

ISO Rules

Part 200 Markets

Division 206 Capacity Market

Section 206.3 Uniform Capacity Value Determination



External Consultation Draft
October 22, 2018

Applicability

- 1 Section 206.3 applies to:
 - (a) a **capacity market participant**; and
 - (b) the **ISO**.

Requirements

Calculating Uniform Capacity Value for Associated Assets

2 The **ISO** must calculate a **uniform capacity value** in accordance with this section 206.3 for an asset associated with a **capacity market participant** in accordance with the timelines specified in the *Capacity Market Auction Guidelines*.

Selection of Tightest Supply Cushion Hours

3(1) The **ISO** must, subject to subsection 3(2), select 250 hours from each of the previous 5 consecutive periods dating November 1 to October 31 in as follows:

- (a) calculate the supply cushion for every hour;
- (b) rank all hours based on supply cushion in ascending order;
- (c) within the order referred to in subsection 3(1)(b), rank hours with equivalent supply cushion in ascending order from the most recent to the most distant of time;
- (d) remove any hours in which there was a state of market suspension; and
- (e) select the first 250 hours after ranking and removing hours in accordance with subsections 3(1)(b) through 3(1)(d).

(2) The **ISO** must select the 250 hours from the most recent 12 **month** consecutive period dating November 1 to October 31 using the methodology in subsection 3(1) for a load asset providing a **firm consumption level**.

Asset Specific Hours for Uniform Capacity Value Calculation

4(1) The **ISO** must create a historical data set for an asset by identifying and removing the following hours from the hours referred to in subsection 3(1) or 3(2), as applicable, on an asset-specific basis:

- (a) an hour in which an asset was not energized and commissioned;
- (b) an hour that the **ISO** determines that the asset was affected by:
 - (i) an event of limited markets operations, war, invasion, armed conflict, blockade, act of public enemy, riot, revolution, insurrection, act of terrorism, sabotage, act of vandalism, fire or explosion that does not originate at the asset, lightning, earthquake or flooding; and
 - (ii) a **mothball outage** or temporary economic **delist outage**;
- (c) an hour in which the asset was **commissioning**;
- (d) in the case of an import asset, an hour in which the relevant transfer path was unavailable as a result of an issue on the **transmission system** in Alberta;

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- (e) in the case of a **long lead time asset**, an hour in which:
 - (i) the **capacity market participant** submits to the **ISO**, in accordance with the timelines prescribed in the *Capacity Market Auction Guidelines*, that the asset was in a long lead time configuration and is synchronized or is able to become synchronized within 1 hour but has varying start up times for distinct portions of its generating capability, and requires more than 1 hour to deliver such additional portions of the asset's generating capability; and
 - (ii) the **ISO** determines that the short-run marginal costs of the asset, using the methodology outlined in Section 203.5 of the **ISO rules**, *Energy Market Mitigation*, exceed the **pool price**.
- (f) notwithstanding 4(1)(e), for the first 3 **obligations periods**, an hour in which:
 - (i) the **capacity market participant** submits to the **ISO**, in accordance with the timelines prescribed in the *Capacity Market Auction Guidelines*, that the asset was in a long lead time configuration and is synchronized or is able to become synchronized within 1 hour but has varying start up times for distinct portions of its generating capability, and requires more than 1 hour to deliver such additional portions of the asset's generating capability; and
 - (ii) the **capacity market participant** submits to the **ISO**, in accordance with the timelines prescribed in the *Capacity Market Auction Guidelines*, the short run marginal costs that exceed the **pool price** for the hour including:
 - (A) the heat rate in GJ/MWh;
 - (B) the fuel price in \$/GJ;
 - (C) carbon intensity in tonnes of CO₂/MWh; and
 - (D) variable operations and maintenance costs in \$/MWh.

(2) The **ISO** must remove subsections 4(1)(f) and 4(2) on or about the day the **rebalancing auction** for the third **obligation period** is concluded.

