

Proposed New ISO Rule – Section 207.1, *Gross Minimum Procurement Volume*

Period of Comment: September 7, 2018 through September 28, 2018

Comments From: Capital Power

Date [yyyy/mm/dd]: 2018/09/28

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Please provide comments relating to the subsection of the proposed rule in the corresponding box. Please include any views on whether the language clearly articulates the requirement for either the AESO or a market participant, and provide any proposed alternative wording by blacklining the proposed language below.

Section	Subsection	Proposed language	Stakeholder comments
		Applicability	
1		Section 207.1 applies to: (a) the ISO.	
		Requirements Gross Minimum Procurement Volume	
2		The ISO must, for each base auction and rebalancing auction , establish the gross minimum procurement volume that meets the resource adequacy standard in accordance with subsections 3 and 4 below.	<p>Capital Power believes that increased transparency regarding load forecast and probabilistic modeling assumptions is required. Capital Power requests that the data used in the AESO’s models be shared to stakeholders in advance of the forthcoming AUC proceedings to help accelerate the review and approval process.</p> <p>Firstly, the rule should require that the ISO must make its assumptions publicly available. Secondly, given the importance of certain assumptions, Capital Power requests that some assumptions be mandated directly in the rule while an associated information document (ID) could list more specifics about additional data. Capital Power provides specific suggestions below in this document.</p> <p>Given the importance of certain demand inputs, Capital Power’s comments with respect</p>

Section	Subsection	Proposed language	Stakeholder comments
			to subsection 5 provide specific suggestions regarding critical data to be included in an appendix of the rule.
		Base Auction Gross Minimum Procurement Volumes for 2021/2022 and 2022/2023 Obligation Periods	
3		<p>The ISO must establish the gross minimum procurement volumes as follows:</p> <ul style="list-style-type: none"> (a) 18,516 MW of maximum capability for the base auction for the 2021/2022 obligation period based on the assets listed in Appendix A; and (b) 18,597 MW of maximum capability for the base auction for the 2022/2023 obligation period based on the assets listed in Appendix B. 	<p>Capital Power requests greater clarity with respect to the treatment of demand response on the demand and supply side to support the filed numbers. See below subsections 4 and 5 below.</p> <p>Capital Power understands that the AESO is filing the 2022/23 gross minimum procurement volume to comply with AUC Rule 017 section 13.2(k). However, it is not clear to stakeholders whether the AESO will adjust the minimum procurement volume prior to the publication of the <i>Capacity Market Auction Guidelines</i> of the 2022/23 base auction based on benefits of better more up-to-date information. While this number is what is being proposed to be filed for AUC approval, it is not clear whether it will remain unchanged for the 2022/23 base auction with potential detrimental effects. Capital Power's view is that the 2022/23 should be updated closer to the base auction.</p> <p>The rule must specify how and when the minimum procurement volume and demand curve will be published for the rebalancing auctions.</p>
		Probabilistic Model	
4	(1)	<p>The ISO must perform a probabilistic model of resource adequacy that considers the following characteristics:</p> <ul style="list-style-type: none"> (a) the load forecast referred to in subsection 5; (b) the available capability or available generation from all individual generating units and aggregated generating facilities in Alberta that the ISO anticipates will have, for the obligation period, a: <ul style="list-style-type: none"> (i) maximum capability greater than or equal to 5 MW; or (ii) uniform capacity value that is greater than or equal to 1 MW. (c) historical outages of thermal assets, including automatic forced outages, delayed forced outages, planned outages and ambient temperature 	<p>The rule must include a backcast requirement of at least three years for the purpose of calibration and ensuring stakeholder confidence. Capital Power is concerned with recent comments from stakeholders (Demand Curve Set 3 Session on Sep 13, 2018) regarding poor confidence in the AESO's model calibration. As previously stated in Capital Power's comments during the CMD consultation process, a way to address calibration and confidence issues is by performing robust backcasting of the probabilistic model for a minimum of 3 historical years and ideally incorporate years where the system exhibited significant events.</p> <p>The AESO's probabilistic model must include demand response (DR) and this must be reflected in subsection 4. The AESO must make reasonable assumptions regarding</p>

Section	Subsection	Proposed language	Stakeholder comments
		<p>derates, and any projected changes as applicable;</p> <ul style="list-style-type: none"> (d) historical performance of existing intermittent resources, including wind and solar, and any projected changes; (e) anticipated performance of new intermittent resources, including wind and solar; (f) historical performance of hydroelectric generation and any projected changes; (g) historical performance of cogeneration sites in Alberta and any projected changes; (h) the correlation of load and generation at cogeneration sites in Alberta, as applicable; (i) the available transfer capability and gross import offers on the interties; and (j) capacity to maintain regulating reserve. 	<p>DR for modeling completeness, avoid double counting and mitigate any risk of under or over procurement. The AESO has indicated during CMD consultations and rule set 3 capacity market rule stakeholder session, that the load forecast incorporates price responsive load impacts. To the extent these resources participate in the capacity market on the supply side, there is a risk of under-procurement. In addition, given their cost structure, cryptocurrency mining load is anticipated to participate as DR and like price-responsive load, it must be included as a resource on the supply side.</p>
4	(2)	<p>The ISO must, as applicable, make assumptions about the model characteristics identified in subsection 4(1) in order to minimize model error and the risk of over procuring or under procuring capacity to the extent practicable.</p>	<p>The rule should also require the ISO to share the specific assumptions about the model characteristics with stakeholders. This will allow market participants the ability to be able to properly assess the probabilistic model and procurement amount. To this effect, information document (ID) should list the assumptions that the AESO will make available before the base and rebalancing auctions. Specific suggestions regarding minimum amount of information to be provided is listed in the ID comment box at the end of this matrix.</p>
4	(3)	<p>The ISO must add or subtract capacity from the probabilistic model referred to in subsection 4(1) to determine the gross minimum procurement volume that meets the resource adequacy standard.</p>	<p>This subsection or an associated ID must clearly outline how the ISO will add and subtract capacity from the probabilistic model referred to in subsection 4(1) to determine the gross minimum procurement volume. “Aligning with the characteristics of the reference technology” may be adequate when adding “new” capacity but it is too vague when it comes to subtracting from the existing fleet.</p>
		<p>Load Forecast</p>	
5		<p>The ISO must, for the purpose of performing the probabilistic model in subsection 4, complete a forecast of Alberta gross load for a 5-year forward looking period, considering the following variables:</p>	<p>The rule should clearly indicate a requirement on the ISO to make a certain level of information publicly available regarding the load forecast inputs and assumptions. The rule reference a minimum list of critical variables that will be made public, including:</p>

