

Information Documents are not authoritative. Information Documents are provided for information purposes only and are intended to provide guidance. In the event of any discrepancy between an Information Document and any Authoritative Document(s) in effect, the Authoritative Document(s) governs.

1 Purpose

This Information Document relates to the following Authoritative Documents:¹

- (a) section 202.2 of the ISO rules, *Short Term Adequacy and Supply Shortfall*;
- (b) section 202.4 of the ISO rules, *Managing Long Lead Time Assets*; and
- (c) section 202.6 of the ISO rules, *Adequacy of Supply*.

This Information Document provides background information regarding the steps the AESO uses to manage a supply shortfall event and the criteria used for conducting both short-term and long-term adequacy assessments. This Information Document is likely of most interest to pool participants, legal owners and operators of sink assets and source assets, and legal owners of electric distribution systems.

2 AESO Steps in Managing Supply Shortfall

Appendix 1 of this Information Document outlines steps that the AESO takes in managing a supply shortfall event. Certain steps may be more effective than others in differing supply shortfall events.

The AESO continues to meet the control performance standard as defined in the *Consolidated Authoritative Document Glossary* during a supply shortfall event. As such, if the AESO determines that a step in Appendix 1 is not effective in managing the supply shortfall event such that the control performance standards are met, the AESO skips that step and proceeds to steps deemed more effective. If the AESO does skip one or more steps in Appendix 1 when managing a supply shortfall event, the AESO returns to the skipped steps and reduces the requirements for energy from later steps if time and operating conditions permit.

3 Voluntary Efforts to Alleviate Supply Shortfall

The AESO may request the assistance of the following market participants in alleviating the supply shortfall event as follows:

3.1 Pool Participants in General

In response to the message issued pursuant to subsection 3(1) of section 202.2 of the ISO rules, a pool participant may voluntarily curtail load. If a pool participant can no longer voluntarily curtail load, the AESO encourages the pool participant to provide notice to the AESO before restoring large amounts of load.

3.2 Legal Owners of Electric Distribution Systems

The AESO encourages the legal owner of an electric distribution system to make best efforts to achieve a 3% voltage reduction on the electric distribution system. The AESO encourages those who are able to reduce voltage to provide notice to the AESO before restoring voltage to normal.

¹ "Authoritative Documents" is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and regulations, and that contain binding legal requirements for either market participants or the AESO, or both. AESO Authoritative Documents include: the ISO rules, the Alberta reliability standards and the ISO tariff.

4 Determining Short-term Supply Adequacy

On occasion, the amount of demand is greater than the amount of energy offered in the energy market merit order. When the AESO has issued dispatches for all energy in the energy market merit order, the interconnected electric system may experience a supply shortfall event. Various events such as generation contingencies, transmission contingencies, energy market deficiencies, or unexpected demand levels can produce a supply shortfall event.

The AESO assesses short term adequacy to determine the likelihood of a supply shortfall event in upcoming settlement periods. If the short term adequacy assessment indicates that a supply shortfall event is likely to occur, then the AESO takes steps to maintain regulating reserves and avoid shedding firm load.

5 Long Lead Time Asset Priority Order for Supply Shortfall

If a short term adequacy assessment leads the AESO to take the steps outlined in subsection 3(2) of section 202.2 of the ISO rules, the AESO issues directives to long lead time assets in the following priority order:

- (a) shortest start-up time;
- (b) largest incremental availability capability;
- (c) shortest minimum run time; and
- (d) lowest loss factor.

6 Short Term Adequacy Assessment Assumptions

The AESO makes certain assumptions when conducting the calculation described in subsection 3 of section 202.6 of the ISO rules, including using a forecast output from wind and solar aggregated generating facilities, persisting current values for price-responsive loads and behind the fence generation for the next 36 hours, and then applying a fixed number for the remainder of the 7 day period based on statistical data. Currently, the AESO uses 200 MW for price-responsive load and 355 MW for behind the fence generation..

7 Long Term Adequacy Metrics and Reporting

The AESO posts a quarterly report to the AESO website every February, May, August, and November, that contains long term adequacy metrics. The long term adequacy metrics include: new generation projects and retirements, a reserve margin, a supply cushion, and the two year probability of supply adequacy shortfall.

