Stakeholder Comments and AESO Replies Matrix

Proposed New Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume*

Date of Request for Comment:	November 28, 2018		
Period of Comment:	November 28, 2018	through	December 13, 2018

Stakeholder Comments and/or Proposed Alternative Rule Wording	AESO Replies
General	
ATCO Electricity Generation ("ATCO") ATCO previously noted in its comments on Section 207.1, *Gross Minimum Procurement Volume*, submitted to the AESO on September 28, 2018: > ATCO requires more clarity surrounding the process that the AESO would use to subtract capacity from the probabilistic model. It understands that the addition of capacity would be through the inclusion of generic units of the chosen CONE reference technology; the process that the AESO would use to subtract capacity from the incumbent fleet is not clear and should be detailed in the authoritative document. Due to the changes in the resource adequacy modelling, the AESO has had to subtract installed capacity from the modelled Alberta fleet to meet the resource adequacy standard. In the 2021-2022 delivery year, ATCO understands that CRS1 has been removed from the fleet (48MW installed capacity) and that CRS2 has been derated by 9MW. Stakeholders require further clarity around the AESO's choice to remove this particular unit in the probabilistic model. The assumption that CRS1 and partial CRS2 would be the units to be removed needs to be justified. The methodology to make this determination should be detailed in the rule and vetted before the Commission. With regard to further transparency, the Appendix that accompanies the rule should indicate which units are removed or derated to meet the resource adequacy standard; it would also be helpful to indicate which units are being removed/added due to assumptions about the Alberta fleet in the delivery year (e.g. BR3).	As a starting point for the RAM, the AESO determines a base fleet of assets in Alberta for the obligation period, which includes assumptions about additions and retirements. For the estimation of the 2021/2022 and 2022/2023 procurement volumes these assumptions on additions and retirements were made available on several occasions including at AESO's September 13, 2018 consultation session for the Set 3 rules. Please see the AESO's September 13, 2018 "Demand Curve Rules Set 3 Consultation Session" presentation (PDF p. 34 of 62). From this base fleet, the AESO adds or subtracts volumes of capacity (i.e., maximum capability) to establish different levels of installed capacity and then evaluates expected unserved energy (EUE) for each level. The purpose of this exercise is to identify the relationship between installed capacity and resource adequacy (i.e., EUE). In cases where the base fleet results in normalized EUE less than 0.0011%, the AESO removes capacity from the base fleet to identify the exact amount of installed capacity that is needed to meet the resource adequacy standard. Where such subtractions are small, the AESO removes gas units that are similar to the reference technology, such as CRS1, CRS2, CRS3, ENC1 and PH1. Removing units does not mean that these facilities are expected to be mothballed or otherwise unavailable during the obligation period – they are only removed to determine the gross minimum procurement volume. Removing an asset from the RAM, or derating it, does not have any impact on the asset's uniform capacity value (UCAP), or eligibility for the capacity market. The translation of the gross procurement volume (i.e., installed capacity) to the net procurement volume (e.g., uniform capacity) in Proposed Section 207.4, *Shape of the Demand Curve* uses the performance factors calculated in accordance with Proposed Section 206.3, *Uniform Capacity Determination*.