Section	Subsection	Proposed language	Stakeholder comments
		<ul style="list-style-type: none"> (a) economic growth indicators in Alberta including real gross domestic product, population, employment, and natural resource production; (b) weather and temperature data selected from multiple locations across Alberta; (c) load variations in Alberta based on calendar variables, including month of the year, day of the week, hour of the day, daylight savings, and holidays; (d) historical load behaviour in Alberta and any projected changes; (e) performance data from load assets that are qualified to participate in the capacity market to provide demand response; (f) load forecast uncertainty reflecting variability in the load forecast due to weather and economic forecasts; and (g) any other variables that, in the ISO's determination, may maximize the performance of the load forecast model. 	<ul style="list-style-type: none"> • GDP, population, employment, natural resource production and any other key macroeconomic variable historical and forecast used for the development of the model and its results. • Economic forecast uncertainty ranges • Historical demand • DR assumptions for assets that qualify and assets that do not qualify (e.g. current price responsive load) and an explanation of how they are incorporated in the load forecast • Cryptocurrency assumptions given their likelihood to participate in DR • Annual energy and monthly peak demand forecasts • The temperature locations and weights applied to each location <p>Currently, market participants do not have the majority of the above information regarding the load forecast used to derive the gross minimum procurement volume stated in the rule.</p> <p>The rule indicates that the AESO will consider performance data from load assets that are qualified to participate in the capacity market to provide demand response. Given that no DR asset has qualified, the AESO cannot consider any DR in the load forecast according to the rule. However, during the CMD consultations and Set 3 capacity market rule stakeholder session, the AESO indicated that price responsive load has been considered in the preparation of the load forecast. The language in the rule omits this price responsive load, leading to confusion for stakeholders. In this subsection 5, the rule must include "price responsive load" as a consideration to perform the load forecast. In an ID, the AESO must explain the treatment of price responsive load, whether it is adding or subtracting to the forecast based on its historical behavior, to understand its impact on the capacity procurement level and avoid any risk of over or under procurement. The ID should also explain how the AESO will provide DR and price responsive load information before each main and rebalancing auction.</p> <p>The rule must specify that the 5-year load forecast should be the same as the AESO's LTO and, in general, the same load forecasts used for transmission planning purposes. In the event there are variances with other forecasts produced by the AESO, these variances should be explained together with the issuance of the 5-year capacity market projections.</p>

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		<p>Filing of Base Auction Gross Minimum Procurement Volume</p>	
6		<p>The ISO must file the gross minimum procurement volume for a base auction determined in accordance with this section 207.1 with the Commission for approval a minimum of 6 months prior to the publication of the <i>Capacity Market Auction Guidelines</i> for the applicable base auction.</p>	<p>See Section 3 above regarding comments for the 2022/23 gross minimum procurement volume.</p> <p>The rule must specify when procurement volumes for the rebalancing auctions will be established. Together with the rebalancing volumes, the assumptions and results of the load forecast, as well as, any updates to the probabilistic model assumption should be released.</p>
		<p>Applicable Auctions</p>	
7		<p>This Section 207.2 is in effect for the following auctions:</p> <ul style="list-style-type: none"> (a) the base auction and rebalancing auction for the 2021/2022 obligation period; (b) the base auction and rebalancing auction for the 2022/2023 obligation period; (c) the base auction and rebalancing auction for the 2023/2024 obligation period; and (d) the base auction and rebalancing auctions for the 2024/2025 obligation period. 	<p>Subject to the AUC's further consultation and amendments to AUC Rule 017 on application of ISO rules that pertain to the demand curve and related elements of the capacity market, the ISO rule should provide the governance framework and stakeholder consultation process including timelines that the AESO will follow to develop the subsequent set of rules.</p> <p>Also, subject to the AUC Rule 017 amendments, the ISO rules should specify the requirements and process that the AESO will follow to update the load forecast, reliability requirement, net-CONE and demand curve between each of the obligation periods described in this Section 7. The timelines, information to be disclosed by the AESO and engagement process should be specified for main and rebalancing auctions.</p>

Please provide your comments on this rule's appendices:

Appendices A and B should include **reasonable assumptions of DR** as stated in 4(1) above.

Please provide your comments on the following (as set out in AUC Rule 017 s. 13(b-j)):

Item #		Stakeholder comments
1	whether you agree that the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i> relates to the capacity market and why or why not	Capital Power agrees that the proposed rule relates to the capacity market and is, generally, necessary to establish the requirements to meet the reliability standard as legislated by the Government of Alberta.
2	whether you agree that the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i> should [or should not] be in effect for a fixed term and why or why not	Capital Power understands that the AESO’s reliability modeling is in early stages and that, as a matter of common practice, demand curves should generally be re-set every 3 or 4 years and therefore agrees with the rationale for prescribing a fixed term for the proposed rule as proposed in subsection 7.
3	whether you understand and agree with the objective or purpose of the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i> and whether, in your view, the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i> meets the objective or purpose	Capital Power agrees with the objective or purpose of the proposed rule which it understands as defining the gross minimum procurement volume for the base auctions of the capacity market.
4	how, in your view, the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i> affects the performance of the capacity market and the electricity market	Capital Power has no comments at this time.
5	your views on any analysis conducted or commissioned by the AESO supporting the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i>	Greater transparency and analysis around price responsive load and potential future DR is missing.
6	whether you agree with the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i> taken together with all ISO rules and in light of the principle of a fair, efficient and openly competitive market	Capital has no comments at this time.

