

# ISO Rules

## Part 300 System Reliability and Operations

### Division 304 Routine Operations

#### Section 304.3 Wind and Solar Power Ramp Up Management



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#### Applicability

**1(1)** Subject to subsections 1(2) and 1(3), section 304.3 applies to:

- (a) the **legal owner** of a wind or solar **aggregated generating facility** connected to the **interconnected electric system** or an electric system within the service area of the City of Medicine Hat, including a wind or solar **aggregated generating facility** situated within an industrial complex that is directly connected to the **interconnected electric system** or to an electric system within the service area of the City of Medicine Hat and that has a **gross real power** capability equal to or greater than 5 MW;
- (b) the **operator** of a wind or solar **aggregated generating facility** connected to the **interconnected electric system** or an electric system within the service area of the City of Medicine Hat, including a wind or solar **aggregated generating facility** situated within an industrial complex that is directly connected to the **interconnected electric system** or to an electric system within the service area of the City of Medicine Hat and that has a **gross real power** capability equal to or greater than 5 MW; and
- (c) the **ISO**.

**(2)** Except as otherwise specified herein, this section 304.3 does not apply to the following wind or solar **aggregated generating facilities**, as represented by their **pool asset** descriptions: Castle River #1 (CR1), Cowley Ridge (CRE3), Kettles Hill (KHW1), Suncor Magrath (SCR2), McBride Lake Windfarm (AKE1), Summerview 1 (IEW1), Bull Creek #1 (BUL1) and Bull Creek #2 (BUL2) (collectively referred to herein as the “exempt facilities”).

**(3)** The provisions of this section 304.3 do not apply to the **legal owner** of an **aggregated generating facility** that was energized and commissioned prior to April 7, 2017 in accordance with a previous technical requirement, technical standard, **ISO rule** or functional specification, but the **legal owner** of such an existing **aggregated generating facility** must remain compliant with the ramp up management requirements set out in that previous technical requirement, technical standard, **ISO rule** or functional specification.

**(4)** Notwithstanding subsection 1(2) or 1(3), if any of the **aggregated generating facilities** described in subsections 1(2) or 1(3) undergoes one or more:

- (a) facility additions after April 7, 2017 resulting in an increase in the cumulative **gross real power** capability of the **aggregated generating facility** by an amount equal to or greater than 5 MW; or
- (b) equipment replacements after April 7, 2017 where the equipment replaced has a **gross real power** capability equal to or greater than 5 MW irrespective of whether the cumulative **gross real power** capability of the **aggregated generating facility** is increased;

then the entire **aggregated generating facility** will be subject to and must comply with the provisions of this section 304.3.

**(5)** Notwithstanding subsections 1(2), (3) and (4), the **ISO** may require the **legal owner** of a wind or solar **aggregated generating facility**, **transmission facility** to comply with any specific provision or all of the provisions of this section 304.3, if the **ISO** determines that such compliance is necessary for the safe and reliable operation of the **interconnected electric system**.

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#### Requirements

##### Functional Specification

**2(1)** The **ISO** may issue a written functional specification containing details, work requirements and specifications for the design, construction and operation of a wind or solar **aggregated generating facility** and associated **transmission facility** connection facilities.

**(2)** The functional specification referred to in subsection 2(1) must be generally consistent with the provisions of this section 304.3, but may contain material variances approved of by the **ISO** based upon its discrete analysis of any one or more of the technical, economic, safety, operational and **reliability** requirements of the **interconnected electric system** related to the specific facility project.

##### Real Power and Ramp Rate Limitations

**3(1)** The **legal owner** of a wind or solar **aggregated generation facility** must ensure that the facility has the control capability to limit the **real power** output at the **point of connection**, or the connection to the **electric distribution system**, in accordance with any limits or instructions contained in any **directive** and must ensure that the **real power** output does not exceed the tolerances described in this subsection 3.

**(2)** The **legal owner** of a wind or solar **aggregated generating facility** must ensure that the **real power** control limit referred to in subsection 3(1) is adjustable from the minimum operating output to the **gross real power** capacity at an average resolution of 1 MW.

**(3)** Subject to subsection 3(4), the **legal owner** of a wind or solar **aggregated generating facility** must, when a **real power** control limit is in effect in accordance with a **directive** and ambient conditions at the wind or solar **aggregated generation facility** result in increasing **real power** output, ensure that the **real power** control limit of the wind and solar **aggregated generating facility** is capable of keeping the one (1) minute average **real power** output from exceeding the **real power** control limit specified in the **directive**, within 2% of the **gross real power** capability.

**(4)** The **legal owner** of a wind or solar **aggregated generating facility** must ensure that, if changing ambient conditions result in the **real power** control limit set out in the **directive** referred to in subsection 3(3) being instantaneously exceeded, the **real power** output of the wind or solar **aggregated generating facility** at the **point of connection**, or the connection to the **electric distribution system**, must not exceed the **real power** control limit by more than 5% of the **gross real power** capability.