7.1 New Generation Projects and Retirements Metric

The new generation projects and retirement metrics includes four tables. All four tables include the sponsor, project name, fuel type and unit capacity and either the announced in-service date or the retirement date. The metric further classifies projects into the following four categories to provide additional information:

- (a) generation projects under active construction, as determined by the AESO;
- (b) generation projects which have received government permits or approvals to proceed from the Electric Utilities Board, Alberta Utilities Commission or other Alberta agencies;
- (c) generation projects which have a connection application before the AESO or have been publicly announced and have an ongoing commitment to proceed, as determined by the AESO; and
- (d) existing generating assets which are known to be retiring as indicated by the public announcements of the owners of such assets or by other publicly available sources of

information.

The AESO may provide additional public generation project information regarding the magnitude of the impact of a project on long term adequacy and may identify potential impediments to the timely completion and connection of the projects if appropriate.

7.2 Reserve Margin Metric

The reserve margin metric is a comparison of generation supply and demand during annual peak demand in Alberta. This metric is a calculation of the installed generation capacity and future generation capacity, accounting for seasonal hydro capacity and generation with on-site load, and excluding wind and solar capacity at the time of system peak that is in excess of the system annual peak demand, expressed as a percentage of the system peak. Three forecast reserve margins are presented, each with different future supply additions. The different supply additions correspond to the stage of the generation projects in the new generation projects and retirements metric. The metric may be calculated with or without intertie capacity, as appropriate for the specific study, since full import capability may not always be available at the time of system peak demand.

7.3 Supply Cushion Metric

The supply cushion metric illustrates the ability of installed generation capacity and future generation capacity, accounting for seasonal hydro capacity and generation with on-site load, and excluding wind and solar capacity to meet peak demand on a daily basis. This metric includes existing generation and generation under construction less announced retirements but it does not include transmission outages unless submitted as a generator outage or derate by an asset owner. A deficiency of supply to meet daily peak demand does not mean a supply shortfall exists as there may be other resources such as wind, solar, or imports available to meet demand. Any confidential information used in the metric is only shown in aggregate form.

7.4 Two-year Probability of Supply Adequacy Shortfall Metric

The two-year probability of supply adequacy shortfall metric provides information on potential energy supply shortfall events during the two year period in terms of number of hours of supply shortfalls, largest supply shortfall hour in MW, and total MWh not served. The calculated total MWh not served represents the cumulative total of MW of demand not served during each hour of all supply shortfall events modeled during the two year period.

The AESO may establish other metrics deemed appropriate for the assessment of long term adequacy in Alberta. The other metrics may not necessarily be published in the quarterly report but would be used to assist the AESO in fulfilling its obligations under section 202.6 of the ISO rules and under the *Electric Utilities Act*.

The AESO updates the long term adequacy metric methodology as appropriate. Generally, the methodology:

- (a) covers the key elements which directly or indirectly measure long term adequacy;
- (b) is relatively simple to understand and promotes understanding of the energy market;
- (c) to the extent possible, is based on publicly available and verifiable information; and
- (d) provides an outlook on long term adequacy.

8. Long Term Adequacy Threshold Determination and Use

To calculate the long term adequacy threshold, as per the methodology in subsection 5(1) of section 202.6 of the ISO rules, the AESO assumes an average hourly Alberta internal load and uses a one in ten year one-hour supply shortfall. An example of the calculation for an average load of 8000 MW produces a one in ten year one-hour supply shortfall equivalent to 800 MW (8000 MW / 10 years). Applying this over a two year period produces a threshold value of 1600 MWh (800 MWh x 2 years).

9. Long Term Adequacy Threshold Actions

The long term adequacy threshold actions the AESO may procure are described below:

- (a) load shed – the AESO contracts with pool participants for the right to curtail load in certain circumstances and under specific terms and conditions.
- (b) self-supply and back-up generation – the AESO contracts with the legal owners of self-supply and back-up generating units for the ability to call on such generating units to provide energy production to the system. The contracted generating units normally only produce energy solely for use at the generation site, or are normally available to provide back-up when there is an outage at the generation site, and would not otherwise have been available to participate in the energy market.
- (c) emergency portable generation – the AESO would contract with the legal owners of emergency portable generating units for the ability to call on such generating units to provide energy production to the system. Emergency portable generating units are portable units that are not currently located in Alberta but which can be interconnected on short notice if a suitable site is available.