Item #		Stakeholder comments
7	whether you would suggest any alternatives to the proposed new ISO Rule – Section 207.1, <i>Gross Minimum Procurement Volume</i>	Greater requirements for transparency and disclosure of assumptions and data is needed in the rules and IDs for stakeholder to accept the filed gross minimum procurement volumes.
8	whether you agree that the proposed provisional rule supports ensuring a reliable supply of electricity at a reasonable cost to customers and why or why not	To ensure reliable supply of electricity as well as reasonable costs to customers, the rule must reflect the proper treatment of and accounting for DR. However, these aspects are missing from the currently proposed rule. Capital Power strongly recommends that the rule be revised as proposed above. Lastly, to promote transparency, Capital Power encourages the AESO to develop details in this regard in an associated information document as noted below.
9	whether you agree that the proposed provisional rule supports the public interest and why or why not	Capital Power has no comments at this time.

Please provide your views on the type of content that should be included in an information document associated with the proposed new ISO Rule – Section 207.1, Gross Minimum Procurement Volume.

ID's should be part of the solution to make the reliability modeling more transparent for stakeholders to gain confidence in the AESO's results. The IDs should explain the methodology but should also list the assumptions and data that pertain to the load forecast and probabilistic model that the AESO should make available before each main and rebalancing auction. In addition to the information provided in proposed ID 207.1 Load Forecast and proposed ID 207.1 Minimum Procurement Volume, the AESO must provide a list of data to be made available with the release of the gross minimum procurement volume. In addition to the set of variables provided in comments to section 5 above, such list must include:

- The weights used by the AESO in calculating the economic variable index applied to RQTOA, RHA and RLEMA and any other variable to calculate such index
- Any other consideration and variable used by the AESO to minimize forecast error
- A reasonable representation of the final demand forecast model specification in formulaic form. This should clarify how the weighted index is interacted with calendar and temperature variables
- Historical and forecast planned outage rates by asset or at least by technology class
- Historical and forecast forced outage rates by asset or at least by technology class
- Total cogeneration capacity and specific assets included in the aggregate cogeneration category
- How cogeneration outages (planned and forced) are considered or not in the aggregate cogeneration category
- Manual scheduled planned outages due to cogeneration aggregation
- Extreme, abnormal events excluded from the analysis
- Temperature derate curves applied to gas assets
- Historical and forecast available transfer availability for the interties and additional gross offers applied to the Saskatchewan intertie
- Details regarding DR. Stakeholders need transparent understanding of how price responsive load and any expected DR are treated in the demand forecast and the probabilistic model. The AESO should explain how the methodology once all DR assumptions are taken into account does not double count any resources.
- An explanation of the methodology to add and subtract capacity in the reliability model to arrive at the resource adequacy standard. Details on how the AESO plans to align the concept of “characteristics of reference technology” when subtracting from the existing fleet.

An ID should delineate how the AESO will present the results of the most recent probabilistic model (RAM) backcasts with commentary that explains how the analysis provides enough confidence on the model forward looking results.

An ID should delineate the process, information to be disclosed by the AESO, consultation and timelines to update the rebalancing auctions parameters.

Proposed New ISO Rule – Section 207.2, *Calculation of Net-CONE*

Period of Comment: September 7, 2018 through September 28, 2018
Comments From: Capital Power
Date [yyyy/mm/dd]: 2018/09/28

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Section	Subsection	Proposed language	Stakeholder comments
		Applicability	
		Section 207.2 applies to: (a) the ISO.	
		Requirements Establish Gross-CONE, Energy and Ancillary Services Offset and Net-CONE	The rule must specify that the AESO must define what gross-CONE and Net-CONE values are intended to represent. For example, a levelized value in future dollars that represents annual net revenues that a new generation resource needs to earn to recover its capital investment and fixed costs, given reasonable expectations about future cost recovery over its economic life. Currently, the Brattle report does provide enough characterization of its gross-CONE. However, given the selected methodology, it is unclear to stakeholders what the net-CONE value represents, if it is consistent with Brattle’s nominal levelized approach, and why it does not seem to represent an expectation about future cost recovery over the economic life of the asset (given consideration to only one year).
2		The ISO must establish for each obligation period : (a) a gross-CONE value in \$/kW-year in accordance with subsections 3 and 4, as applicable; (b) an energy and ancillary services offset value in \$/kW-year in accordance with subsection 5; and	The rule must specify that the AESO will establish a gross-CONE value based on a study performed by independent and credible consultant. Even though this is already the case, it should be included to set a precedent for the development of future CONE values.

Section	Subsection	Proposed language	Stakeholder comments
		(c) a net-CONE value in \$/kW-year in accordance with subsection 6.	
		Initial Gross-CONE Value for 2021/2022 Obligation Period	
		The ISO must establish an initial gross-CONE value for the 2021/2022 obligation period of \$244.2/kW-year.	Capital Power supports the AESO's selection of reference technology that best fits the unique aspect of the Alberta market, being one of the most economic, frequently developed, and a technology that does not impede other technologies from competing in the market.
		Calculation of Gross-CONE	
4	(1)	<p>The ISO must calculate the gross-CONE value for every obligation period following the 2021/2022 obligation period in accordance with the following formula:</p> $\text{gross-CONE}_t = \text{gross-CONE}_{t=2021/2022} \times \text{Composite Index}_t$ <p>where:</p> <ul style="list-style-type: none"> (i) t equals the obligation period for which the gross-CONE is being determined; (ii) gross-CONE_t is the gross-CONE value for obligation period t; (iii) $\text{gross-CONE}_{t=2021/2022}$ is the initial gross-CONE value in subsection 3 above; and (iv) Composite Index_t is the composite index value for obligation period t calculated in accordance with subsection 4(2) below. 	
4	(2)	<p>The ISO must, in calculating the gross-CONE $_t$ value under subsection 4(1) above, calculate the Composite Index $_t$ using the following formula:</p> $\text{Composite Index}_t = 0.25 \times \frac{\text{Labour Index}_t}{60.7} + 0.35 \times \frac{\text{Materials Index}_t}{118.5} + 0.40 \times \frac{\text{Turbine US Cost Index}_t \times \text{Foreign Exchange Rate}_t}{268.7}$ <p>where:</p>	In the calculation of gross-CONE, Brattle correctly recognizes that developers will hedge the exchange rate for purposes of purchasing turbines and further assumes that developers will make payments over a period of one year. Recognizing that developers will purchase the turbines in the future and that they will hedge these costs to the extent possible, it does not make sense for the composite index to update the exchange rate assumption with historical exchange rates but instead and to maintain consistency with the initial CONE estimate, the composite index should use the Forward exchange rate.

Section	Subsection	Proposed language	Stakeholder comments
		<ul style="list-style-type: none"> (i) t equals the obligation period for which the gross-CONE value is being determined; (ii) Composite Index_{t} is the composite index value for obligation period t; (iii) Labour Index_{t} is the most recent 12 month average of published Statistics Canada Construction Union Wage Rates (Electrician), Monthly for Edmonton Alberta, Table 18-10-0046-01; (iv) Materials Index_{t} is the most recently published Statistics Canada Gross National and Gross Domestic Income, Indexes and Related Statistics, Annual, Table 36-10-0105-01; (v) Turbine US Cost Index_{t} is the most recent 12 month average of published Federal Reserve Economic Data (St. Louis) Producer Price Index by Industry: Turbine and Turbine Generator Set Units Manufacturing (PCU333611333611); and (vi) USD/CAD Foreign Exchange Rate_{t} is the most recent 12 month average of published Statistics Canada Monthly Average Exchange Rates in Canadian Dollars, U.S. Dollar monthly average, Table 33-10-0163-01. 	
		Calculation of Energy and Ancillary Services Offset	
5	(1)	<p>The ISO must, for every obligation period, calculate the energy and ancillary services offset value in accordance with the following formula:</p> $= \frac{\text{EAS Offset}_t}{(\text{Forward Power Price}_t - \text{Energy Market Expense}_t) \times \text{Forward Product Energy}_t} \times \text{Nameplate Capacity} \times 1000$ <p>where;</p> <ul style="list-style-type: none"> (i) t equals the obligation period for which the energy and ancillary services offset is being determined; (ii) EAS Offset_{t} is the energy and ancillary services offset for obligation period t; (iii) Forward Power Price_{t} is the weighted average of the settlements 	<p>Greater clarity and consistency is necessary to understand net-CONE. Contrary to CONE, net-CONE is not a levelized figure. It does not recognize increases or decreases in energy market revenue potential as the Alberta fleet changes over time. It does not recognize that new generation may need higher capacity revenues today due to lower energy prices in the future or lower on-peak/off-peak spreads. An account of how the net-CONE methodology aligns with the gross-CONE methodology in the context of levelizing costs should be provided.</p> <p>The rule should specify that the AESO must provide in an ID greater clarity regarding the criteria to be used in the selection of Forward settlements. If a specific period cannot be provided, the AESO must provide the guidelines and criteria that it will use in selecting a representative settlement period. In addition, to avoid potentially unrepresentative price samples, Capital Power suggests that incorporating a traded-</p>

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		<p>matching the obligation period t, where the settlements are the average over a period determined by the ISO, for the published NGX forward power product in Appendix 1 that yields the highest EAS Offset t for obligation period t;</p> <p>(iv) Energy Market Expense t is the energy market expense value for obligation period t calculated in accordance with subsection 5(3) below;</p> <p>(v) Forward Product Energy t is the forward product energy value for obligation period t calculated in accordance with subsection 5(2) below; and</p> <p>(vi) Nameplate Capacity is equal to 93 MW.</p>	<p>volume criteria – a minimum bid ask spread for a minimum duration posted on a recognized exchange or via broker – could also suffice and, in some cases, may be more appropriate.</p> <p>Capital Power believes that subsection 5(1)(iii) may be prone to confusion as it may give the false impression that the AESO will select the Forward settlement average that maximizes EAS offsets. It is Capital Power’s understanding that this is not the intention. The AESO should consider separating the selection of product argument from the selection of settlements argument.</p> <p>The AESO must ensure that the treatment of taxes in the E&AS offset is consistent with the treatment used by Brattle in the gross-CONE calculation. The Brattle report (p. 45) recognizes that corporate income tax rates affect both the cost of capital and cash flows in the financial model used to calculate CONE. It appears that income taxes are missing in the E&AS model.</p>
5	(2)	<p>The ISO must, in calculating the EAS Offset t under subsection 5(1) above, calculate the Forward Product Energy t using the following formula:</p> $\text{Forward Product Energy}_t = \text{Average Capacity} \times (1 - \text{Forced Outage Rate}) \times \text{Forward Product Hours}_t$ <p>where:</p> <p>(i) t equals the obligation period for which the generation is being determined;</p> <p>(ii) Average Capacity is equal to 87 MW;</p> <p>(iii) Forced Outage Rate is equal to 3.0%; and</p> <p>(iv) Forward Product Hours t is the number of hours defined in the ICE NGX Contracting Party Agreement for the forward power product associated with the Forward Power Price in subsection 5(1)(iii) above, for obligation period t.</p>	<p>Further to the above comments, if the Net-CONE measure is truly meant to represent only the first year of operation, the forced outage rate should be adjusted up for typically higher expected outages in that first year. However, Capital Power suggests that net-CONE should represent an average operating year, as developers make investments for the economic life of assets. As such, the AESO should include an allowance for planned outages in the forward product energy calculation.</p>

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5	(3)	<p>The ISO must, in calculating the EAS Offset t under subsection 5(1) above, calculate the Energy Market Expense t using the following formula:</p> $\begin{aligned} \text{Energy Market Expense}_t &= [\text{Forward Gas Price}_t + (1 + \text{Commodity Fuel Charge}_t)] \times \text{Heat Rate}_t \\ &+ \text{Variable Operations and Maintenance}_t \\ &+ (\text{Emission Intensity} - \text{Established Benchmark}_t) \times \text{Carbon Price}_t \\ &+ \text{Transmission Losses}_t + \text{Trading Charge}_t \end{aligned}$ <p>where;</p> <ul style="list-style-type: none"> (i) t equals the obligation period for which the energy and ancillary services offset is being determined; (ii) Energy Market Expense t is the energy market expense value for obligation period t; (iii) Forward Gas Price t is the weighted average of the settlements matching the obligation period t, where the settlements are the average over the period determined by the ISO in subsection 5(1)(iii), of NGX Phys, FP (CA/GJ), AB-NIT; (iv) Commodity Fuel Charge t is the most recent 12 month average of published NOVA Gas Transmission Ltd NGTL Fuel Usage and Measurement Variance; (v) Heat Rate is equal to 9.677 GJ/MWh; (vi) Variable Operations and Maintenance t is the variable operations and maintenance value for obligation period t calculated in accordance with subsection 5(4) below; (vii) Emission Intensity is equal to 0.50 tonnes of CO2/MWh; (viii) Established Benchmark t is the weighted average of the calendar year values matching obligation period t for an established benchmark for electricity published by a public authority; (ix) Carbon Price t is the weighted average of the calendar year values 	<p>Capital Power submits that the energy market trading charge should be escalated by inflation given the high likelihood that the figure will be periodically updated before the delivery year.</p>

Section	Subsection	Proposed language	Stakeholder comments
		<p>matching obligation period t for the carbon price published by a public authority;</p> <p>(x) Transmission Losses $_t$ is the transmission loss value for obligation period t calculated in accordance with subsection 5(5) below; and</p> <p>(xi) Energy Market Trading Charge $_t$ is the most recent energy market trading charge published on the AESO website.</p>	
5	(4)	<p>The ISO must, in calculating the Energy Market Expense $_t$ under subsection 5(3) above, calculate the Variable Operations and Maintenance $_t$ value using the following formula:</p> $\text{Variable Operations and Maintenance}_t = \text{Variable Operations and Maintenance}_{t=2021/2022} \times \frac{\text{Materials Index}_t}{118.5}$ <p>where:</p> <ul style="list-style-type: none"> (i) t equals the obligation period for which the variable operations and maintenance is being determined; (ii) Variable Operations and Maintenance $_{t=2021/2022}$ is equal to \$4.60/ MWh; and (iii) Materials Index $_t$ for obligation period t is the value in subsection 4(2)(a)(iv) above. 	<p>The variable operations and maintenance expense must be adjusted to the selection of Forward type. The AESO must consider in its variable operating and maintenance charge that \$4.60/MWh is based on baseload operations and that in the event that the AESO switches to on-peak or supper-peak forwards and forward energy, the maintenance charge may very likely become a function of starts and operating costs should be adjusted accordingly.</p>
5	(5)	<p>The ISO must, in calculating the Energy Market Expense $_t$ under subsection 5(2) above, calculate the Transmission Losses $_t$ value using the following formula:</p> $\text{Transmission Losses}_t = \frac{\sum_{i=1}^n \text{Loss Factor}_i}{n} \times \text{Forward Power Price}_t$ <p>where:</p> <ul style="list-style-type: none"> (i) t equals the obligation period for which the transmission losses is being determined; (ii) $i \dots n$ are facilities located in the Fort Saskatchewan area identified in the most recent Loss Factors published on the AESO website; 	

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		<p>(iii) Loss Factor_{<i>t</i>} is the most recent published loss factor values published on the AESO website; and</p> <p>(iv) Forward Power Price_{<i>t</i>} for obligation period <i>t</i> is the value in subsection 5(1)(a)(iii) above.</p>	
		Calculation of Net-CONE	
6	(1)	<p>The ISO must, subject to subsection 6(2), calculate the net-CONE value for every obligation period in accordance with the following formula:</p> $\text{net-CONE}_t = \text{gross-CONE}_t - \text{EAS Offset}_t$ <p>where:</p> <p>(i) <i>t</i> equals the obligation period for which the net-CONE value is being determined;</p> <p>(ii) gross-CONE_{<i>t</i>} is the gross-CONE value in subsection 3 above or the gross-CONE value calculated in accordance with subsection 4 above for the obligation period <i>t</i>, as applicable; and</p> <p>(iii) EAS Offset_{<i>t</i>} is energy and ancillary services offset value calculated in accordance with subsection 5 above for obligation period <i>t</i>.</p>	
6	(2)	<p>The ISO must, if the net-CONE value calculated in subsection 6(1) is:</p> <p>(a) below zero, set the net-CONE value at zero.</p> <p>(b) above the gross-CONE value in subsection 3 or 4, set the net-CONE value at the gross-CONE value</p>	
		Publication of Net-CONE, Data and Indices	
7		<p>The ISO must, publish the net-CONE value determined in accordance with this section 207.2 and the following data and indices in the <i>Capacity Market Auction Guidelines</i> for each base auction and rebalancing auction:</p> <p>(a) Composite Index_{<i>t=2021/2022</i>};</p> <p>(b) Composite Index_{<i>t</i>};</p>	<p>The combined federal and provincial corporate income tax rate may be missing if included in the calculation of E&AS.</p>

Section	Subsection	Proposed language	Stakeholder comments
		<ul style="list-style-type: none"> (c) Labour Index $_t$; (d) Material Index $_t$; (e) Turbine US Cost Index $_t$; (f) USD/CAD Foreign Exchange Rate $_t$; (g) Energy Market Expense $_t$; (h) Forward Power Price $_t$; (i) Forward Product Hours $_t$; (j) Forward Product Energy $_t$; (k) The period determined by ISO refer to in subsections 5(1)(iii), 5(2)(iv) and 5(3)(iii) ; (l) Forward Gas Price $_t$; (m) Commodity Fuel Charge $_t$; (n) (o) Variable Operations and Maintenance $_t$; (o) (p) Emission Intensity; (p) Established Benchmark $_t$; (q) Carbon Price $_t$; (r) Transmission Losses $_t$; (s) Loss Factor $_i$; and (t) Trading Charge $_t$ 	
		<p>Substitute Index or Benchmark</p>	
9		<p>The ISO must, if any of the indices or benchmarks referred to in this section 207.2 are unavailable or not applicable for use in the calculation of the net-CONE value, use another comparable industry index or benchmark and publish the index or benchmark in the <i>Capacity Market Auction Guidelines</i> for each base auction and rebalancing auction.</p>	

Section	Subsection	Proposed language	Stakeholder comments
		<p>Applicable Auctions</p>	
<p>10</p>		<p>This Section 207.2 is in effect for the following auctions:</p> <ul style="list-style-type: none"> (a) the base auction and rebalancing auction for the 2021/2022 obligation period; (a) the base auction and rebalancing auction for the 2022/2023 obligation period; (a) the base auction and rebalancing auction for the 2023/2024 obligation period; and (a) the base auction and rebalancing auctions for the 2024/2025 obligation period. 	<p>Subject to the AUC's further consultation and amendments to AUC Rule 017 on application of ISO rules that pertain to the demand curve and related elements of the capacity market, the rule should provide the governance framework and stakeholder consultation process including timelines that the AESO will follow to develop the subsequent set of rules.</p> <p>Also, subject to the AUC Rule 017 amendments, the AESO rules should specify the requirements and process that the AESO will follow to update the load forecast, reliability requirement, net-CONE and demand curve between each of the obligation periods described in this Section 7. The timelines, information to be disclosed by the AESO and engagement process should be specified for main and rebalancing auctions.</p>

Please provide your comments on this rule's appendices:

Empty comment box

Please provide your comments on the following (as set out in AUC Rule 017 s. 13(b-j)):

Item #		Stakeholder comments
1	whether you agree that the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i> relates to the capacity market and why or why not	Capital Power agrees that the proposed rule relates to the capacity market and, in general, is necessary to determine the net-CONE.
2	whether you agree that the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i> should [or should not] be in effect for a fixed term and why or why not	Capital Power understands that CONE, net-CONE and the demand curve are proposed to be re-set every 3 or 4 years and therefore agrees with the rationale for prescribing a fixed term for the proposed rule as proposed in subsection 7.
3	whether you understand and agree with the objective or purpose of the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i> and whether, in your view, the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i> meets the objective or purpose	Capital Power has no comment at this time.
4	how, in your view, the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i> affects the performance of the capacity market and the electricity market	The proposed E&AS methodology may be prone to volatility and adversely affect investor confidence and the performance of the capacity market. Limited Forward market liquidity three or more years out suggests that forward prices can change drastically from the net-CONE calculation to delivery period and from auction to auction, not to mention that Forwards are more volatile relative to fundamental forecasts. The fact that the type of Forward curve (flat, on-peak, supper-peak) that maximizes E&AS value can change from one auction to the next, further increases the uncertainty around Net-CONE, inflicting further damage on markets performance.
5	your views on any analysis conducted or commissioned by the AESO supporting the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i>	There is lack of analysis that supports the E&AS offset methodology. The approach results in unrealistic operations and capacity factors. Furthermore, the resulting net-CONE does not represent the levelized missing money over the life of the asset. The methodology fails to account for changes in energy revenue potential as the Alberta fleet changes and movements in energy prices over time.
6	whether you agree with the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i> taken together with all ISO rules and in light of the principle of a fair, efficient and openly competitive market	Capital Power has no comment at this time.
7	whether you would suggest any alternatives to the proposed new ISO Rule – Section 207.2, <i>Calculation of Net-CONE</i>	The E&AS methodology would be conceptually stronger if it was complemented with simulations since it could (depending on how it is implemented) actually represent the levelized costs of entry. The simulation approach would limit potential E&AS volatility and anchor the results closer to realistic operations.

Item #		Stakeholder comments
8	whether you agree that the proposed provisional rule supports ensuring a reliable supply of electricity at a reasonable cost to customers and why or why not	Capital Power has reservations regarding the E&AS calculation and the financial assumption used by Brattle that may affect ensuring a reliable supply of electricity at a reasonable cost to customers. On the other hand, the proposed aeroderivative technology supports the entry of resources that better fit the unique nature of the Alberta market and better address the uncertainty around the actual units that will get built in the future. Importantly, the selection of aeroderivative allows a greater set of resources to compete, reduces the risk of market failure and poor reliability risk. In addition, it allows reasonable prices to be achieved through competition.
9	whether you agree that the proposed provisional rule supports the public interest and why or why not	Capital Power has no comments at this time.

Please provide your views on the type of content that should be included in an information document associated with the proposed new ISO Rule – Section 207.2, Calculation of Net-CONE.

If not included in the rule, the AESO's criteria to determine the set of Forward settlements, including things like exclusion of outliers and methodology to assign weights.
The AESO's definition of net-CONE and an explanation of how the net-CONE methodology conforms to the CONE methodology laid out by Brattle.
The spreadsheets or models used to calculate the EA&S.

Proposed New ISO Rule – Section 207.3, *Shape of Demand Curve*

Period of Comment: September 7, 2018 through September 28, 2018

Comments From: Capital Power

Date [yyyy/mm/dd]: 2018/09/28

Contact: Ricardo Rangel Ruiz

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Email: rrangelruiz@capitalpower.com

Please provide comments relating to the subsection of the proposed rule in the corresponding box. Please include any views on whether the language clearly articulates the requirement for either the AESO or a market participant, and provide any proposed alternative wording by blacklining the proposed language below.

Section	Subsection	Proposed language	Stakeholder comments
		Applicability	
		Section 207.3 applies to: (a) the ISO.	
		Requirements Establish Preliminary Demand Curve	
2	(1)	The ISO must, for the purpose of establishing a preliminary demand curve in accordance with subsection 2(2), estimate the net minimum procurement volume in subsection 3 below based on the most recent uniform capacity values calculated by the ISO in accordance with Section 206.3 of the ISO rules, Uniform Capacity Value Determination	As commented above regarding procurement volumes, the rules must specify when the demand curve adjusted for updated volumes will be published for purposes of the rebalancing auctions.
2	(2)	The ISO must, for each base auction and rebalancing auction , establish a preliminary downward-sloping convex demand curve with the following: (a) a horizontal section from 0 MW to the estimate of the net minimum procurement volume in subsection 2(1), at a price cap that is the greater of: (i) 1.75 times the adjusted net-CONE in subsection 4; or (ii) 0.5 times gross-CONE established in accordance with Section 207.2 of the ISO rules , <i>Calculation of Net-CONE</i> divided by 0.8; (b) a downward-sloping section from the estimate of the net minimum	As can be inferred from CMD Final and the last set of materials presented by Brattle on June 14, 2018, Brattle performed all the demand curve performance analysis based on gross capacity and more specifically before netting out self-supply and REP volumes. It is unclear if it was done before or after converting other assets MCs to uniform capacity. Based on the demand rule as written, the demand curve can change drastically depending on the amount of self-supply and final uniform capacity selected by market participants (the latter within minimum and maximum ranges provided by the AESO). Brattle's analysis shows a demand curve with a width (max – min volumes) of around 2000 UCAP MW, while a demand curve that nets out the expected self-supply and REP as reported by the AESO, results in a demand curve width of about 1600 UCAP MW.

Section	Subsection	Proposed language	Stakeholder comments
		<p>procurement volume in subsection 2(1) at the price cap in subsection 2(2)(a) to an inflection point set at a multiplier of 0.875 times the adjusted net-CONE in subsection 4 below at a quantity 7% above the estimate of the net minimum procurement volume; and</p> <p>(c) a downward sloping section from the inflection point in 2(1)(b) to a price floor of zero dollars at a quantity 18% above the estimate of the net minimum procurement volume.</p>	<p>Once converted to MC, this UCAP difference amounts to a significant 500 MW in width difference. The width and consequently the shape are also at the mercy of whether market participants choose uniform capacities generally at the upper or lower ranges to be provided by the AESO.</p> <p>Consequences:</p> <ul style="list-style-type: none"> • Although Capital Power does not agree with Brattle’s tuning methodology of the demand curve and thinks that the risk of under-procurement is overstated in their analysis. Brattle and the AESO have not proven that the gross analysis yields the same results after netting self-supply and REP, that the different width demand curves will yield the same reliability results of breaching the minimum reliability requirement of 0.0011% EUE 5% of the time. • The RAM, as well as Brattle analyses have been performed for the entire Alberta system and it is difficult to understand how the system’s reliability is not affected by completely different procurement levels -as portrayed by different demand curve shapes- when simply changing how on-site supply decides to participate in the market and the final uniform capacities chosen by market participants. Further explanation from the AESO is required. • Since nobody knows how much onsite generation will select self-supply and what final uniform capacities will be selected, stakeholders cannot asses the likely demand curve. At the extremes, one demand curve may suggest over-procurement while another one under-procurement. <p>One way to overcome the potential errors in translating the Brattle analysis and the uncertainty around the demand curve is to <u>not</u> net out self-supply and REP from the demand curve but to add their volumes at a zero price on the supply side. Depending on how Brattle performed its initial analysis, an adjustment for discrepancies in selection of uniform capacities may be done on the supply side if at all required.</p>
2	(3)	The ISO must publish the preliminary demand curve in the <i>Capacity Market Auction Guidelines</i> for the relevant base auction or rebalancing auction .	See comments in section 2(2) above.
		Net Minimum Procurement Volume	
3		The ISO must, after uniform capacity values are assigned in accordance with Section 206.3 of the ISO rules , <i>Uniform Capacity Value Determination</i> , adjust the gross minimum	The rule should specify that the AESO should perform analysis that demonstrates fungibility among UCAPs of different assets as it relates to their contribution to reliability in

Section	Subsection	Proposed language	Stakeholder comments
		<p>procurement volume established for each base auction or rebalancing auction in accordance with Section 207.1 of the ISO rules, <i>Gross Minimum Procurement Volume</i> to a net minimum procurement volume using the following formula:</p> $Net\ minimum\ procurement\ volume_t = \sum_i^n UCAP_{Actual(i)}$ <p>where:</p> <ul style="list-style-type: none"> (i) <i>t</i> is the obligation period for the base auction or rebalancing auction that the gross minimum procurement volume was established for; (ii) <i>i...n</i> are all the assets modelled in the probabilistic model that established the gross minimum procurement volume for the obligation period; (iii) $UCAP_{Actual(i)}$ is the final uniform capacity value determined in accordance with Section 206.3 of the ISO rules, <i>Uniform Capacity Value Determination</i> for such asset or the most recent estimate of the uniform capacity value for such asset; 	<p>the RAM model to ensure fairness and for the additive function in this section 3 to be valid.</p>
		<p>Adjusted Net-CONE</p>	
		<p>The ISO must, using the following formula, adjust the net-CONE established for each obligation period in accordance with Section 207.2 of the ISO rules, <i>Calculation of Net-CONE</i>:</p> $Adjusted\ net-CONE_t = \frac{net-CONE_t}{0.8}$ <p>where;</p> <ul style="list-style-type: none"> (i) <i>t</i> equals the obligation period for which the adjusted net-CONE value is being determined; and (ii) $net-CONE_t$ is net-CONE value established in accordance with Section 207.2 of the ISO rules, <i>Calculation of Net-CONE</i> in \$/kW-year. 	<p>Since the performance factor of the reference technology is expected to change over time, the rule should reference the performance factor instead of referencing 0.8 to avoid under or over-procurement in any deliverability period.</p>
		<p>Establish Final Demand Curve for Base Auction and Rebalancing Auction</p>	
5	(1)	<p>The ISO must, for each base auction and rebalancing auction, establish a final</p>	<p>See comments in section 2(2) above.</p>

Section	Subsection	Proposed language	Stakeholder comments
		<p>downward-sloping convex demand curve with the following:</p> <ul style="list-style-type: none"> (a) a horizontal section from 0 MW to the net minimum procurement volume in subsection 3, at a price cap that is the greater of: <ul style="list-style-type: none"> (i) 1.75 times the adjusted net-CONE in subsection 4; or (j) 0.5 times gross-CONE established in accordance with Section 207.2 of the ISO rules, <i>Calculation of Net-CONE</i> divided by 0.8; (b) a downward-sloping section from the net minimum procurement volume in subsection 3 at the price cap in subsection 5(1)(a) to an inflection point set at a multiplier of 0.875 times the adjusted net-CONE in subsection 4 below at a quantity 7% above the net minimum procurement volume; and (c) a downward sloping section from the inflection point in 5(1)(b) to a price floor of zero dollars at a quantity 18% above the net minimum procurement volume in subsection 3 below. 	
5	(2)	<p>The ISO must publish the final demand curve prior to the opening of the offering window for each base auction or rebalancing auction.</p>	<p>More detailed should be indicated of what “prior” means. A reasonable amount of time should be provided for market participants to prepare their analyses before the start of the auction. Capital power suggests that the demand curve should be published two months before the offering window.</p>
		<p>Applicable Auctions</p>	
6		<p>This Section 207.2 is in effect for the following auctions:</p> <ul style="list-style-type: none"> (a) the base auction and rebalancing auction for the 2021/2022 obligation period; (b) the base auction and rebalancing auction for the 2022/2023 obligation period; (c) the base auction and rebalancing auction for the 2023/2024 obligation period; and (d) the base auction and rebalancing auctions for the 2024/2025 obligation period. 	<p>Subject to the AUC's further consultation and amendments to AUC Rule 017 on application of ISO rules that pertain to the demand curve and related elements of the capacity market, the rule should provide the governance framework and stakeholder consultation process including timelines that the AESO will follow to develop the subsequent set of rules.</p> <p>Also, subject to the AUC Rule 017 amendments, the ISO rules should specify the requirements and process that the AESO will follow to update the load forecast, reliability requirement, net-CONE and demand curve between each of the obligation periods described in this subsection 7. The timelines, information to be disclosed by the AESO and engagement process should be specified for the main and rebalancing auctions.</p>

Please provide your comments on the following (as set out in AUC Rule 017 s. 13(b-j)):

Item #		Stakeholder comments
1	whether you agree that the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i> relates to the capacity market and why or why not	Capital Power agrees that the proposed rule relates to the capacity market and, in general, is necessary to determine the appropriate shape of the demand curve.
2	whether you agree that the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i> should [or should not] be in effect for a fixed term and why or why not	Capital Power understands that CONE, net-CONE and the demand curve are proposed to be re-set every 3 or 4 years and therefore agrees with the rationale for prescribing a fixed term for the proposed rule as proposed in subsection 7.
3	whether you understand and agree with the objective or purpose of the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i> and whether, in your view, the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i> meets the objective or purpose	Capital Power agrees with the overall objective or purpose of the proposed rule which it understands as defining the shape of the demand curve. However, the specific objective of converting the gross minimum procurement volume to net minimum procurement volume is not proven to be achieved according to units of capacity that are equivalent or fungible.
4	how, in your view, the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i> affects the performance of the capacity market and the electricity market	<p>The performance of the demand curve in terms of reliability is subject to the amount of load that chooses self-supply and final chosen levels of uniform capacity, as different choices of self-supply and uniform capacity will result in different amounts of total capacity demanded for the system as a whole. If different levels of self-supply require different levels of procurement, it follows that different levels of self-supply should have been modeled in the reliability (RAM) and Brattle’s demand simulations, something that was not undertaken. In addition, there would be no reason for increasing or decreasing total demand due to market participants selecting generally higher or lower uniform capacities.</p> <p>One way of avoiding affecting the performance of the demand curve as modeled by Brattle is to adjust self-supply and REP volumes on the supply side.</p>
5	your views on any analysis conducted or commissioned by the AESO supporting the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i>	Analysis is lacking that proves fungibility of UCAP among different resources. It is unclear whether a MW of UCAP is equivalent across assets or even across technology types, something that, in principle and for fairness, the AESO should be striving for. The AESO should validate the consistency of the contribution of assets to reliability between the RAM model and the assigned UCAP in Section 206.3 of the ISO rules.
6	whether you agree with the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i> taken together with all ISO rules and in light of the principle of a fair, efficient and openly competitive market	To the extent that UCAP is not truly a fungible product, something that has not yet been proven, the capacity market will lack fairness.

Item #		Stakeholder comments
7	whether you would suggest any alternatives to the proposed new ISO Rule – Section 207.3, <i>Shape of Demand Curve</i>	See Capital Power’s comments above.
8	whether you agree that the proposed provisional rule supports ensuring a reliable supply of electricity at a reasonable cost to customers and why or why not	The uncertainty posed by different self-supply and uniform capacity opted levels on the shape of the demand curve makes it difficult for stakeholders to assess whether the rule supports reliable supply of electricity at a reasonable cost.
9	whether you agree that the proposed provisional rule supports the public interest and why or why not	Capital Power has no comments at this time.

Please provide your views on the type of content that should be included in an information document associated with the proposed new ISO Rule – Section 207.3, Shape of Demand Curve.

The range of possible demand curves that can be derived according to different chosen levels of self-supply and uniform capacities, including Brattle's curve. An analysis that explains how the different curves achieve the same reliability performance.

An ID that specifies how the AESO will perform analyses that proves fungibility among UCAPs of different assets as it relates to their contribution to reliability in the RAM model for the formula presented in Section 3 to be valid.