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It is unclear to ATCO how the derate on CRS2 will impact the translation from installed capacity to uniform capacity value. As 9MW is 18.75% of that unit's installed capacity, will the UCV of CRS2 be decreased by 18.75%? Further, it seems inconsistent to model the Alberta fleet during the 2022-2023 delivery year with the reentry of CRS1 and removal of the derate on CRS2. Is there a limit to how much "mothballed" generation can be added to future years to meet the resource adequacy standard before generic build units must be added? To say this a different way, what configuration of the Alberta generation fleet is the reference for the resource adequacy modelling? While CRS1 may have similar characteristics to the chosen reference technology for the generic technology, it is an important consideration that the performance factor of CRS1 will be based on historic data and the performance factor of the generic unit will be taken as given in the model assumptions.	CRS1 was removed and CRS2 was derated to establish the exact amount of installed capacity required to meet the resource adequacy standard for the 2021/2022 obligation period. CRS3, ENC1 and PH1 would have also been appropriate to remove for this purpose. For the 2022/2023 obligation period, the addition of 38 MW above the base fleet is required to meet the resource adequacy standard. The AESO has further clarified in Attachment B - Resource Adequacy Model Inputs for 2021/2022 and 2022/2023 Obligation Periods which assets in Appendix 1 and Appendix 2 of Proposed Section 207.2 have been removed or derated for the purpose of establishing the gross minimum procurement volumes. The AESO noted that the BR3, HRM, DV1, GOC1 are assumed to be retired or mothballed during the 2021/2022 and 2022/2023 obligation periods at the AESO's September 13, 2018 consultation session for the Set 3 rules. Please see the AESO's September 13, 2018 "Demand Curve Rules Set 3 Consultation Session" presentation (PDF p. 34 of 62).
<u>The Cogeneration Working Group ("CWG")</u> The AESO had not provided a draft of Section 207.1 Resource Adequacy Model. All demand curve-related rules are inextricably intertwined. Accordingly, without the full suite of rules related to the demand curve, it is not possible to fully assess Section 207.2 Gross Minimum Procurement Volume at this time. As the AESO has acknowledged in Item 6 of this comment matrix, Section 207.2, must be "taken together with all ISO rules and in light of the principle of a fair, efficient and openly competitive market".	The full suite of demand curve rules has been posted for consultation. The AESO's November 28, 2018 Letter of Notice – New Section 207.2 of the ISO rules, Gross Minimum Procurement Volume clarified that: • the gross minimum procurement volumes for the 2021/2022 and 2022/2023 obligation periods have been moved into proposed new Section 207.2, *Gross Minimum Procurement Volumes*; • proposed new Section 207.1 has been renamed *Resource Adequacy Model*; and • *Calculation of Net-CONE* and *Shape of Demand Curve* have been renumbered to Section 207.3 and Section 207.4, respectively.
Base Auction Gross Minimum Procurement Volumes for 2021/2022 and 2022/2023 Obligation Periods **Subsection 2**	

Stakeholder Comments and/or Proposed Alternative Rule Wording	AESO Replies
Capital Power Corporation ("Capital Power") Capital Power appreciates the AESO's effort to perform a 2018 calibration assessment, which is a step in the right direction of performing more backcasts analyses necessary for model fine-tuning and gaining stakeholder confidence. Capital Power believes that the Rule should explicitly require the AESO to perform robust model calibration against historical data for the benefit of the numbers filed in proposed Section 207.2 and subsequent gross minimum procurement calculations as suggested by Capital Power comments to draft Section 207.1. Unserved energy is a rare phenomenon and more than 2 years of calibration are needed to assess the reliability model accuracy. In addition, the results of the calibration analyses need to examine more of the distribution of supply cushion hours, not just EUE and EEA hours. More information on the performance of the RAM model can be determined by examining a greater portion of the supply cushion distribution. For example, the AESO could calculate, by month-Weekday/Weekend-peak/off-peak/superpeak the average supply cushion from the 200 model runs and the average supply cushion from historical data. This analysis will illustrate whether the model is estimating reliability on a consistent basis with historical experience.	As noted in the AESO's November 29, 2018 reply to Solas Energy Consulting / Renewable Energy Coalition, the AESO reviewed key inputs in the RAM and performed a calibration against 2018 YTD actuals. The AESO is of the view that performing additional calibrations for years prior to 2017 has limited benefit and will not add value to the assessment of the reasonableness of the gross minimum procurement volumes for the 2021/2022 and 2022/2023 obligation periods for the following reasons: • Years 2014 to 2016, inclusive, experienced a high supply cushion with no observed load shed events. The expected calibrations would not be materially different than the results from the 2017 calibration and therefore, would not provide any additional insight. • For years prior to 2014, the base fleet and inputs into the RAM would be materially different than the current model. These material differences would not provide comparable results. It would not be reasonable to apply insights gained from calibrations to the current model. • The 2017 and 2018 calibrations sufficiently validate the current RAM and demonstrate that the gross minimum procurement volumes in Proposed Section 207.2 are reasonable.
Industrial Power Consumers Association of Alberta ("IPCAA") Given the sensitivity of the gross minimum procurement volume to the RAM inputs, it would be more appropriate not to fix the number in the rule. Fixing the number will make it necessary to continually update the rule. ~~The **ISO** must establish the gross minimum procurement volumes as follows:~~ ~~(a) 18,305 MW of **maximum capability** for the **base auction** for the 2021/2022 **obligation period** based on the assets listed in Appendix 1; and~~ ~~(b) 18,400 MW of **maximum capability** for the **base auction** for the 2022/2023 **obligation**~~ The maximum capability for each base auction for an obligation period will be submitted to the AUC at the commencement of the prequalification period and be based on the methodology described in rule 207.1	The AESO does not agree with the changes proposed by IPCAA. Pursuant to AUC Rule 017, the AESO is required to file the procurement volumes for the first two auctions with the Commission as part of its application for the approval of the proposed provisional rules. The demand curve parameters are embedded in ISO rules in accordance with Part 2.2 of the *Electric Utilities Act,* which dictates that ISO rules are the vehicle for establishing and operating the capacity market. Gross minimum procurement volumes will be based on the methodology in Proposed Section 207.1, *Resource Adequacy Model*. The AESO expects to file a procurement volume for approval with the Commission before the commencement of the qualification period for each auction so that, at the start of the qualification period, the size of the market is known and can be used to inform supply participation and other business decisions. At its December 4, 2018 process meeting, the Commission indicated that is planning to revisit AUC Rule 017 to consider further governance surrounding future procurement volumes.

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TransAlta Corporation ("TransAlta") 18,305 MW of maximum capability for the base auction for the 2021/2022 obligation period based on the assets listed in Appendix 1; and 18,400 MW of maximum capability for the base auction for the 2022/2023 obligation period based on the assets listed in Appendix 2. **The AESO must provide the data, assumption and key inputs for resource adequacy modeling in order for any market participant to make informed comment on the proposed changes.** TransAlta has reviewed the Letter of Notice and Attachment 1 issued on November 28, 2018 but we have no information to truly understand the change other than what the AESO has conveyed. We are concerned that the AESO's own internal analysis had not identified these issues until after it had already issued ID 207.1: Minimum Procurement Volume issued on September 25, 2018 and proposed Section 207.1: Gross Minimum Procurement Volume on October 26, 2018, both of which now need to be revised. These issues speak to lack of meaningful information and data about the resource adequacy modeling that we have repeatedly requested since February 13, 2018. Frankly, it is irreconcilable that the AESO can purport that "during the capacity market design process the AESO was transparent with its resource adequacy modeling assumptions with the Adequacy and Demand Curve Working Group in 2017 and Demand Curve Working Group in 2018" when our requests continue to be ignored. Even with the significant changes being proposed, the AESO has not provided any of the supporting data and analysis that has led to the change in biomass unit planned and forced outages, regulating reserves and intertie distribution. Respectfully, the explanations provided in Attachment 1 do not provide sufficient transparency of the internal analysis or the AESO review process. We ask for further clarity on the following: • Did the AESO update all of its historical data for all of its inputs for the same historical range of data (January 1, 2015 – October 31, 2018) used for the intertie distribution? • Explain why the regulating reserves were lower than 1.5% during "historical tight supply hours"? Please clarify what the AESO is considering "historical tight supply hours" (e.g. 250 tightest hours, supply cushion of less than 500 MWs, etc.). • Provide all planned and forced outage rate assumptions by unit or technology type. • Confirm whether there were any other changes made to inputs (what is the load forecast being	Please see the following attachments accompanying AESO's replies on Proposed Section 207.2: • "**Attachment A – Index of Consultation Materials**" contains links to consultation materials from AESO's website, pinpointing where the AESO shared and discussed inputs, assumptions and summary data related to each of the variables used in modelling the procurement volumes for the 2021/2022 and 2022/2023 obligation periods during the Comprehensive Market Design process or the ISO rule consultation process; • "**Attachment B – Resource Adequacy Model Inputs**" contains the list of assets, intertie data, hydro data, emergency operations data and outage summary statistics used in modelling the procurement volumes for 2021/2022 and 2022/2023 obligation periods; • "**Attachment C – Load Profiles**" contains the 150 load profiles used in modelling the procurement volumes for the 2021/2022 and 2022/2023 obligations; • "**Attachment D – Wind Profiles**" contains the wind profiles used in modelling the procurement volumes for the 2021/2022 and 2022/2023 obligations; • "**Attachment E – Solar Profiles**" contains the solar profiles used in modelling the procurement volumes for the 2021/2022 and 2022/2023 obligations; and • "**Attachment F – Procurement Volume Outputs**" contains the EUE value tables for base auctions, asset list, distribution of EUE values from modelling the procurement volumes for the 2021/2022 and 2022/2023 obligation periods as well as the 2017 and 2018 calibrations. The AESO used an evolutionary process with numerous feedback points to develop the RAM and the procurement volumes starting with the SAM Adequacy and demand curve work group, continuing with CMD Demand curve working group and the broader industry. The working group feedback was generally supportive indicating there was sufficient information to evaluate both the methodology and approach. In response to stakeholder feedback on the Set 3 of the ISO rules for the implementation of the capacity market that the procurement volumes for the 2021/2022 and 2022/2023 obligation periods would result in over procurement, the AESO revisited the RAM and refined the procurement volumes. With respect to TransAlta's first bullet, the AESO confirmed in "Attachment 1 – Gross Minimum Procurement Volume Input and Methodology Review" that only the intertie distribution was updated with