**(5)** The **legal owner** of a wind or solar **aggregated generating facility** must ensure that the facility is equipped with **ramp rate** limiting controls.

**(6)** The **legal owner** of a wind or solar **aggregated generating facility** must ensure that the **ramp rate** limiting controls referred to in subsection 3(5) are capable of limiting the ramp up of the **real power** of the wind or solar **aggregated generating facility**, and that they are adjustable such that the **ramp rate** does not exceed, in MW per minute, a range equal to 5% of the **gross real power** capability to 20% of the **gross real power** capability.

**(7)** The **legal owner** of a wind or solar **aggregated generating facility** must ensure that the default setting for the **ramp rate** limiting controls referred to in subsection 3(5) is set at 10% of the **gross real power** capability, unless otherwise approved by the **ISO** in writing.

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(8) The **legal owner** of a wind or solar **aggregated generating facility** must ensure that any difference between the **real power** at:

- (a) the **point of connection** or the connection to the **electric distribution system** of the wind or solar **aggregated generating facility**, and
- (b) any **collector busses** of the wind or solar **aggregated generating facility**,

is compensated for in the **real power** limiting and **ramp rate** limiting controls.

#### Use of the Energy Market Merit Order

4 The **ISO** must implement the energy market **merit order** provisions of the **ISO rules** for energy balance to manage the ramp up of the total **real power** output from all wind or solar **aggregated generating facilities**, including the exempt facilities.

#### Calculation of Alberta System Wind and Solar Aggregated Generating Facilities Power Limit

5(1) The **ISO** must calculate, at a minimum monitoring interval of every twenty (20) minutes, an Alberta system wind and solar **aggregated generating facilities** power limit.

(2) The **ISO** must issue, at the start of each monitoring interval, **directives** by means of Supervisory Control and Data Acquisition signals to the **operator** of each wind or solar **aggregated generating facility**, specifying its wind and solar **aggregated generating facilities** power limit pro rata share.

#### Calculation and implementation of Wind and Solar Aggregated Generating Facilities Power Limit Pro Rata Share

6(1) The **ISO** must, if the wind and solar **aggregated generating facilities** power limit pro rata share for a wind or solar **aggregated generating facility** causes the wind or solar **aggregated generating facility** to exceed its **maximum capability**, reallocate the difference in MW on a pro rata basis to all other wind and solar **aggregated generating facilities**.

(2) The **operator** of a wind or solar **aggregated generating facility** that receives:

- (a) a pro rata share Supervisory Control and Data Acquisition **directive** signal under subsection 5(2); and
- (b) a curtailment **directive** for any other reason;

must comply with the subsection 6(2)(b) curtailment **directive**.

(3) The **ISO** must, where the **operator** of a wind or solar **aggregated generating facility** receives both of the **directives** described in subsection 6(2), reallocate any difference in MW between the pro rata share **directive** and the curtailment **directive** to all other wind and solar **aggregated generating facilities**.

#### Methodology Used to Calculate the Alberta System Wind and Solar Aggregated Generating Facilities Power Limit and Pro Rata Share

7(1) The **ISO** must post the methodology used to calculate the Alberta system wind and solar **aggregated generating facilities** power limit and methodology used to calculate the pro rata share of the Alberta system wind and solar **aggregated generating facilities** power limit to the AESO website.

(2) The **ISO** must, to amend the methodology used to calculate the Alberta system wind and solar **aggregated generating facilities** power limit or methodology used to calculate the pro rata share of the Alberta system wind and solar **aggregated generating facilities** power limit posted to the AESO website

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in accordance with subsection 7(1):

- (a) notify **market participants** no less than thirty (30) **days** in advance of the amended methodology coming into effect; and
- (b) post the amended methodology to the AESO website on the date the amended methodology comes into effect.

#### Revision History

| Date       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| xxxx-xx-xx | Revised the applicability section to include solar aggregated generating facilities and to apply to an aggregated generating facility that has a gross real power capability equal to or greater than 5 MW; added real power and ramp rate limitations requirements; revised the requirement to issue a power limit pro rata share from when a predetermined criterion is met to at the start of each monitoring interval; removed the methodologies used to calculate the Alberta system wind power limit and pro rata share; added subsection 7; revised subsection 4 to allow the energy market merit order provisions of the ISO rules and pro rata share to occur concurrently; and administrative amendments. |
| 2015-04-01 | Rule references have been updated in subsection 5(1)(a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2015-04-01 | The words “or dispatch” were added in subsection 5(1)(b).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2013-01-08 | Previously defined terms have been un-defined and the words have been un-bolded.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2011-12-01 | Initial release.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |