produce advisory notices, as required, to notify *market participants* of any additional information pertaining to market and system conditions.

We inform *market participants* of expected conditions on the *IESO-controlled grid* and in the *IESO-administered markets* in the near-term through a number of reports and advisories:

- *Adequacy* Reports for the period that is 0-34¹ days out,
- Ontario Zonal *Demand* Forecast Report for the period that is 0-34 days out,
- Transmission *Facility* Limits Reports for the period that is 0-34 days out,
- Advisory notices, published as required, and
- Surplus Baseload Generation (SBG) report for the period that is 1-10 days out.

This manual describes how we prepare and *publish* these reports.

The procedures for preparing and publishing the long-term forecasts and assessments are described in “Market Manual 2: Market Administration”².

1.2 Roles and Responsibilities

Responsibility for performing near-term *security* and *adequacy* assessments and publishing reports and advisories is shared among:

- **All market participants**, who are responsible for providing the *outage* information described in “Part 7.3: Outage Management”,
- **Market participants operating energy-limited resources**, who are responsible to provide pre-schedule information of the daily *energy* availability of their *energy-limited* resources for the *Adequacy* Report, and to update this data for any material change,
- **Transmitters**, who are responsible for providing transmission rating change information as it occurs,
- **Self-scheduling, Intermittent and Transitional Scheduling Generators**, who are responsible for providing generation schedule information to the *IESO* as *dispatch data*,

¹ The current day is referred to as day 0.

² The relevant parts of “Market Manual 2: Market Administration” are:

- “Part 2.8: Reliability Assessments Information Requirements”, and
- “Part 2.11: 18-Month Outlook and Related Information Requirements”.

- **Market participants**, who are responsible for submitting requests for *segregated mode of operation*, as described in [Market Manual 7.3: Outage Management](#).
- The **IESO**, who is responsible for:
 - Preparing the *demand* forecast,
 - Preparing the *variable generation* forecast,
 - Calculating the operating *security limits* for the *IESO-controlled grid*,
 - Performing the *security* and *adequacy* assessments for each hour and each day, as appropriate,
 - *Publishing* the *Adequacy* Report, the Ontario Zonal *Demand* Forecast Report, the *Transmission Facility All-in-Service Limits* Report, the *Transmission Facility Outage Limits* Report and the *SBG Forecast* Report, and
 - Notifying *market participants*, through advisory notices, of additional information not addressed through the *security* and *adequacy* assessments.

All *published* reports and advisory notices are available on the *IESO* website.

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 (<http://www.ieso.ca/corporate-ieso/contact>). Customer Relations staff will respond as soon as possible.

– End of Section –

2. Adequacy and Transmission Limits Reports

We regularly produce four near-term reports relating to the *security* and *adequacy* of the *IESO-controlled grid*:

- *Adequacy Report*
- Ontario Zonal *Demand Forecast Report*
- Transmission *Facility All in Service Limits Report*
- Transmission *Facility Outage Limits Report*

The *Adequacy Report* covers days 0-34 and has hourly granularity. Reports published on day 0, as well as all reports published on day 1 after successful completion of the day-ahead commitment process, will include aggregated values of the capacity offered and *bid* by *market participants* for the *dispatch day* and the aggregated *pre-dispatch schedules*. Each day, we *publish* an *Adequacy Report* that includes a new day 34.

The Ontario Zonal *Demand Forecast Report* covers days 0-34 and has hourly granularity. The report is published daily and provides additional information on the *demand* forecast for the East and West systems.

The Transmission *Facility All in Service Limits Report* is published daily and provides *market participants* with information on available transfer capabilities under all-in-service conditions.

The Transmission *Facility Outage Limits Report* covers days 0-34 and provides *market participants* with information on available transfer capabilities under *outage* conditions.

2.1 Market Participant Requirements to Submit Data

We need inputs from you to produce the daily assessments (C. 5, S.7.1.5 of the *market rules*). Each Tuesday by 17:00 EST, *market participants* that operate *energy-limited generators* are required to provide us with a pre-schedule of these resources for the period beginning the following day and going out 34 days. The pre-schedule defines the total hourly and daily *energy* content of all aggregated *energy-limited* resources. You need to update the *energy-limited* resource pre-schedule for any changes to the information previously provided.

2.1.1 Data Submission Instructions

All *market participants* who operate *energy-limited* generation resources submit, via Online *IESO*:

- A forecast of the daily aggregated *energy* production of all resources for the days of week 4 (i.e., days 28 to 34), and
- An updated forecast of the daily aggregated *energy* production for all other days of the period.

2.2 Producing and Publishing the Adequacy Report for Days 0 and 1

Each day, we prepare and *publish Adequacy Reports* for the current day and the following day, with the following schedule (C. 7, S. 12.1. 1 of the *market rules*):

- Two times per hour, for the current day,
- By 05:30 EST, for tomorrow,
- By 09:00 EST, for tomorrow,
- After each successful run of the day-ahead commitment process, for tomorrow,
- Hourly after 15:00 EST, for tomorrow.

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

2.3 Producing and Publishing the Adequacy Report for Days 2 to 34

Each day by 17:00 EST, we prepare and *publish Adequacy Reports* for 2 to 34 days beyond the current day (C. 5, S.7.1.1.2 of the *market rules*). Reports are published at approximately 09:00 and 15:30 EST, for each day in the assessment period.

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

2.4 Producing and Publishing the Ontario Zonal Demand Forecast Report

Each day by 17:00 EST, we prepare and *publish* the Ontario Zonal *Demand Forecast Report* that spans the period from the current day to 34 days out. The report provides the Ontario total *demand* forecast, as well as the *demand* forecast for the East and West systems, with hourly granularity.

2.5 Producing and Publishing the Transmission Facility All in Service Limits Report

Each day by 17:00 EST, we prepare and *publish* a *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.

2.6 Producing and Publishing the Transmission Facility Outage Limits Reports

Each day, we prepare and *publish* Transmission *Facility Outage* Limits Reports to provide *market participants* with information on available transfer capabilities for internal interfaces and interties³, considering anticipated *outage* conditions.

Separate reports are published twice per hour for the day 0 to 2 period and twice per day for the day 3 to 34 period.

The publication of these reports will provide *market participants* with updates on available transfer capability since the previous scheduled publication.

– End of Section –

³ The list of internal interfaces and interties is given in Appendix E.

3. Advisory Notices

Advisory notices allow us to present information to *market participants* that is not addressed through the *Adequacy* Report and the Transmission Limits Reports. Publication of advisory notices is exception-based, since advisory notices are intended to provide information on events that are not captured through the regularly scheduled publication of the reports noted above. For example, if we need to identify that an external jurisdiction has made a *reliability* declaration calling upon Ontario capacity for firm *energy* exports, this will be communicated via an advisory notice.

Changes in expected load, *generation* or *transmission capacity* will normally be captured through the regularly scheduled publications of the *Adequacy* Report and the Transmission *Facility Outage* Limits Report. A Major Change Advisory will be published in the event of any change that the *IESO* deems significant, for example during adverse system events causing loss of a substation or an entire interface.

Four types of advisory notices may be published (C. 7, S. 12.1.3 of the *market rules*):

- A **Major Change Advisory** if a major change in expected load, *generation*, or *transmission capacity* has occurred.
- A **System Advisory** if we expect over-generation, under-generation, or shortfalls in *operating reserve* or *contracted ancillary services*. The System Advisory includes the actions we intend to take if the market does not or cannot respond sufficiently to eliminate the problem.
- A **System Emergency Advisory** if we expect an *emergency operating state*, or a *high risk operating state*.⁴ Any such System *Emergency Advisory* includes the actions we intend to take if the market does not or cannot respond sufficiently to eliminate the problem.
- A **Market Suspension Advisory** or **Market Resumption Notice** if we are suspending or resuming *operation* of all or part of the *IESO-administered markets*.

Advisory notices are categorized as Normal and *Emergency*:

- A 'Normal' advisory notice is one that has been *published* with a System Advisory or Major Change Advisory.

An '*Emergency*' advisory notice is one that has been *published* with a System Emergency Advisory (excluding advisories for a *high risk operating state*), a Market Suspension / Resumption Advisory, or any message to *market participants* requiring their immediate action.

– End of Section –

⁴ High risk conditions that occur frequently as a result of weather conditions are reported through the Transmission *Facility Outage* Limits Report.

4. Surplus Baseload Generation

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 which may include *inertie* scheduling, dispatching hydroelectric generation, dispatching *variable generation*, and nuclear manoeuvring or shutdown. During SBG periods we expect that most, if not all, of Ontario's generation will be supplied by non-carbon sources.

4.1 Baseload Generation

Baseload generation is typically considered to be⁵ the sum of the expected generation of all available:

- Nuclear *generators*,
- Must-run hydroelectric generation,
- *Self-scheduling generation facilities* (including commissioning units),
- *Intermittent generators*,
- *Variable generators* (including wind and solar *generators*), and
- Other *generators* that typically *offer* their generation at a value lower than the highest offer for nuclear generation.

4.2 SBG Reports

The purpose of the SBG Report is to identify those times when the output of Ontario's baseload *generators* is expected to be greater than the forecast Ontario *demand*. This will allow *market participants* to assess the potential impact of SBG on their facilities.

Each day, we *publish* an SBG report on the IESO public website:

- The report spans the period from tomorrow to 10 days out.
- We calculate SBG by subtracting the forecast Ontario *demand* from the forecast baseload generation. Exports are not factored in the calculation.
- Our SBG reports will include the amount of exports we reasonably estimate will be scheduled during the highest SBG period for the day.
- We expect to *publish* this report each day by 17:00 EST.
- We use the forecast Ontario *demand* based upon forecast weather and the embedded *variable generation* forecast for facilities ≥ 5 MW.
- We use the centralized *variable generation* forecast for Ontario's *variable generators* for days 1 to 7.

⁵ Depending on the timeframe of assessment, there may be slightly different definitions of baseload generation. This definition is used in the operational timeframe.

- We will issue Minimum Generation Alerts as per the conditions set out in section 4.3: Minimum Generation Alerts and Events.

4.3 Minimum Generation Alerts and Events

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, we provide advance notice where possible of potential reductions of the output of nuclear *generators* for surplus baseload management – both for the benefit of the nuclear *facility* operators and for other *market participants*.

We will *publish* advisory notices with Minimum Generation Alerts under the following conditions:

- If we forecast a nuclear manoeuvre of at least 50 MW for 4 or more contiguous hours for a day that is 3-4 days out, we 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. We may issue advisory notices further out than 3-4 days for holiday weekends or as necessary.
- If we forecast a nuclear manoeuvre of at least 50 MW for 2 or more contiguous hours for a day that is 1-2 days out, we 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, we will *publish* an advisory notice indicating a Minimum Generation Alert⁶.
- In real-time, if a nuclear manoeuvre is imminent or in progress, we will *publish* an advisory notice indicating a Minimum Generation Event.

Triggers that may exacerbate or lessen forecast SBG events include:

- Load is different (lighter or heavier) than forecast,
- *Forced outages* with forced or urgent Priority Code of dispatched generation or transmission facilities,
- Short notice changes of hourly export transactions (increase or decrease), and/or
- *Intermittent generators, self-scheduling generation facilities and variable generators* producing more or less than anticipated.

We will cancel a Minimum Generation Alert if conditions change such that we no longer expect nuclear manoeuvres. Table 1-1 provides a summary of the Minimum Generation conditions.

⁶ After the Day-Ahead Commitment Process completes, we will assess *pre-dispatch* results on an hourly basis. If we determine, with reasonable certainty, that a baseload generation manoeuvre exceeding 50 MW is likely for a future hour, we will issue a Minimum Generation Alert.

Table 1-1: Minimum Generation Status

| Timeframe | Forecast Condition | Minimum Generation Status |
|---------------------|--|---------------------------|
| 3-4 days out | A nuclear manoeuvre of at least 50 MW is forecasted for four or more contiguous hours. | Alert |
| 1-2 days out | A nuclear manoeuvre of at least 50 MW is forecasted for two or more contiguous hours. | |
| <i>Pre-dispatch</i> | <i>Pre-dispatch</i> shows a nuclear manoeuvre of 50 MW or more. | |
| Real-Time | A nuclear generation manoeuvre is imminent or in progress | Event |

4.4 IESO Control Actions (Nuclear Manoeuvres Forecasted or Occurring)

If the IESO determines during *pre-dispatch* that we are forecasting a nuclear manoeuvre in future hours, or if a nuclear manoeuvre is imminent in real-time operations, we will ensure the nuclear reductions are managed in a manner that respects the characteristics of the nuclear *generation facility* while simultaneously satisfying our requirement to balance the power system.

The following actions are executed in the *pre-dispatch* timeframe:

| If... | Then... |
|--|--|
| The Control Room Operator (CRO) determines that the use of average <i>demand</i> forecasting will mitigate nuclear generation manoeuvres | We will use the average <i>demand</i> forecast instead of the peak demand forecast for any or all of the IESO Ramp Hours ⁷ . |
| The two hour out <i>pre-dispatch</i> identifies nuclear units are being dispatched down by more than 50 MW | <p>We may issue an advisory notice opening the mandatory window for <i>bids</i> and <i>offers</i>.</p> <p>We may expand the Net Interchange Scheduling Limit (NISL) to 1000 MW and issue an advisory notice indicating the NISL expansion.</p> <p>Note: We will only take these actions if they are likely to provide assistance in managing the SBG event.</p> |

⁷ IESO Ramp Hours are defined as any hour in which the peak demand forecast exceeds the average demand forecast by at least 300 MW.

| If... | Then... |
|---|---|
| One hour out, the <i>pre-dispatch schedule</i> identifies nuclear units are being dispatched down by more than 50 MW | <p>We will curtail import transactions (including inadvertent payback) equal to the total MW reduction amount. Imports that are cut for this purpose will be tagged with ADQh.⁸</p> <p>Note: All imports will be cut economically on a reasonable effort basis.</p> |
| <ul style="list-style-type: none"> • The <i>dispatch</i> of a nuclear unit is not for the full amount of its manoeuvrable capability, or • The nuclear unit cannot operationally respond to the instruction | <p>We may manually adjust its schedule, requiring other <i>generators</i> (including variable) to respond in its place.</p> <p>Note: The manual adjustment may be to maintain the nuclear unit at its current output or to <i>over-dispatch</i> the nuclear unit for the full amount of its maneuverable capability.</p> <p>Manual adjustments to <i>generator</i> schedules are for the hour-at-hand and the next hour only. If adjustments were to extend further into the future, it is likely that <i>pre-dispatch</i> would schedule actions interfering with our management of the SBG event. For example, a constrained-off nuclear unit may result in pre-dispatch scheduling fewer export transactions in future hours.</p> <p><i>Response</i> from other <i>generators</i> will result from (?) an automatic <i>dispatch</i> from the Dispatch Scheduling and Optimization (DSO) tool.</p> |
| Prior to the last run of <i>pre-dispatch</i> for the <i>dispatch</i> hour, the <i>pre-dispatch schedule</i> indicates that nuclear units are being shut down | <p>Approximately two hours before the dispatch hour, we will curtail linked wheel-through transactions to satisfy the total MW reduction amount required to avoid nuclear unit shutdown.</p> <p>Note: We will issue an advisory notice stating that the IESO may curtail transactions for reliability during HEXX - HEXX.</p> <p>Note: Such curtailments are tagged TLRe. All linked wheel-through transaction curtailments will be made pro-rata on a reasonable effort basis.</p> |
| All flexible <i>responses</i> from baseload generation are exhausted | <p>We may need to implement nuclear unit shutdowns.</p> <p>Note: We will issue an advisory notice stating that a shutdown is in progress.</p> |

⁸ADQh is the code applied to transactions curtailed for *IESO Adequacy* (Surplus or Deficiency) Actions. These transactions are not eligible for CMSC and are exempt from real time failure charges.

In the event we determine that the nuclear units are being dispatched down in real-time, we may take one or more of the following control actions, which may be performed in any order:

| If... | Then... |
|---|--|
| Nuclear units are being dispatched down by more than 50 MW (possibly as a result of export failures) | We may curtail import transactions (including inadvertent payback) equal to the total MW reduction amount. Note: Imports cut for this purpose will be tagged with ADQh. All imports will be cut economically on a reasonable effort basis. |
| <ul style="list-style-type: none"> • The <i>dispatch</i> of a nuclear unit is not for the full amount of its maneuverable capability, or • The nuclear unit cannot operationally respond to the instruction | <p>We may manually adjust its schedule, requiring other <i>generators</i> (including variable) to respond in its place.</p> <p>Note: The manual adjustment may be to maintain the nuclear unit at its current output, or to <i>over-dispatch</i> the nuclear unit for the full amount of its maneuverable capability.</p> <p>Manual adjustments to <i>generator</i> schedules are for the hour-at-hand and the next hour only. If adjustments were to extend further into the future, it is likely that <i>pre-dispatch</i> would schedule actions interfering with our management of the SBG event. For example, a constrained-off nuclear unit may result in pre-dispatch scheduling fewer export transactions in future hours.</p> <p><i>Response</i> from other <i>generators</i> will be an automatic <i>dispatch</i> from the DSO tool.</p> |
| All flexible <i>responses</i> from baseload generation are exhausted | We may need to implement nuclear unit shutdowns. Note: We will issue an advisory notice stating that a shutdown is in progress. |

– End of Section –

5. Control Action Operating Reserve

Control Action Operating Reserve (CAOR) *offers* represent the IESO's ability to use the following control actions to meet *operating reserve* requirements:

- 3% and 5% voltage reductions
- Disregarding the 30-minute *operating reserve* requirement (for up to four hours)

The use of the control actions to meet the operating reserve requirement is permitted under NPCC Regional Reliability Reference Directory #5.

Two fictitious (i.e., dummy) *generators* supply standing *offers* to the *operating reserve market*:

| | |
|--|--|
| RICHVIEW-230.G_3VR (to represent voltage reductions) | <ul style="list-style-type: none"> • 400 MW for 10-minute operating reserve at \$30.10/MW, and • 400 MW for 30-minute operating reserve at \$30/MW |
| RICHVIEW-230.G_5VR (to represent disregarding the 30-minute operating reserve requirement) | 400 MW for 30-minute operating reserve: <ul style="list-style-type: none"> • 200 MW at \$75/MW, and • 200 MW at \$100/MW |

CAOR is only scheduled in the real-time *dispatch algorithm*, and is not considered by the day-ahead commitment and pre-dispatch sequences.

5.1 Derating CAOR

When Ontario *demand* is sufficiently low, CAOR capacity backed by voltage reductions is required to be derated. This is because the MW relief associated with voltage reductions is proportional to system demand. These derates are applied in the day-ahead timeframe and may be updated in real-time as demand changes.

In the **day-ahead** timeframe, the IESO will:

- Derate the RICHVIEW-230.G_3VR resource for the next day real-time scheduling. Derates will be based on the expected MW relief, achievable within 10 minutes, from implementing a 5% voltage reduction⁹.
- Issue an advisory notice for the next day indicating that we have derated the RICHVIEW-230.G_3VR resource.

In **real-time**, the IESO will:

- Monitor Ontario *demand* changes from the day-ahead forecast. Any change to Ontario *demand* that results in a change in demand reduction expected from a voltage reduction greater than 50 MW will trigger an update to the CAOR resource quantity.
- Issue an advisory notice if we modify the derate to the RICHVIEW-230.G_3VR resource, and include the start time and maximum MW amount of the derate.

⁹ We assume that 85% of total voltage reduction capacity can be achieved within 10 minutes of a contingency.

– End of Section –

Archive

Appendix A: Report Screens

This appendix contains samples of the Adequacy Report, Transmission Facility All in Service Limits Report, and the Transmission Facility Outage Limits Report (Days 0 to 2).