Application of Methodologies for Uniform Capacity Value Calculation

5(1) The **ISO** must, subject to subsection 5(2), when calculating a **uniform capacity value** for an asset, apply the methodologies in subsections 6 and 7, rounded to the nearest integer, as follows:

- (a) if the number of hours in the asset's historical data set determined in accordance with subsection 4 is greater than or equal to 300 hours and less than or equal to 1250 hours, use the applicable methodology in subsection 6;
 - (b) if the number of hours in the asset's historical data set determined in accordance with subsection 4 is greater than or equal to 1 hour and less than 300 hours:
 - (i) use the applicable methodology in subsection 6 for the hours in the asset's historical data set; and
 - (ii) use the applicable methodology in subsection 7 for the number of hours that is 300 hours minus the hours in the asset's historical data set;
- or
- (c) if the number of hours in the asset's historical data set determined in accordance with subsection 4 is 0 hours then use the applicable methodology in subsection 7.

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(2) The **ISO** must apply the methodologies in subsections 6 and 7 as follows to calculate a **uniform capacity value** for a load asset providing **firm consumption level**:

- (a) use the methodology in subsection 6(5) for the hours in the asset's historical data set determined in accordance with subsection 3; and
- (b) use the methodology in subsection 7(1)(a) for the number of hours that is 250 hours minus the hours in the asset's historical data set determined in accordance with subsection 4.

(3) The **ISO** must, where the **ISO** applies the methodologies in both subsections 6 and 7, weight the values identified in subsection 5(2)(a) and 5(2)(b) by the hours observed for each of those approaches when calculating the **uniform capacity value** for an asset.

Methodologies for Hours in an Asset's Historical Data Set

6(1) The **ISO** must, subject to subsections 6(2) through 6(8) calculate a **uniform capacity value** for an asset as follows:

- (a) calculate the hourly availability factor for each hour in the asset's historical data set in accordance with the following formula:

$$\text{hourly availability factor}_t = \frac{\text{time weighted available capability}_t}{\text{maximum capability}_t}$$

where:

- (i) *hourly availability factor*_t is the availability factor for hour *t*;
 - (ii) *time weighted available capability*_t is the asset's **available capability** with the weight being proportional to the time the **available capability** was in effect within hour *t*; and
 - (iii) *maximum capability*_t is the **maximum capability** of the asset in hour *t*;
- (b) calculate the average availability factor in accordance with the following formula:

$$\text{average availability factor} = \frac{\sum \text{hourly availability factor}_t}{\text{observed hours}}$$

where:

- (i) *hourly availability factor*_t are the hourly availability factors calculated in subsection 6(1)(a); and
 - (ii) *observed hours* is the numbers of hours in the asset's historical data set;
- and
- (c) calculate the asset's **uniform capacity value** by multiplying the average availability factor in subsection 6(1)(b) by the asset's **maximum capability**.

(2) The **ISO** must calculate a **uniform capacity value** for a wind, solar, or run of river hydroelectric **generating units** or an **aggregated generating facility**, an aggregated asset containing a wind or solar **aggregated generating facility**, or an asset that cannot change generation levels in response to a **dispatch** as follows:

- (a) calculate the hourly capacity factor for each hour in the historical data set in accordance with the following formula:

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$$\text{hourly capacity factor}_t = \frac{\text{metered volume}_t + \text{curtailed volume}_t + \text{applicable ancillary service volume}_t}{\text{maximum capability}_t}$$

where:

- (i) *hourly capacity factor*_t is the capacity factor for hour *t*;
 - (ii) *metered volume*_t is the **metered volume** that was delivered to the interconnected electric system during hour *t*; and
 - (iii) applicable *ancillary service volumes*_t is the volume of electric energy that was subject to a **dispatch** for ancillary services during hour *t*; and
 - (A) in the case of an asset that was subject to a **dispatch** for **spinning reserve** or **supplemental reserve**, the volume that was provided pursuant to Section 205.5 of the **ISO rules**, *Spinning Reserve Technical Requirements and Performance Standards* or Section 205.6 of the **ISO rules**, *Supplemental Reserve Technical Requirements and Performance Standards*; and
 - (B) in the case of an asset that was subject to a **dispatch** for **regulating reserve**, the volume that was provided pursuant to Section 205.4 of the **ISO rules**, *Regulating Reserve Technical Requirements and Performance Standards* that is not captured as **metered energy**;
 - (iv) *curtailed volume*_t is a volume that was curtailed as a result of a **transmission market constraint** during hour *t*;
- (b) calculate the average capacity factor in accordance with the following formula:

$$\text{average capacity factor} = \frac{\sum \text{hourly capacity factor}_t}{\text{observed hours}}$$

where:

- (i) *hourly capacity factor*_t are the hourly capacity factors calculated in subsection 6(2)(a); and
 - (ii) *observed hours* is the numbers of hours in the asset's historical data set;
- and
- (c) calculate the asset's **uniform capacity value** by multiplying the average capacity factor in subsection 6(2)(b) by the asset's **maximum capability**.
- (3)** The **ISO** must calculate a **uniform capacity value** for an import asset as follows:
- (a) calculate the hourly availability factor for each hour in the asset's historical data set in accordance with the following formula:

$$\text{hourly availability factor}_t = \frac{\min\{\text{available capability}, \text{long term firm transmission}\}_t}{\text{long term firm transmission}}$$

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where:

- (i) *hourly availability factor* t is the availability factor for hour t ;
 - (ii) $\min\{\text{availability factor}, \text{long term firm transmission}\}_t$ is the lesser of the sum of the import asset's **available capacity** and the import asset's long term firm transmission capacity over the applicable transfer path in hour t ; and
 - (iii) *long term firm transmission* is the import asset's long term firm transmission capacity over the applicable transfer path to the Alberta border;
- (b) calculate the average availability factor in accordance with the following formula:

$$\text{average availability factor} = \frac{\sum \text{hourly availability factor}_t}{\text{observed hours}}$$

where:

- (i) *hourly availability factor* t are the hourly availability factors calculated in subsection 6(3)(a); and
 - (ii) *observed hours* is the numbers of hours in the import asset's historical data set; and
- (c) multiply the average availability factor calculated in subsection 6(3)(b) by the import asset's long term firm transmission over the applicable transfer path.
- (4)** The **ISO** must calculate a **uniform capacity value** for a site with one or more onsite **generating units** or **aggregated generating facilities** that self-supplies **capacity** and receives a **dispatch** on a gross-to-grid basis as follows:
- (a) calculate a gross **uniform capacity value** for the onsite **generating unit** or **aggregated generating facilities** in accordance with the availability factor formula in subsection 6(1); and
 - (b) perform a linear regression of net-to-grid energy as a function of the energy market **dispatches** issued to the onsite **generating unit** on the self-supply site; and
 - (c) translate the gross **uniform capacity value** calculated in subsection 6(4)(a) to a net **uniform capacity value** using the linear regression formula established in subsection 6(4)(b).
- (5)** The **ISO** must, subject to subsection 8, calculate a **uniform capacity value** for a load asset providing **firm consumption level** as follows:
- (a) identify the **metered energy** for the **settlement intervals** with the same **hour ending** as the hour in the historical data set which must be either:
 - (i) the 15 most recent **business days** prior to the day with the hour in the historical data set if the hour falls on a **business day**;
 - (ii) the 10 most recent weekend **days** or holidays prior to the day with the hour in the historical data set if the hour falls on a weekend **day** or a holiday; or
 - (iii) the **days** the **ISO** specifies if, in the 45 **day** period prior to the **day** with the hour in the historical data set, there are fewer than 15 **business days** and 10 weekend **days** when **days** containing **settlement intervals** identified in subsection 6(b) are excluded;
 - (b) determine if any **settlement intervals** referred to in subsection 6(5)(a):
 - (i) occurred on days containing availability hours referred to in Section 206.8 of the **ISO rules**, *Obligation Period Performance Assessment*;