10 Appendices

Appendix 1 – *Table 1: Supply Shortfall Management*

Revision History

Posting Date	Description of Changes
2018-09-04	Updates to reflect addition of solar and clarify assumptions for short term adequacy assessments.
2015-10-19	Addition of Step 20, Appendix 1, Table 1, requesting BC emergency energy.
2013-12-20	Admin update to remove, re-organize and clarify information. Addition of long-term supply adequacy sections relating to section 202.6 of the ISO rules.
2013-07-26	Reordered steps in Table 1 to reflect more efficient process
2013-06-24	Changes to steps in Table 1 to reflect more efficient process
2013-01-08	Initial Release

Appendix 1

Table 1: Supply Shortfall Management

The AESO performs the following steps in managing a supply shortfall event as outlined in section 2 of this Information Document. When returning to normal operations after a supply shortfall event, the AESO follows these steps in reverse order.

(1)	When the short term adequacy program issues an alarm, perform a short term adequacy assessment in accordance with section 202.2.
(2)	Perform planning steps, which may include: <ul style="list-style-type: none"> (a) if step 8 is anticipated to be reached, cancel transmission maintenance to remove generation constraints or increase import available transfer capability on all interconnections with neighbouring balancing authorities; (b) if it is assessed that shedding of firm load is likely to occur, and sufficient time is available for a public appeal to reduce electrical energy consumption to reduce load, arrange for AESO Corporate Communication to issue a public appeal; (c) allow for 1 hour notice if it is anticipated that the demand opportunity service 1 hour loads are to be curtailed in step 7; (d) determine in which future hours during the potential supply shortfall export available transfer capability on all interconnections with neighbouring balancing authorities are to be posted to 0 MW in step 6 so new export available transfer capability levels can be posted 1 hour in advance (e) if the AESO reasonably anticipates an Energy Emergency Alert 1 or 2 is likely to be reached, notify the adjacent balancing authorities; and (f) allow for 1 hour notice if it is anticipated that the AESO Voluntary Load Curtailment Program loads are to be issued dispatches to terminate load in step 13.
(3)	Issue a dispatch to terminate dispatch down service with respect to a directive for energy from a long lead time asset.
(4)	Internal notifications within the AESO.
(5)	Declare Energy Emergency Alert 1.
(6)	Reduce export available transfer capability to zero on all interconnections with neighbouring balancing authorities and post the updated available transfer capability to the AESO website.
(7)	Curtail demand opportunity service loads.
(8)	Cancel transmission maintenance.
(9)	Issue directives for dispatched contingency reserves that are in excess of the contingency reserve requirement.
(10)	Issue directives for out-of-market energy from long lead time assets.
(11)	Declare Energy Emergency Alert 2.
(12)	Request legal owners of an electric distribution system institute a 3% distribution voltage reduction.

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(13)	Issue dispatches to terminate load in the AESO's voluntary load curtailment program as identified by the AESO in internal procedures.
(14)	If available transfer capability is limited because of the lack of offers for load shed service for imports, then disregard this constraint and increase the posted Alberta-BC and Alberta-Montana interconnection import available transfer capability up to the limit as if all available load shed service for imports loads are in service. This step is performed as weather and other operating conditions allow.
(15)	If import available transfer capability is available, permit intra-hour interchange transactions up to the posted import available transfer capability limit.
(16)	Issue directives for supplemental reserves and excess spinning reserves.
(17)	Issue directives for spinning reserves.
(18)	If there is available capacity (i.e., surplus available transfer capability) on the interconnections, request emergency energy from the NWPP.
(19)	If there is available capacity (i.e., surplus available transfer capability) on the interconnections, request emergency energy from Saskatchewan.
(20)	If there is available capacity (i.e., surplus available transfer capability) on the interconnections, request emergency energy from British Columbia.
(21)	Declare Energy Emergency Alert 3. Issue a directive to curtail firm load and set pool price to \$1000/MWh