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used and when was that last updated). Furthermore, we believe that the revised gross minimum procurement volumes ought to trigger the implementation of a mechanisms to deal with out-of-market procurements. According to these new numbers, out-of-market procurements have resulted in existing assets no longer being required to meet system resource adequacy requirements in the first obligation period.	data from the historical range January 1, 2015 – October 31, 2018. With respect to TransAlta's second bullet, regulating reserves are not lower than 1.5% during historic tight supply cushion hours (i.e., 250 tightest hours during each of the previous 5 years). The RAM was adjusted to reflect the fact that, on average, only 0.72% of the regulating reserve requirement is not dispatched during tight supply cushion hours. The remaining 0.78% was dispatched and served demand. This indicated that the initial 1.5% assumption was too conservative. With respect to TransAlta's third bullet, planned and forced outage rate assumptions by technology type were presented to the Demand Curve Working Group on August 17, 2018. Please see the AESO's August 17, 2018 "CONE Update, EAS Offset Methodology, CONE Reference Technology Selection" presentation. The changes to the biomass planned and forced outage rate assumptions were provided on November 28, 2018 in "Attachment 1 – Gross Minimum Procurement Volume Input and Methodology Review". Please also see Attachment B – Resource Adequacy Model Inputs. With respect to TransAlta's fourth bullet, the only changes that have been made are the ones conveyed in "Attachment 1 – Gross Minimum Procurement Volume Input and Methodology Review". As part of the Market Roadmap, the AESO has committed to working with stakeholders in 2019 to explore potential distortionary impacts of subsidized resources on the capacity market, as well as potential alternatives for mitigating identified impacts. The revisions to the procurement volumes for the 2021/2022 and 2022/2023 obligation periods do not alter the priority of this initiative.
Appendices 1 & 2	
Capital Power Corporation ("Capital Power") Include reasonable estimate of demand response resources. Articulate accounting of price responsive load and demand response with and without obligations in the load forecast and RAM. See comments on the right. Since demand resources will be allowed to qualify and participate in the auctions from inception of the market, the AESO must include these resources in its resource adequacy modeling and in Appendix 1 of Section 207.2.	Load has the option to participate in the capacity market. Accordingly, the AESO is of the view that it is premature to make assumptions about the participation of load assets on the supply side of the capacity market. At this time no load assets are modeled as capacity resources in the RAM. Future updates to the RAM will take into account load assets that qualify as capacity assets. Outside of the capacity market, load assets can respond to incentives to reduce consumption. Changes to

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It is still unclear how demand resources are accounted for in the demand forecast and interactions in the reliability modeling. Footnote 3 of Attachment 1 (207.2 dated November 29, 2018) indicates that "The 2018 calibration deviates from the procurement volume load forecast methodology by accounting for observed price responsive load impacts to expected unserved energy in 2018. This is considered appropriate for the calibration as it captures observed behavior today, whereas for the 2021/22 and 2022/2023 the obligations and behavior of price responsive load are unknown at this time." If behavior of price responsive load is unknown, what is assumed in the AESO's modeling for 2021/2022 and 2022/2023? If price responsive load obligations and behavior are ignored or omitted in the forecast, what are the implications? What are the implications to the modeling if existing price responsive load assumes (or not) obligations in 2021/2022 and 2022/2023? The AESO has acknowledged that its load forecast considers price responsive load that currently participates in the energy market. The AESO, however, has not articulated how the reliability model (RAM) takes these loads into account under the assumption that they participate or not in the capacity market. In addition, new loads, like cryptocurrency miners, will likely participate as load resources in the capacity market and/or price responsive loads in the energy market and a reasonable effort should be made to consider their impact in the probabilistic model to avoid double counting or omissions that will lead to under or over procurement.	these incentives may be influenced by capacity market cost allocation, tariff redesign and changes in the energy market resulting from the implementation of the capacity market and are unknown at this time. What has been observed historically about price responsive load behaviour is captured in the RAM through the load forecast which is based on historical data. This approach mitigates the risk of over- or under- estimating what price responsive load behaviour will be in the future. If behaviour changes in response to incentives, it will be captured through the historical data used in future load forecasts. For additional information on current price responsive load behavior, please see the AESO's April 6th, 2018 "Price Responsive Load in the Resource Adequacy Model" presentation in the Demand curve working groups materials. The AESO agrees there is some uncertainty on how to treat price responsive loads in the absence of information on their decisions to participate in the capacity market and successful qualification. As such there are small risks to under or over procurement that are unavoidable for the first auctions. Over procurement risk exists if the AESO reconstitutes the load forecast to add back historical price responsive load presuming all those load assets becoming committed capacity and in reality they do not and continue to act as they have historically. Under procurement risks exist if the AESO models price responsive loads as reducing demand in tight supply conditions and then those assets becoming committed capacity. The current approach, where the load forecast captures historical PRL behavior, but the resource adequacy model doesn't model load responsive as a resource to reduce EUE, balances the over and under procurement risk.
<u>The Cogeneration Working Group ("CWG")</u> CRS1 missing, CRS2 derated CRS1 included, CRS2 fully included, Generic Build included The AESO has not provided a rationale for modeling expected unserved energy by excluding and derating the Crossfield units (CRS1 and CRS2). Accordingly, it is not clear whether this is an appropriate modeling approach. Although the Crossfield units may be similar to the generic build, they are likely not identical. It is also unlikely that the Crossfield units are candidates for mothballing or retirement. To assess whether the AESO's modelling approach is appropriate, it is necessary to understand whether the UCV can actually be compared between different types of generation. To that end, stakeholders have made numerous requests to the AESO for an analysis that demonstrates whether the UCV between, for example, a wind farm, simple cycle unit, coal plant, or hydro facility, can be compared on a	Please see the AESO's reply to ATCO's comment under the "General" heading above. The AESO provided its analysis on the UCAP methodology to the Design Working Group over the course of the CMD design process. UCAP calculations for all assets, apart from load assets providing a firm consumption level, will be based on the 250 tightest supply cushion hours in each year during each of the previous 5 years. Supply cushion is a measure of real-time resource adequacy risk. The evaluation of the reliability contribution of assets over the tightest supply cushion hours captures the correlation of each assets' availability and capability to deliver electric energy with system factors that drive periods of system tightness. The AESO is of the view that the UCAP methodology creates a standardized and comparable measure of capacity across all asset types that qualify to participate in the Alberta capacity market.

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unit by unit basis. That is, whether a 100MW wind farm with a UCV of 5 MW provides the same reliability as a 6 MW simple cycle unit with a UCV of 5 MW.	
TransAlta Corporation ("TransAlta") **Please explain why CRS1 is not listed in Appendix 1.** TransAlta reviewed the list of assets in Appendix 1 and noted that CRS1 is no longer listed and the maximum capability for CRS2 has been revised from 48 MW to 39 MW. We request the AESO to confirm these changes and provide explanations as to why the list of assets was changed.	Please see the AESO's reply to ATCO's comment under the "General" heading above

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

Item #		Stakeholder comments	AESO Replies
1	whether you agree that Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume* relates to the capacity market and why or why not	Capital Power Corporation ("Capital Power") 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.	The AESO acknowledges Capital Power's comment.
		The Cogeneration Working Group ("CWG") The CWG agrees. The minimum procurement volume is an element of the demand curve. The demand curve is essential for the capacity market. It is worth noting however, that actual procurement volumes should be approved on different timelines, based on the most current forecast information, for each auction. This will prevent unnecessary inefficiency that would likely result from locking in volumes based on premature assumptions. This issue could be addressed by qualifying the volumes in the rules as preliminary, subject to a future update filing for Commission approval closer to the actual auction. Another solution could be to remove volumes from this rule and to include a requirement of a separate rule filing for Commission approval containing volumes at a later stage, closer to the actual auction.	Please see the AESO's reply to IPCAA's comment on subsection 2 above.
		Industrial Power Consumers Association of Alberta ("IPCAA") IPCAA agrees that this rule relates to the capacity market.	The AESO acknowledges the UCA's comment.
		TransAlta Corporation ("TransAlta") TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO's November 29, 2018 replies to Appendix 1 of TransAlta's November 14, 2018 submission. Please also see the AESO's reply to TransAlta's comment on subsection 2 above.
		Utilities Consumer Advocate ("UCA") Yes, it relates. It is a key component in the capacity market.	Please see the AESO's reply to CWG's comment under the "General" heading

		However, it is UCA's understanding that this section should be titled 207.1 as 207.2 pertains to the calculation of net-CONE.	above.
2	whether you agree that Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume* should or should not be in effect for a fixed term and why or why not	Capital Power Corporation ("Capital Power") Capital Power has no comments at this time.	
		Industrial Power Consumers Association of Alberta ("IPCAA") While the gross minimum procurement volume does need to be defined, it is not appropriate to specify the precise number in the rule. Instead, the rule should point to the procedure to determine the target volume. In turn, the final target volume to be used in the auction should be published closer to the pre-qualification period and again closer to the actual auction itself.	Please see the AESO's reply to IPCAA's comment on subsection 2 above.
		TransAlta Corporation ("TransAlta") TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO's November 29, 2018 replies to Appendix 1 of TransAlta's November 14, 2018 submission. Please also see the AESO's reply to TransAlta's comment on subsection 2 above.
		Utilities Consumer Advocate ("UCA") Yes, the gross minimum procurement volume should be in effect for the fixed term of the obligation period. However, the UCA submits that more information is needed to demonstrate that the stated volume meets the objectives of reliability at the lowest cost for consumers. Considering the many unknowns that will affect the market and the uncertainty inherent in any new design, a short fixed term would be appropriate to allow a revision if necessary	Please see the AESO's reply to TransAlta's comment on subsection 2 above. The AESO must establish a new procurement volume for each base auction and rebalancing auction. Rebalancing auctions will mitigate the risk of changes between when the resource adequacy model is run and the beginning of the obligation period.
3	whether you understand and agree with the objective or purpose of Section 207.1 of the ISO Rules, *Gross Minimum Procurement Volume* and whether, in your view, Section 207.1 of the ISO Rules, *Gross Minimum Procurement Volume* meets the objective or purpose	ATCO Electricity Generation ("ATCO") ATCO believes that the AESO should consider removing the targeted capacity procurement volumes from Section 207.2. ATCO assumes that the AESO is publishing the gross minimum procurement volume in Section 207.2 to comply with 13.2(k) of AUC Rule 017. ATCO submits that the AESO may instead be compliant with 13.2(k) if the targeted capacity procurement volumes are filed as part of the	Please see the AESO's reply to IPCAA's comment on subsection 2 above. Based on the legislative framework that is in place for approving the demand curve parameters and the schedule for the first and second capacity market auctions, there are limited opportunities to make further refinements to the 2021/22 and 2022/23 procurement volumes following the Commission's