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- (ii) occurred on days containing delivery hours referred to in Section 206.8 of the **ISO rules**, *Obligation Period Performance Assessment*;
 - (iii) occurred on days containing hours identified in subsection 4(1); or
 - (iv) occurred on days containing hours in which the asset was subject to a **directive** for **ancillary services** or the asset received **dispatch** for an amount greater than 0 MW;
- (c) calculate the average hourly **metered energy** where hourly metered energy is the **metered energy** for the **settlement intervals** referred to in subsection 6(5)(a):
- (i) excluding the **metered energy** for the **settlement intervals** identified in subsections 6(5)(b)(i), 6(5)(b)(ii) and 6(5)(b)(iii); and
 - (ii) including the addition to the **metered energy** the volume of the **directive** for **ancillary services** or the volume for **dispatch** in the **settlement intervals** identified in accordance with subsection 6(b)(iv);
- and
- (d) calculate the qualified baseline in accordance with the following formula:

$$\text{qualified baseline} = \frac{\text{total metered energy}}{\text{settlement intervals}}$$

where:

- (i) *total metered energy* is the average of all the hourly **metered energy** values from subsection 6(5)(c) for each of the hours in the historical data set; and
- (ii) *settlement intervals* is the number of hours in the historical data set determined in subsection 6(5)(a).

(6) The **ISO** must calculate a **uniform capacity value** for a load asset providing **guaranteed load reduction** if the load asset has been subject to a **capacity commitment** in a prior **obligation period**, multiply the **guaranteed load reduction** declared in accordance with Section 206.1 of the **ISO rules**, *Qualification of Capacity*, by the load asset's availability factor calculated in accordance with subsection 6(1).

(7) The **ISO** must calculate a **uniform capacity value** for an asset with incremental **capacity** in accordance with the following formula:

$$\text{uniform capacity value} = \text{performance factor} \times (\text{maximum capability} + \text{incremental capacity})$$

where:

- (a) *performance factor* is:
- (i) the average availability factor or average capacity factor calculated in accordance with subsection 6, as applicable;
 - (ii) in the case of an import asset, the average availability factor calculated according to subsection 6(3)(b) derating the value declared, in accordance with Section 206.1 of the **ISO rules**, *Qualification of Capacity*, to reflect the hours in the 1250 hours determined in accordance with subsection 3 where the British Columbia transfer path, Montana transfer path or Saskatchewan transfer path, as applicable, was out of service with an **available transfer capability** of 0 MW.

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and

- (iii) in the case of a load asset, 91%, unless the **ISO** publishes a class average performance factor based on load data from Alberta.
 - (b) *maximum capability* is the **maximum capability** of the asset without considering the incremental capacity; and
 - (c) *incremental capacity* is the volume of incremental **capacity** in MW qualified by the **ISO** pursuant to Section 206.1 of the **ISO rules**, *Qualification of Capacity*.
- (8) The **ISO** must, in the event an asset undergoes a derate in **maximum capability**, calculate a **uniform capacity value** for such asset in accordance with the applicable methodology in subsection 6, substituting the **maximum capability** of the asset for the derated **maximum capability**.
- (9) The **ISO** must, where the **uniform capacity value** for at least 1 asset in an aggregated asset would be calculated in accordance with subsection 6(2), calculate the **uniform capacity value** of the aggregated asset in accordance with subsection 6(2).

Methodologies for Hours not in an Asset's Historical Data Set

- 7(1) The **ISO** must, subject to subsections 7(2) through 7(4), calculate a **uniform capacity value** for an asset as follows:
- (a) multiply the asset's **maximum capability** by the applicable class average performance factor published by the **ISO**;
 - (b) if a class average performance factor is not available, multiply the asset's **maximum capability** by a performance factor derived from engineering studies or equivalent engineering documents, or production or load estimates of the asset; or
 - (c) if a class average performance factor and production or load estimates are not available, multiply the asset's **maximum capability** by a performance factor derived from a review of similar assets in other jurisdictions.
- (2) The **ISO** must calculate a **uniform capacity value** for an import asset by multiplying the value declared in accordance with Section 206.1 of the **ISO rules**, *Qualification of Capacity* by a derate factor that reflects number of hours in the asset's historical data set where the applicable transfer path was out of service with an **available transfer capability** of 0 MW.
- (3) The **ISO** must calculate a **uniform capacity value** for a load asset providing **firm consumption level** in accordance with the following formula:

$$\text{uniform capacity value} =$$

$$(\text{declared qualified baseline} - \text{declared firm consumption level}) \times \text{performance factor}$$

where:

- (a) *declared qualified baseline* is the qualified baseline declared in accordance with Section 206.1 of the **ISO rules**, *Qualification of Capacity*;
- (b) *declared firm consumption level* is the **firm consumption level** declared in accordance with Section 206.1 of the **ISO rules**, *Qualification of Capacity*; and
- (c) *performance factor* is 91%, unless the **ISO** publishes a class average performance factor based on load data in Alberta.

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(4) The **ISO** must calculate a **uniform capacity value** for a load asset providing **guaranteed load reduction** in accordance with the following formula:

$$\text{uniform capacity value} = \text{guaranteed load reduction} \times \text{performance factor}$$

where:

- (a) *guaranteed load reduction* is the **guaranteed load reduction** declared in accordance with Section 206.1 of the **ISO rules**, *Qualification of Capacity*; and
- (b) *performance factor* is 91%, unless the **ISO** publishes a class average performance factor based on load data in Alberta.

Test Requirement for Load Assets

8(1) A **capacity market participant** must demonstrate to the **ISO** the ability of a load asset that was subject to a **capacity commitment** in the immediately preceding **obligation period** to reduce consumption of electric energy reflecting the **uniform capacity value** and maintain the reduction for 1 hour if, in the **obligation period** prior to **obligation period** for which the **ISO** is calculating a **uniform capacity value** in accordance with subsection 7(5), the following was not observed:

- (a) there were no delivery hours as referred to in Section 206.8 of the **ISO rules**, *Obligation Period Performance Assessment*; and
- (b) the asset did not reduce consumption in response to an energy market **dispatch** or **ancillary services** market **directive** to reflect the **uniform capacity value** for the load asset.

(2) The **ISO** must, in the event that the load asset fails the demonstration in subsection 8(1), reduce the **uniform capacity value** for the **asset** to reflect the observed load reduction in 8(1).

Calculation of Ranges for a Uniform Capacity Value

9(1) The **ISO** must, subject to subsection 9(2), calculate ranges for a **uniform capacity value** on an asset-specific basis as follows:

- (a) determine the 5% range rounded to the nearest positive integer, as follows:
 - (i) calculate the upper limit, as follows:
 - (A) remove 5% of the hours identified in the historical data set, in which the asset's availability factor or capacity factor, as applicable, was the lowest;
 - (B) average the asset's remaining availability factor or capacity factor, as applicable; and
 - (C) multiply the average remaining availability factor or capacity factor, as applicable, by the asset's **maximum capability**; and
 - (ii) calculate the lower limit, as follows:
 - (A) remove 5% of the hours identified in the historical data set, in which the asset's availability factor or capacity factor, as applicable, was the highest;
 - (B) average the asset's remaining availability factor or capacity factor, as applicable; and
 - (C) multiply the average remaining availability factor or capacity factor, as applicable, by the asset's **maximum capability**;

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- (b) determine the +/- 2% range rounded to the nearest positive integer, as follows:
 - (i) calculate the upper limit, as follows:
 - (A) 2% multiplied by the **maximum capability**; and
 - (B) added to the **uniform capacity value**;
 - (ii) calculate the lower limit, as follows:
 - (A) 2% multiplied by the **maximum capability**; and
 - (B) subtracted from the **uniform capacity value**;and
 - (c) determine the +/- 1 MW range, as follows:
 - (i) calculate the upper limit by adding 1 MW to the **uniform capacity value**; and
 - (ii) calculate the lower limit by subtracting 1 MW to the **uniform capacity value**.
- (2)** The **ISO** must not calculate the **uniform capacity value** ranges in subsection 9(1) for:
- (a) assets with **new capacity** or refurbished capacity;
 - (b) incremental capacity;
 - (c) a load asset; and
 - (d) an import asset.

Notification of Tightest Supply Cushion Hours and Preliminary Uniform Capacity Values

10(1) The **ISO** must, within the timelines prescribed by the *Capacity Market Auction Guidelines*, publish on the AESO website:

- (a) the 1250 tightest supply cushion hours identified in accordance with subsection 3(1); and
- (b) the class averages referred to in subsection 7(1)(a).

(2) The **ISO** must, within the timelines prescribed by the *Capacity Market Auction Guidelines*, provide the following information to a **capacity market participant** on an asset-specific basis:

- (a) the hours in the historical data set, referred to in subsection 4;
- (b) the **uniform capacity value** calculated in accordance with subsections 5, 6 and 7, as applicable;
- (c) the methodology used to calculate the **uniform capacity value**;
- (d) the greatest of the upper limits calculated in accordance with subsections 9(1)(a)(i), 9(1)(b)(i) and 9(1)(c)(i) to a maximum of the asset's **maximum capability**; and
- (e) the lowest of the lower limits calculated in accordance with subsection 9(1)(a)(ii), 9(1)(b)(ii) and 9(1)(c)(ii) to a minimum of 1 MW.

Uniform Capacity Value Variances

10(1) A **capacity market participant** may, within the timelines prescribed by the *Capacity Market Auction Guidelines*, request to vary the **uniform capacity value** of an asset if:

- (a) the asset has or will undergo a physical change before the start of the **obligation period** that will increase or decrease the **uniform capacity value** of the asset by at least 1 MW; or

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(b) where the class average data, production or load estimates, or jurisdictional assessment used in calculating the **uniform capacity value** in accordance with subsections 7(1)(a)(ii), 7(1)(b) or 7(1)(c), does not create a comparable representation of the asset's future performance.

(2) The **capacity market participant** must, in the request referred to in subsection 9(1), submit to the **ISO** detailed information in support of the request, including, as applicable:

- (a) information regarding a planned or completed physical change to the asset demonstrating that the **uniform capacity value** will increase or decrease by at least 1 MW;
- (b) information supporting why the characteristics, selection criteria and rationale for comparable assets, for class average and jurisdictional assessment requests, are not valid for the asset due to:
 - (i) **maximum capability**; and
 - (ii) available production and load data;
 and
- (c) engineering studies or equivalent engineering documents, or production or load estimates which are specific to the asset at its location, completed by a qualified professional engineer.

(3) The **ISO** must notify the **capacity market participant** of its decision on whether to vary the **uniform capacity value** within the timelines prescribed by the *Capacity Market Auction Guidelines*.

Declaration and Assignment of Final Uniform Capacity Value

12(1) A **capacity market participant** must, in accordance with the timelines prescribed by the *Capacity Market Auction Guidelines*, declare to the **ISO**, as applicable, the **uniform capacity value** within the range identified in subsection 9(1) that it will use for the applicable **base auction** or **rebalancing auction**.

(2) The **ISO** must assign to a **capacity market participant** the **uniform capacity value** for each associated asset in the following order of priority:

- (a) the **uniform capacity value** from the dispute resolution process described in the *Capacity Market Regulation*;
- (b) the **uniform capacity value** from the variance process in subsection 11(2);
- (c) the **uniform capacity value** declared in accordance with subsection 12(1); or
- (d) the **uniform capacity value** calculated by the **ISO** in accordance with subsections 6 and 7, as applicable.

(3) The **ISO** must, in accordance with the timelines prescribed by the *Capacity Market Auction Guidelines*, publish the assigned **uniform capacity values** for all assets qualified for the **obligation period**.

Revision History

Date	Description
xxxx-xx-xx	Initial release