Adequacy Report

Created at Jan 18, 2017 23:48:14
For Jan 18, 2017

| Ontario | | Hour | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|------------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| Forecast Supply | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacity | | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | 36248 | |
| Energy (MWhr) | | 78538 | 78223 | 78188 | 78227 | 78135 | 78188 | 78534 | 78822 | 79718 | 79718 | 79718 | 79603 | 79513 | 79464 | 79394 | 79313 | 79353 | 80667 | 80577 | 80202 | 79963 | 79943 | 78870 | 78743 | |
| Internal Resources | Nuclear | Capacity | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | 13010 | |
| | | Outages | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | 2250 | 2230 | |
| | | Offered | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | 11655 | |
| | | Scheduled | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | 10765 | |
| | Gas | Capacity | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | 9944 | |
| | | Outages | 1403 | 1411 | 1411 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | 1403 | |
| | | Offered | 2951 | 2954 | 2955 | 2992 | 2992 | 2997 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | 2998 | |
| | | Scheduled | 458 | 407 | 407 | 407 | 543 | 682 | 974 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | 798 | |
| | Hydro | Capacity | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | 8544 | |
| | | Outages | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | 959 | 939 | |
| | | Forecasted (MWhr) | 3931 | 3623 | 3600 | 3430 | 3338 | 3381 | 3940 | 4208 | 5103 | 5103 | 5103 | 4988 | 4904 | 4865 | 4634 | 4714 | 5252 | 6088 | 5978 | 5703 | 5284 | 4906 | 4131 | 4022 |
| | | Offered | 6303 | 6313 | 6319 | 6315 | 6322 | 6317 | 6310 | 6288 | 6474 | 6466 | 6456 | 6439 | 6448 | 6451 | 6442 | 6372 | 6369 | 6631 | 6629 | 6630 | 6630 | 6343 | 6289 | 6278 |
| | Wind | Scheduled | 2704 | 3037 | 3451 | 3470 | 3530 | 4195 | 4564 | 5104 | 5265 | 5191 | 5070 | 4833 | 4790 | 4713 | 3078 | 5295 | 5502 | 5571 | 5610 | 5302 | 4654 | 4452 | 3959 | |
| | | Capacity | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | 3980 | |
| | | Outages | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | -4202 | |
| | | Forecasted | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | 4600 | |
| | Solar | Scheduled | 1336 | 1299 | 1238 | 1263 | 1198 | 1180 | 1113 | 1018 | 1030 | 1015 | 990 | 943 | 918 | 896 | 887 | 833 | 887 | 833 | 887 | 833 | 951 | 1002 | 1341 | 1489 |
| | | Capacity | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | 280 | |
| | | Outages | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | -9720 | |
| | | Forecasted | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | |
| | Biofuel | Scheduled | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 23 | 26 | 46 | 46 | 38 | 33 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | |
| | | Capacity | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | 490 | |
| | | Outages | 295 | 295 | 295 | 295 | 295 | 287 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | 277 | |
| | | Offered | 15 | 15 | 15 | 15 | 15 | 23 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | 238 | |
| Other | Scheduled | 15 | 15 | 15 | 15 | 15 | 23 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 63 | 141 | 183 | 183 | 203 | 213 | | |
| | Capacity | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | 598 | | |
| | Outages | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | Forecasted | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Total | Scheduled | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | Outages | -45190 | -45182 | -45182 | -45180 | -45180 | -45189 | -45207 | -45243 | -45204 | -45117 | -45117 | -45117 | -45112 | -45112 | -44956 | -45267 | -45267 | -45267 | -45210 | -45210 | -45238 | -45238 | | | |
| | Forecasted | 78923 | 76936 | 76936 | 76977 | 76894 | 76994 | 76994 | 76996 | 77160 | 77138 | 77128 | 77128 | 77128 | 77128 | 77119 | 77436 | 77453 | 77515 | 77521 | 77521 | 77237 | 77180 | 77149 | | |
| | Scheduled | 15268 | 15483 | 15877 | 15920 | 16043 | 16818 | 17430 | 17717 | 17916 | 17881 | 17760 | 17635 | 17116 | 16881 | 17000 | 17618 | 18268 | 18347 | 18463 | 18638 | 18302 | 17887 | 17207 | | |
| Imports | Manitoba | Offered | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | 275 | | |
| | | Scheduled | 46 | 69 | 127 | 49 | 46 | 145 | 175 | 134 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | Minnesota | Offered | 210 | 180 | 130 | 210 | 210 | 210 | 190 | 210 | 210 | 190 | 80 | 80 | 190 | 80 | 190 | 190 | 190 | 160 | 80 | 190 | 190 | 80 | | |
| | | Scheduled | 7 | 105 | 35 | 112 | 111 | 50 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | | |
| | Michigan | Offered | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | | |
| | | Scheduled | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 121 | 85 | 0 | 0 | | |
| | New York | Offered | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300 | 300 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | Scheduled | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | Quebec | Offered | 1324 | 1324 | 1294 | 1284 | 1294 | 1363 | 1587 | 1888 | 1638 | 1638 | 1795 | 1734 | 1742 | 1734 | 1842 | 1734 | 1734 | 1834 | 1734 | 1834 | 1734 | 1734 | | |
| | | Scheduled | 1245 | 798 | 546 | 290 | 230 | 270 | 621 | 1539 | 1203 | 1509 | 1614 | 1733 | 1741 | 1733 | 1741 | 1733 | 1733 | 1733 | 1733 | 1733 | 1733 | 1588 | | |
| | Total | Offered | 1928 | 1889 | 1818 | 1889 | 1889 | 2168 | 2172 | 2393 | 2544 | 2494 | 2270 | 2208 | 2287 | 2208 | 2387 | 2278 | 2280 | 2390 | 2209 | 2378 | 2278 | 2209 | | |
| | | Scheduled | 1301 | 910 | 731 | 411 | 410 | 465 | 809 | 1673 | 1203 | 1509 | 1614 | 1733 | 1773 | 1733 | 1741 | 1733 | 1863 | 1927 | 1818 | 1733 | 1733 | | | |
| Estimated | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Capacity Imports | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Solved Capacity | | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | | |
| Regulation | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | |
| Total Supply | | 80538 | 80529 | 80529 | 80538 | 80538 | 80545 | 80535 | 80891 | 80851 | 80865 | 80465 | 80465 | 80465 | 80459 | 80450 | 80284 | 80625 | 80625 | 80625 | 80548 | 80548 | 80685 | 80715 | | |

| Forecast Demand | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|-------------------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ontario Demand | Forecast Ontario Demand | 14510 | 13991 | 13694 | 13609 | 13751 | 14858 | 16362 | 17391 | 17446 | 17401 | 17438 | 17454 | 17391 | 17357 | 17399 | 17718 | 18689 | 19072 | 18931 | 18775 | 17904 | 17235 | 16244 | 15223 | |
| | Peak Demand | 14728 | 14167 | 13681 | 13567 | 13898 | 14858 | 16362 | 17391 | 17446 | 17415 | 17442 | 17448 | 17413 | 17366 | 17522 | 17995 | 18689 | 19072 | 18994 | 18838 | 18115 | 17644 | 16817 | 15823 | |
| | Average Demand | 14510 | 13991 | 13694 | 13609 | 13751 | 14369 | 15673 | 17201 | 17446 | 17401 | 17438 | 17454 | 17391 | 17357 | 17399 | 17718 | 18374 | 19067 | 18931 | 18775 | 17904 | 17235 | 16244 | 15223 | |
| | Wind Embedded Forecast | 92 | 82 | 90 | 87 | 89 | 88 | 79 | 70 | 72 | 64 | 64 | 54 | 56 | 59 | 65 | 70 | 70 | 70 | 88 | 94 | 114 | 127 | 133 | 129 | |
| | Solar Embedded Forecast | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Dispatchable Load | Capacity | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 | 512 |
| | | Bid/Forecasted | 251 | 251 | 251 | 251 | 157 | 157 | 157 | 157 | 157 | 158 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 | 157 |
| | | Scheduled ON | -251 | -251 | -251 | -251 | -157 | -157 | -157 | -157 | -157 | -158 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 | -157 |
| | Hourly Demand Response | Scheduled OFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Bid | 16 | 16 | 16 | 16 | 16 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Scheduled | | -16 | -16 | -16 | -16 | -16 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | -15 | |
| Exports | Curtailed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Manitoba | Bid | 510 | 510 | 525 | 303 | 305 | 290 | 290 | 262 | 398 | 403 | 403 | 512 | 569 | 400 | 307 | 400 | 403 | 403 | 360 | 483 | 442 | 412 | 414 | 412 |
| | | Scheduled | -206 | -289 | -304 | -304 | -304 | -289 | -289 | -261 | -82 | -96 | -165 | -165 | -197 | -84 | 0 | -39 | 0 | -116 | 0 | -27 | -125 | -108 | -193 | -108 |
| | Minnesota | Bid | 128 | 143 | 145 | 128 | 63 | 99 | 90 | 65 | 65 | 105 | 124 | 128 | 128 | 128 | 66 | 66 | 66 | 66 | 66 | 66 | 110 | 146 | 148 | |
| | | Scheduled | -45 | -78 | -70 | -48 | -48 | -99 | -90 | -63 | -66 | -99 | -101 | -103 | -105 | -63 | -31 | -63 | -20 | 0 | -53 | -65 | -89 | -83 | -130 | |
| | Michigan | Bid | 1470 | 1570 | 1730 | 1725 | 1605 | 1303 | 1355 | 1265 | 1225 | 1280 | 1310 | 1360 | 1405 | 1411 | 1290 | 1560 | 1460 | 1335 | 1322 | 1210 | 1345 | 1395 | 1635 | 1960 |
| | | Scheduled | -1020 | -1220 | -1490 | -1450 | -1490 | -1150 | -900 | -950 | -905 | -930 | -950 | -1014 | -675 | -675 | -890 | -906 | -740 | -590 | -600 | -709 | -1170 | -1320 | -1385 | -1450 |
| | New York | Bid | 1140 | 1168 | 1180 | 1163 | 1130 | 1056 | 936 | 1106 | 1028 | 1180 | 1002 | 1012 | 972 | 930 | 840 | 1185 | 1199 | 1423 | 1385 | 1208 | 1083 | 1108 | 1121 | 1138 |
| | | Scheduled | -700 | -700 | -700 | -700 | -700 | -646 | -476 | -386 | -573 | -700 | -700 | -700 | -461 | -406 | -803 | -304 | -333 | -432 | -390 | -700 | -673 | -700 | -695 | -888 |
| | Quebec | Bid | 882 | 882 | 960 | 960 | 960 | 960 | 882 | 804 | 804 | 866 | 865 | 804 | 847 | 804 | 804 | 882 | 882 | 882 | 882 | 882 | 882 | 882 | 882 | 960 |
| Scheduled | | -192 | -192 | -480 | -270 | -270 | -270 | -192 | -114 | -114 | -175 | -175 | -114 | -157 | -114 | -114 | -192 | -152 | -114 | -192 | -192 | -192 | -192 | -192 | -270 | |
| Total | Bid | 4130 | 4273 | 4538 | 4281 | 4063 | 3910 | 3533 | 3300 | 3878 | 3814 | 3704 | 3816 | 3921 | 3660 | 3307 | 4185 | 4023 | 4108 | 4015 | 3844 | 3768 | 3907 | 4030 | 4618 | |
| | Scheduled | -2163 | -2479 | -2894 | -2772 | -2772 | -2454 | -1947 | -1584 | -1738 | -2000 | -2091 | -2096 | -1395 | -1342 | -1438 | -1704 | -1465 | -1272 | -1435 | -1689 | -2225 | -2409 | -2546 | -2946 | |
| | Capacity Exports | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | 389 | |
| Generation Reserve Holdback | Total Operating Reserve Requirement | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | 1418 | |
| | Minimum 10-Minute OR | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | 945 | |
| | Minimum 10-Minute Spin OR | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | 237 | |
| | Load Forecast Uncertainty | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Additional Contingency Allowance | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Requirement | | 16517 | 15998 | 15691 | 15616 | 15758 | 16863 | 18386 | 19380 | 19456 | 19408 | 19445 | 19461 | 19388 | 19362 | 19404 | 19725 | 20686 | 21076 | 20938 | 20782 | 19911 | 19242 | 18251 | 17230 | |
| Capacity Excess/Shortfall | | 64022 | 64531 | 64638 | 64923 | 64780 | 63881 | 62186 | 61293 | 61099 | 61057 | 61020 | 61005 | 61061 | 61038 | 60890 | 60800 | 59590 | 59547 | 59610 | 59766 | 60687 | 61443 | 62434 | 63483 | |
| Energy Excess/Shortfall (M Whr) | | 64018 | 64222 | 64504 | 64419 | 64394 | 63329 | 62192 | 61491 | 61288 | 61217 | 61278 | 61230 | 61212 | 61207 | 61895 | 61599 | 61165 | 61596 | 61646 | 61527 | 61999 | 62410 | 62626 | 63519 | |
| Offered Capacity Excess/Shortfall | | 62973 | 63517 | 63970 | 64147 | 63729 | 63053 | 61539 | 60937 | 61008 | 60974 | 60720 | 60636 | 60753 | 60724 | 60738 | 60493 | 59757 | 59836 | 59456 | 59795 | 60438 | 60515 | 61263 | 62149 | |
| Resources Not Scheduled | | 61921 | 61720 | 61373 | 61323 | 61114 | 60347 | 59717 | 59436 | 59415 | 59442 | 59449 | 59638 | 60183 | 60416 | 60289 | 60009 | 59356 | 59338 | 59226 | 59037 | 59390 | 59481 | 60094 | 60378 | |
| Imports Not Scheduled | | 628 | 869 | 1038 | 1478 | 1479 | 1703 | 1363 | 920 | 1341 | 975 | 696 | 476 | 514 | 476 | 646 | 546 | 417 | 463 | 391 | 646 | 546 | 621 | 663 | 1026 | |

Figure A-1: Adequacy Report

Transmission Facility All in Service Limits Report (Days 0 to 34)

Created at Jul 07, 2016 00:22:27
Limits Occurring between Jul 07, 2016 and Aug 10, 2016

| Internal Transmission Facilities Interface | Date/Time Issued | Start Date/Time | End Date/Time | Operating Limit | Comments |
|---|------------------|------------------|------------------|-----------------|--|
| Buchanan Longwood Input [BLUP] | 2016-06-20 16:11 | 2016-01-01 00:00 | 2016-12-31 23:59 | 3000 | All In Service |
| Dryden Area Inflow [DAI] | 2016-06-20 16:14 | 2016-01-01 00:00 | 2016-12-31 23:59 | 90 | All In Service or 601 O/S |
| Wawa Mackay Flow East-230 [WMFE-230] | 2016-06-20 16:14 | 2016-01-01 00:00 | 2016-12-31 23:59 | 590 | All In Service |
| Fort Frances Area Inflow [FAI] | 2016-06-21 09:54 | 2016-01-01 00:00 | 2016-12-31 23:59 | 235 | All In Service |
| Flow Into Ottawa [FIO] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 2900 | All In Service |
| Flow into Dobbin [FID] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 390 | All In Service |
| Negative Buchanan Longwood Input [NBLUP] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1800 | All In Service |
| Flow East To Toronto [FETT] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 5000 | All In Service |
| Flow Away From Bruce Complex and Wind [FABCW] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 7500 | All In Service |
| Wawa Mackay Flow East-230 [WMFE-230] | 2016-06-20 16:14 | 2016-01-01 00:00 | 2016-12-31 23:59 | 600 | All In Service (does not include underlying 115kV circuit) |
| Transfer East of Kenora [TEK] | 2016-06-20 16:22 | 2016-01-01 00:00 | 2016-12-31 23:59 | 385 | All In Service |
| Transfer East of Missisagi [MaeE] | 2016-06-23 13:38 | 2016-01-01 00:00 | 2016-12-31 23:59 | 600 | All In Service or 601 O/S |
| Flow South [FS] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 2100 | All In Service |
| P502X | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1585 | All In Service |
| Flow North [FN] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1500 | All In Service |
| Claireville North [CLAN] | 2016-06-20 13:41 | 2016-01-01 00:00 | 2016-12-31 23:59 | 2000 | All In Service |
| Transfer West of Missisagi [MaeW] | 2016-06-23 13:38 | 2016-01-01 00:00 | 2016-12-31 23:59 | 600 | All In Service or 601 O/S |
| P33C Chats Falls Inflow | 2016-06-20 15:56 | 2016-01-01 00:00 | 2016-12-31 23:59 | 290 | All In Service |
| XIP Flow Into Dobbin | 2016-06-20 15:56 | 2016-01-01 00:00 | 2016-12-31 23:59 | 220 | All In Service |
| Medawaska Generation | 2016-06-20 16:17 | 2016-01-01 00:00 | 2016-12-31 23:59 | 400 | All In Service |
| Kenora Area Outflow [KAO] | 2016-06-20 16:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 123 | All In Service |
| Transfer East of Mecklenzie [TEM] | 2016-06-20 16:07 | 2016-01-01 00:00 | 2016-12-31 23:59 | 450 | All In Service or 601 O/S |
| East-West Transfer East [EWTE] | 2016-06-20 16:07 | 2016-01-01 00:00 | 2016-12-31 23:59 | 325 | All In Service or 601 O/S |
| East-West Transfer West [EWTW] | 2016-06-20 16:07 | 2016-01-01 00:00 | 2016-12-31 23:59 | 350 | All In Service or 601 O/S |

