Information Document
Wind and Solar Power Ramp Up Management
ID #2018-013

Information documents are not authoritative. Information documents are for information purposes only and are intended to provide guidance. In the event of any discrepancy between an information document and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This information document relates to the following authoritative document:

- Section 304.3 of the ISO rules, *Wind and Solar Power Ramp Up Management* ("Section 304.3")

The purpose of this information document is to provide market participants with AESO information referenced in Section 304.3.

2 Exemption List

As referenced by subsection 1(2) of Section 304.3, the following facilities are included in the exemption list:

- Bull Creek #1 ("BUL1"); and
- Bull Creek #2 ("BUL2").

3 Alberta System Wind and Solar Power Limit

3.1 Methodology

The AESO's Alberta system wind and solar power limit methodology referenced in subsection 6(1) of Section 304.3 is set out below.

WSPL (MW) = MAXIMUM [(RPO_TOTAL + RDC + ΔAIL + ΔIS),(RPO_TOTAL + 65)]

where:

WSPL	is the Alberta system wind and solar power limit;
RPO_TOTAL	is the total Alberta real power output from all applicable wind and solar aggregated generating facilities;
RDC	is an estimate of the ramp down capability of the generating facilities participating in the energy market, as determined by the AESO;
ΔAIL	is the difference between the Alberta internal load at time of calculation and the Alberta internal load forecast for the next monitoring interval; and
ΔIS	is the difference between the interchange schedule at time of calculation and the next interchange interval forecast.

[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 associated regulations, and that contain binding legal requirements for either market participants or the AESO, or both. AESO authoritative documents include: the ISO rules, the reliability standards, and the ISO tariff.

3.2 Example Calculation

For clarity, an example is provided below using the following variables:

RPO_TOTAL = 250 MW

RDC = 20 MW

ΔAIL = 20 MW

ΔIS = 10 MW

The AESO would determine the wind and solar aggregated generating facilities power limit as follows:

WSPL = MAX [(250 MW + 20 MW + 20 MW + 10 MW),(250 MW + 65 MW)] = 315 MW

4 Wind and Solar Aggregated Generating Facilities Power Limit Pro Rata Share

4.1 Methodology

The AESO's wind and solar aggregated generating facilities power limit pro rata share methodology referenced in subsection 6(1) of Section 304.3 is set out below.

(a) **Pro Rata Share**

The AESO calculates the pro rata share for each applicable wind or solar aggregated generating facility at the beginning of a power ramp monitoring interval.

Pro Rata Share (MW) = (MC + LR) x (WSPL – RPO_TOTAL)

where:

MC is the maximum capability weighting of each facility calculated.

$$\mathrm{MC} = 20\% * \frac{\mathrm{MC\_F}}{\mathrm{MC\_TOTAL}}$$

where:

MC_F is the maximum capability of the facility; and

MC_TOTAL is the total maximum capability of all applicable wind and solar aggregated generating facilities participating in the pro rata calculation.

LR is the last ramp weighting of each facility calculated as follows:

$$\mathrm{LR} = 80\% * \frac{\mathrm{LR\_F}}{\mathrm{LR\_TOTAL}}$$

where:

LR_F is the last ramp of the facility based on the difference of the potential real power output from start to finish of the look back interval period as determined by the AESO; and

LR_TOTAL is the total last ramp for all applicable wind and solar aggregated generating facilities participating in the pro rata calculation;

WSPL is the Alberta system wind and solar power limit; and

RPO_TOTAL is the total real power output from all applicable wind and solar aggregated generating facilities.

(b) **Pro Rata Limit**

The AESO calculates the pro rata limit for each facility as follows:

Pro Rata Limit (MW) = Pro Rata Share + Real Power Output

4.2 Example Calculation

For clarity, an example is provided below to illustrate the AESO's pro rata share and limit calculations with 2 facilities based on the following assumptions.

RPO_TOTAL = 158 MW

WSPL = 223 MW

MC_TOTAL = 350 MW

LR_TOTAL = 35 MW

For Facility 1: MC_F = 250 MW, LR_F = 15 MW, Real Power Output = 93 MW

For Facility 2: MC_F = 100 MW, LR_F = 20 MW, Real Power Output = 65 MW

The pro rata shares for Facility 1 and 2 are calculated as follows:

For Facility 1:

$$\text{Facility 1 Pro Rata Share} = (\,20\% * \left(\frac{250}{350}\right) + 80\% * \left(\frac{15}{35}\right)) * (\,223 - 158\,) = 32\ \text{MW}$$

For Facility 2:

$$\text{Facility 2 Pro Rata Share} = (\,20\% * \left(\frac{100}{350}\right) + 80\% * \left(\frac{20}{35}\right)) * (\,223 - 158\,) = 33\ \text{MW}$$

The AESO calculates pro rata limits for each facility by adding its real power output to its pro rata share as follows:

Facility 1 Pro Rata Limit (MW) = 32 MW + 93 MW = 125 MW

Facility 2 Pro Rata Limit (MW) = 33 MW + 65 MW = 98 MW

Revision History

Posting Date	Description of Changes
2021-03-22	Administrative amendments to align with AESO drafting principles, fixed typographical errors, remove and consolidate some sections to improve clarity, reduce repetition, and reduce overall requirements.
2020-04-07	Addition of new section 2 Applicability and renumbering of ID sections
2018-09-04	Initial release