| Inter-tie Transmission Facilities Interface | Date/Time Issued | Start Date/Time | End Date/Time | Operating Limit | Comments |
|---|------------------|------------------|------------------|-----------------|---------------------------|
| Ontario-Minnesota Transfer North [MPFN] | 2016-06-20 16:14 | 2016-01-01 00:00 | 2016-12-31 23:59 | 80 | All In Service or 601 O/S |
| Ontario-Minnesota Transfer South [MPFS] | 2016-06-20 16:14 | 2016-01-01 00:00 | 2016-12-31 23:59 | 130 | All In Service or 601 O/S |
| Quebec-Rapide-Ontario (115kV) Import Summer | 2016-06-23 07:57 | 2016-01-01 00:00 | 2016-12-31 23:59 | 55 | All In Service |
| Ontario-Quebec Beauharnois 230 kV Export Summer | 2016-06-23 08:10 | 2016-01-01 00:00 | 2016-12-31 23:59 | 470 | All In Service |
| Ontario-Quebec Kipawa (115kV) Export Summer | 2016-06-23 08:22 | 2016-01-01 00:00 | 2016-12-31 23:59 | 85 | All In Service |
| Ontario-New York Export Summer | 2016-06-23 07:53 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1450 | All In Service |
| Ontario-New York Import Summer | 2016-06-23 07:53 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1300 | All In Service |
| Ontario-Michigan Export Summer | 2016-06-23 07:53 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1500 | All In Service |
| Ontario-Michigan Import Summer | 2016-06-23 07:53 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1500 | All In Service |
| Ontario-Manitoba Transfer East [OMTE] | 2016-06-20 16:30 | 2016-01-01 00:00 | 2016-12-31 23:59 | 275 | All In Service |
| Ontario-Manitoba Transfer West [OMTW] | 2016-06-20 16:30 | 2016-01-01 00:00 | 2016-12-31 23:59 | 275 | All In Service |
| Ontario-Quebec Beauharnois 230 kV Import Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 790 | All In Service |
| Ontario-Quebec Medaren 230 kV Export Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 190 | All In Service |
| Ontario-Quebec Medaren 230 kV Import Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 240 | All In Service |
| Ontario-Quebec Oubrouais 230kV Export Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1230 | All In Service |
| Ontario-Quebec Oubrouais 230kV Import Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 1230 | All In Service |
| Ontario-Quebec Paugan 230 kV Export Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 0 | All In Service |
| Ontario-Quebec Paugan 230 kV Import Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 290 | All In Service |
| Ontario-Quebec Quyon 230 kV Export Winter | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 140 | All In Service |
| Ontario-Quebec Quyon 230 kV Import Winter | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 0 | All In Service |
| Ontario-Quebec Quyon 230 kV Export Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 120 | All In Service |
| Ontario-Quebec Quyon 230 kV Import Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 0 | All In Service |
| Ontario-Quebec Bryson 115 kV Export Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 0 | All In Service |
| Ontario-Quebec Bryson 115 kV Import Winter or Summer | 2016-06-23 08:19 | 2016-01-01 00:00 | 2016-12-31 23:59 | 65 | All In Service |

Figure A-2: Transmission Facility All in Service Limits Report

Transmission Facility Outage Limits Report (Days 0 to 2)

Created at Jul 07, 2016 14:07:06
Limits Occurring between Jul 07, 2016 and Jul 09, 2016

| Internal Transmission Facilities Interface | Date/Time Issued | Start Date/Time | End Date/Time | Operating Limit | Comments |
|--|------------------|------------------|------------------|-----------------|--|
| Wawa MacKay Flow East-230 [WMFE-230] | 2016-06-21 07:17 | 2016-06-06 08:00 | 2016-07-21 16:00 | 400 | Wawa AL23 Breaker or Wawa L21L25 Breaker O/S |
| Flow Into Dobbin [FID] | 2016-06-20 17:03 | 2016-05-18 06:00 | 2016-08-08 07:00 | 300 | Q65 O/S |
| Flow Into Ottawa [FIO] | 2016-06-21 07:12 | 2016-01-11 07:00 | 2016-07-15 11:30 | 2750 | Hawthorne T3.L523 O/S |
| Wawa MacKay Flow East-230 [WMFE-230] | 2016-06-21 07:15 | 2016-04-07 16:00 | 2016-12-31 17:00 | 515 | Sault #3 Radial |
| Transfer East of Kenora [TEK] | 2016-06-28 07:41 | 2016-07-04 06:00 | 2016-07-07 17:00 | 180 | K24F/Port Frances K-Bus/Port Frances T1 O/S |
| Kenora Area Outflow [KAO] | 2016-06-28 07:41 | 2016-07-04 06:00 | 2016-07-07 17:00 | 120 | K24F/Port Frances K-Bus/Port Frances T1 O/S |
| Fort Frances Area Inflow [FAI] | 2016-06-28 07:41 | 2016-07-04 06:00 | 2016-07-07 17:00 | 100 | K24F/Port Frances K-Bus/Port Frances T1 O/S |
| Claireville North [CLAN] | 2016-06-28 08:45 | 2016-07-04 06:00 | 2016-07-08 18:00 | 1000 | E510V + 882V and/or Brownhill L80L82 and/or M808 O/S |
| Flow South [FS] | 2016-06-28 08:46 | 2016-07-04 06:00 | 2016-07-08 18:00 | 1870 | E510V O/S |
| P502X | 2016-06-28 08:46 | 2016-07-04 06:00 | 2016-07-08 18:00 | 1385 | E510V O/S |
| Claireville South [CLAS] | 2016-06-28 08:46 | 2016-07-04 06:00 | 2016-07-08 18:00 | 1200 | E510V + 882V and/or Brownhill L80L82 and/or M808 O/S |
| Flow Into Ottawa [FIO] | 2016-07-05 09:13 | 2016-07-08 13:00 | 2016-07-08 18:00 | 2400 | Hawthorne T3.L523 + B5D O/S |

| Intertie Transmission Facilities Interface | Date/Time Issued | Start Date/Time | End Date/Time | Operating Limit | Comments |
|---|------------------|------------------|------------------|-----------------|--|
| Ontario-Quebec Outaouais 230kV Import Summer | 2016-07-05 16:30 | 2016-07-07 11:00 | 2016-07-07 22:00 | 600 | System Conditions |
| Ontario-New York Export Summer | 2016-06-29 14:06 | 2016-07-06 09:00 | 2016-07-08 19:00 | 1150 | NY High Loads |
| Ontario-Manitoba Transfer East [OMTE] | 2016-06-20 17:29 | 2016-05-18 11:57 | 2016-10-31 23:59 | 200 | Manitoba Hydro Temporary Operating Instruction |
| Ontario-Manitoba Transfer West [OMTW] | 2016-06-20 17:29 | 2016-05-18 11:57 | 2016-10-31 23:59 | 200 | Manitoba Hydro Temporary Operating Instruction |
| Ontario-Quebec Beauharnois 230 kV Import Summer | 2016-06-20 17:34 | 2015-05-30 06:00 | 2017-12-31 23:59 | 650 | Beauharnois T2 (230-2) o/s |
| Ontario-Quebec Beauharnois 230 kV Export Summer | 2016-06-20 17:27 | 2016-05-02 08:00 | 2016-09-01 17:00 | 300 | Beauharnois T2 + T4 o/s |
| Ontario-Minnesota Transfer North [MPFN] | 2016-06-28 07:41 | 2016-07-04 06:00 | 2016-07-07 17:00 | 65 | K24F/Port Frances K-Bus/Port Frances T1 O/S |
| Ontario-Quebec Beauharnois 230 kV Import Summer | 2016-06-20 17:27 | 2016-05-02 08:00 | 2016-09-01 17:00 | 390 | Beauharnois T2 + T4 o/s |
| Ontario-Minnesota Transfer South [MPFS] | 2016-06-28 07:41 | 2016-07-04 06:00 | 2016-07-07 17:00 | 10 | K24F/Port Frances K-Bus/Port Frances T1 O/S |
| Ontario-Quebec Beauharnois 230 kV Import Summer | 2016-07-05 16:23 | 2016-07-07 11:00 | 2016-07-07 22:00 | 200 | System Conditions |
| Ontario-Quebec Beauharnois 230 kV Import Summer | 2016-07-06 10:13 | 2016-07-08 13:00 | 2016-07-08 18:00 | 390 | B5D O/S |

Figure A-3: Transmission Facility Outage Limits Report

– End of Section –

Appendix B: Method to Prepare Ontario Demand Forecast

In accordance with C.5, S 7.1.3 of the *market rules*, this appendix describes the method used to prepare the hourly Ontario *demand* forecasts used as an input to the near-term *adequacy* assessments and presented in the:

- *Adequacy* Report, and
- Ontario Zonal *Demand* Forecast Report.
- To prepare near-term hourly Ontario *demand* forecasts (i.e. from current day, including *pre-dispatch*, out to 34 days), the *IESO* uses a load forecast tool¹⁰. The tool uses models consisting of linear regressions and/or neural network analysis to produce the forecasts.

B.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
 - Cloud Cover
- Historical *Demand* Data
- Embedded Solar Generation Data
 - Historical
 - Forecast

– End of Section –

¹⁰ At the discretion of the *IESO*, we may manually adjust the Ontario *demand* forecasts provided by the load forecast tool to account for conditions such as, but not limited to, actual weather that differs from forecast weather.

Appendix C: Method to Assess Generation and Transmission Adequacy

When assessing generation adequacy, the IESO will compare forecasted demand to available resource capacity and energy, including available generation external to Ontario. The IESO will use the following adequacy criteria for normal operating states:

1. For the *dispatch day* and two days following the *dispatch day* daily assessment, an acceptable level of *adequacy* is achieved if:
 - Available resources, based on installed capacity, estimated imports and outage information, exceed forecasted primary 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 primary demand in MWh.

If there are inadequate resources in the short-term, the IESO shall take necessary actions such as:

- *Publishing* information necessary to allow the market to react to *adequacy* concerns,
 - Activating *reliability must-run contracts* to address *local area adequacy* only (i.e. not permitted to address lack of overall system generation *adequacy*),
 - Rejection, 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 primary *demand* by at least the *Generation Reserve Holdback*¹¹, 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 primary *demand* in MWh.
 3. For the 18 month 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 (LOLE) is less than 0.1 days per year, consistent with NPCC requirements.

¹¹*Generation Reserve Holdback* is an amount of generating capacity that is needed to be held in reserve. See Appendix F for details.

When assessing transmission *adequacy*, the IESO shall compare forecast transmission flows with the applicable *System Operating Limits* under a range of load conditions and *generator* and transmission *facility* availability conditions. Transmission is adequate if forecast loads can be supplied without exceeding applicable *System Operating Limits*, and acceptable system voltages can be maintained.

– End of Section –

Archive

Appendix D: Definitions of Terms in Adequacy Reports

This appendix defines the terms used and presented in the *Adequacy* Report. In addition to the terms in this appendix, all reports published on day 0 and reports published on day 1 after successful completion of the day-ahead commitment process, will include aggregated values of the capacity offered and *bid* by market participants and the aggregated *pre-dispatch schedules* for the *dispatch day*.

D.1 Forecast Supply

The *IESO* will forecast the following elements of supply:

- **Energy (MWhr)** – the amount of *energy* available from generation sources in Ontario plus imports from other *control areas*¹². This quantity is calculated from the relationship:

$$\begin{aligned}
 & \text{[generating capacity in-service (MW)]} * 1 \text{ hr} \\
 & - \text{[capacity unavailable due to } \textit{outages} \text{ (MW)}^{13}] * 1 \text{ hr} \\
 & - \text{[capacity of } \textit{energy-limited} \text{ resources (MW)]} * 1 \text{ hr} \\
 & - \text{[capacity of } \textit{variable generation} \text{ resources (MW)]} * 1 \text{ hr} \\
 & + \textit{energy} \text{ (forecast) of } \textit{variable generation} \text{ resources (MWhr)} \\
 & + \textit{energy-limited resource energy} \text{ for the hour (MWhr)} \\
 & + \text{[imports from other } \textit{control areas} \text{ (MW)]} * 1 \text{ hr}
 \end{aligned}$$

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

- **Capacity (MW)** – the net amount of *generation capacity* in-service in Ontario. This number may be revised lower if a material quantity of capacity is bottled. The *Adequacy* Report includes capacity quantities for each hour.
- **Intermittent generator schedules (MWhr/hr)** – market participants provide *dispatch data* for *intermittent generators* that represent the forecast *energy* output for these facilities. For the days of the *Adequacy* Report in which *intermittent generator* schedules are not available, the *IESO* will use an estimate of these schedules in the *adequacy* assessment.
- **Self-scheduling generator schedules (MWhr/hr)** – market participants provide *dispatch data* for *self-scheduling generators* including *transitional scheduling generators* that represent the forecast *energy* output for these facilities. For the days of the *Adequacy* Report in which *self-scheduling generator* schedules are not available, the *IESO* will use an estimate of these schedules in the *adequacy* assessment.
- **Energy-limited energy (MWhr)** – the *IESO* publishes the aggregate forecast amount of *energy* available from *energy-limited facilities*. An *energy-limited facility* is a generation

¹² An estimated value of imports is used prior to the initial *pre-dispatch* run on day 1.

¹³ Excludes *outages* to *energy-limited* resources and *variable generation* resources.

resource that is unable to supply *energy* equal to the capacity for each of the hours of the day (e.g. a hydro-electric *facility* 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 *facilities*. 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 *facilities* that are *energy*-limited. On any day, the list of *facilities* that may be *energy*-limited may change. To place the *energy*-limited *energy* quantity in context, the nominal capacity of these *facilities* 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*¹⁴. 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* using a set of seasonal capacity factors.¹⁵ 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 **day 0 and 1**, a value of zero will be used,
 - For **days 2 to 10**, an estimate of up to 700 MW *imports* will be used, along with the forecasted Ontario *demand* for this period,
 - **Beyond day 10**, an estimate of up to 2,000 MW¹⁶ *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

¹⁴ At the discretion of the *IESO*, we 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.

¹⁵ 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.

¹⁶ The use of up to 2,000 MW *imports* and forecasted extreme weather Ontario *demand* will apply to the assessment of outages ending **on or after May 1, 2019**.

*interconnections*¹⁷. More conservative numbers will be used where available *interconnection* information indicates that less than 700 or 2,000 MW¹⁸ *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 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 facility* MWs, by fuel type, that are unavailable due to *outage* or derating. This quantity will be provided for each hour of each day of the *Adequacy* Report.
- **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 (C.5, S. 4.4.2 of the *market rules*). 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/generation i.e. the “Total *Outages*” value is increased by 2% of available dispatchable generation. 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.

D.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

¹⁷ For more details, see the [Methodology to Perform Long Term Assessments](#) document available at the [18-month Outlook page](#) of the *IESO* website.

¹⁸ The use of up to 2,000 MW *imports* and forecasted extreme weather Ontario *demand* will apply to the assessment of outages ending **on or after May 1, 2019**.

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*¹⁹, in which it is the peak *demand* forecast.

- **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 commitment process. *Dispatchable load* 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 F: 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-002-1* (Disturbance Control Performance) 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.

D.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:

¹⁹ *IESO* Ramp Hours are defined as any hour in which the peak demand forecast exceeds the average demand forecast by at least 300 MW.

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

D.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* (MWhr) for each hour is calculated from the following formulation:

$$\begin{aligned} & [\text{generating capacity in-service (MW) + estimated imports (MW) + } \textit{dispatchable load}] * 1 \text{ hr} \\ & - [\text{total hourly Ontario } \textit{demand} \text{ forecast (MW) + capacity unavailable due to } \textit{outages} \text{ (MW) +} \\ & \text{capacity of } \textit{energy-limited} \text{ resources (MW) + capacity of } \textit{variable generation} \text{ resources} \\ & \text{(MW)}] * 1 \text{ hr} \\ & + \textit{energy-limited resource energy} \text{ for the hour (MWhr)} \\ & + \textit{energy (forecast) of variable generation} \text{ resources (MWhr)} \end{aligned}$$

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

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

$$\begin{aligned} & [\text{generating capacity in-service (MW) + estimated imports (MW) + capacity imports (MW) +} \\ & \textit{dispatchable load}] \\ & - [\text{total hourly Ontario } \textit{demand} \text{ forecast (MW) + capacity unavailable due to } \textit{outages} \text{ (MW) +} \\ & \text{generation reserve holdback (MW) + capacity exports (MW)}] \end{aligned}$$

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 commitment 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:

$$\begin{aligned} & [\text{total internal generation offered/forecasted (MW/MWhr) + total offered imports (MW) –} \\ & \text{linked wheels + } \textit{dispatchable load bid}] \\ & - [\text{total peak hourly Ontario } \textit{demand} \text{ forecast (MW) + generation reserve holdback (MW)}] \end{aligned}$$

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

D.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. This would likely occur in real-time *operation* in low *demand* periods when one or more *generators dispatch* more generation than the *dispatch instructions* issued by the *IESO* and are unable to respond to *IESO's* subsequent *dispatch instructions* for immediate corrective actions. 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 D.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 Alert

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 a Maximum Generation (MaxGen) Alert via an advisory notice, requesting *market participants* to consider placing additional *offers* into the electricity market.

– End of Section –

Appendix E: Transmission Interfaces

The Transmission Limits report provides deviations in transmission limits for major internal interfaces and all *intertie* interfaces (C.5, S. 7.4.4 of the *market rules*). These are the interfaces on which flows must be restricted below the limit specified to ensure reliable *operation* of the *IESO-controlled grid*.

The following is a list of internal interfaces and external interfaces for which the *IESO* will *publish* limits for all elements in-service and *outage* conditions (C.5, S. 7.4.4.1.2, 7.4.4.1.3 of the *market rules*). These interfaces are consistent with those included in long-term forecast publications (C.5 S. 7.4.2 of the *market rules*). The Maximum Interface Limits posted are representative of Available Transfer Capability (ATC) values. At any time, the actual maximum interface limits may deviate from these values. The table below provides the basis for interface reporting; additional interfaces may be included in the actual reports.

Table E-1: Operating Security Limits

| Interface | Description of Interface | Notes |
|----------------------------|---|---|
| Internal Interfaces | | |
| 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 |
| 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 <i>outage</i> or high risk conditions |
| WMFE-230-115 | Wawa-MacKay Flow East on the 230 kV and 115 kV system | Voltage stability limit |

| Interface | Description of Interface | Notes |
|-----------------------|---|---|
| WMFE-230 | Wawa-MacKay Flow East on the 230 kV system | Voltage violation |
| MissE | Transfer East of Mississauga | Voltage violation |
| MissW | Transfer West into Mississauga | 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 |
| 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 | |
| FIO | Flow Into Ottawa | Voltage Stability Limit |

| Interface | Description of Interface | Notes |
|-----------------------------|--|---|
| 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 Chenux 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 | |
| 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 |

| Interface | Description of Interface | Notes |
|------------------------------------|--|---|
| External Interfaces | | |
| 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 |
| 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 degree 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 degree 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 degree 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 degree 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 degree 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 degree 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 degree 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 degree 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 <i>operation</i> of D5A with Maclaren and H9A with Masson is not permitted |
| Quebec Masson to Ontario - 115 kV - Winter or Summer | Line flow on H9A from Masson to Ontario | Concurrent <i>operation</i> of D5A with Maclaren and H9A with Masson is not permitted. Thermal limit of H9A may be more restricted |

| Interface | Description of Interface | Notes |
|--|--|---|
| 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: <ol style="list-style-type: none"> 1. 1250 MW with two convertors in service or 625 MW with one convertor in service 2. 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: <ol style="list-style-type: none"> 1. 1250 MW with two convertors in service or 625 MW with one convertor in service 2. 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 | |
| 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 | |

| Interface | Description of Interface | Notes |
|---|--|-------|
| Ontario to Quebec Kipawa (115kV) Export | Line flow on H4Z from Holden to Kipawa | |
| <p>* 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 on-line, amount of generation rejection armed, amount of load rejection armed, voltage levels, etc.</p> | | |
| <p>* 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.</p> | | |

– End of Section –

Appendix F: Generation Reserve Holdback Requirements

Generation Reserve Holdback (GRH) is an amount of generating capacity that is needed to be held in reserve, to cover for uncertainty in load forecasting, generation availability, and for the effects of special protection schemes and the commissioning of large *generation units*, so that load may be supplied with an acceptable level of *reliability*. The distribution of the Generation Reserve Holdback throughout a year is based upon a method of levelizing 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 that is required to levelize the risk due to generating 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 generating 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.

Table F-1: Generation Reserve Holdback Requirements

| Type of Report | | Time Period (beginning from present) | Generation Reserve Holdback (MW) |
|-----------------|-----|---|---|
| Adequacy Report | (a) | Days 0-2, where day 0 is the current day. | <i>Operating reserve</i> requirement consisting of 30-minute and 10-minute <i>operating reserve</i> requirements. |
| | (b) | Balance of the first two weeks (3-14 days out) | GRH = <i>operating reserve</i> + LFU + ACA That is, GRH equals the <i>operating reserve</i> Requirement (<i>operating reserve</i>) plus the Load Forecast Uncertainty (LFU) plus the Additional Contingency Allowance (ACA) In this period, the ACA consists of the next largest half contingency beyond the <i>operating reserve</i> requirement. For the Winter Period (December, January and February) a further amount equal to half of the next largest contingency will be added. |
| | (c) | Covers a total of 11-17 days from day 15 out to the end of Week 4 ²⁰ . | Linear interpolation between (b) and (d), except for the Winter Period when it is the same as (d). |

²⁰ A week runs Monday – Sunday. The current week is defined as Week 0.

| Type of Report | | Time Period (beginning from present) | Generation Reserve Holdback (MW) |
|---|-----|---|---|
| Period beyond the days of the Adequacy Report | (d) | Week 5 (this quantity is not included in the <i>Adequacy</i> 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 <i>published</i> in the <i>Resources Adequacy</i> Assessment Table, located in the “18-Month Outlook” as posted on the <i>IESO</i> website. |

- **Total operating reserve (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. Load Forecast Uncertainty (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 B). 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.

From day 0 (current day) to 2 days out, there is less uncertainty in the weather forecast, therefore the LFU allowance is not included in this period. From 3 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 3 days out to day 6, the LFU is a statistical measure of the error variability over the 3 to 6 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 6 days out. As the days out decreases, the uncertainties in the forecasted weather decrease. Therefore, the LFU decreases.

For 7 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 7 days out and beyond.

- **Additional Contingency Allowance (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*.

The Generation Reserve Holdback (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*-administered 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.

– End of Section –

References

| Document ID | 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: 18-Month Outlook and Related Information Requirements |
| IMP_PRO_0035 | Market Manual 7.3: Outage Management |
| MDP_PRO_0014 | Market Manual 1.1: Participant Authorization, Maintenance and Exit |
| | NERC Reliability Standard BAL-002-1 : Disturbance Control Performance |
| | NPCC Directory 5: Reserve |

– End of Document –