		application under additional material rather than as hard-coded values within the ISO Rule. ATCO believes that further modelling refinements may be made after the ISO Rules are provisionally approved by the Commission. For example, if the AESO was to discover a scripting error within the resource adequacy model that changes the resultant targeted capacity procurement volume, under the currently proposed ISO Rule the AESO would be noncompliant. With these latest revisions to the resource adequacy model, it has already been observed that small changes to the model's assumptions can result in material changes to the gross minimum procurement volumes. The better approach may be to have the methodology and process clearly articulated and described in Section 207.2 -- the methodology that the AESO would be required to follow to ensure compliance. If this methodology is then applied in a reasonable and justifiable way, then the resultant targeted capacity procurement volume would be compliant. Further, this would allow the AESO flexibility to correct errors in the modelling process without having to submit changes to the ISO Rule. ATCO is afraid that by including the gross minimum procurement value in Section 207.2, the value becomes more important than the just and reasonable methodology to arrive at the value.	provisional approval of the ISO rules.
		<u>Capital Power Corporation ("Capital Power")</u> Capital Power has no comments at this time.	
		<u>The Cogeneration Working Group ("CWG")</u> The CWG reiterates its concerns in Item 1, above, regarding including actual volumes in this rule. A solution must be found that balances basing procurement volumes on the best and most recent assumptions and the ability of market participants and the Commission to test those assumptions and the resulting procurement volumes.	Please see the AESO's reply to the CWG's comment on Item #1 above.

		TransAlta Corporation (“TransAlta”) TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO’s November 29, 2018 replies to Appendix 1 of TransAlta’s November 14, 2018 submission. Please also see the AESO’s reply to TransAlta’s comment on subsection 2 above.
		Utilities Consumer Advocate (“UCA”) Yes, we understand and agree with the objective of the rule and we support the AESO’s decision to reduce the gross minimum procurement volume. However, the UCA is not convinced that the gross minimum procurement volume stated will meet the capacity market objective of reliability at the lowest cost to consumers and we submit that further information on the AESO’s cost modelling is required. The UCA submits the rule should be changed to include specific inputs from its probabilistic modelling and supporting information about the process used to derive the base auction gross minimum procurement volumes, similar to the draft rule issued on October 22, 2018. In addition, the AESO should exclude the gross minimum procurement values from the rule and include it in its supporting information document. The UCA submits the rule should include a requirement for a stakeholder committee to review the procurement volume methodology and volumes on an ongoing basis to include in the documented process in the rule and file the volumes with the AUC in advance of each prequalification period. Considering the complexity and number of inputs to derive the procurement volume, it is important for there to be a diverse stakeholder group with advanced understanding of the methodology and outcomes to ensure the procurement volumes and shape of the demand curve will achieve the capacity market objectives.	Please see the AESO’s replies to TransAlta’s comment on subsection 2 above, the CWG’s comment under the “General” heading, and IPCAA’s comment on Item #2 above.
4	how, in your view, Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume* affects the performance of the capacity market and the electricity market	Capital Power Corporation (“Capital Power”) Capital Power has no comments at this time.	
		The Cogeneration Working Group (“CWG”) The AESO has proposed to establish the entire demand curve	The AESO is required to establish and operate the capacity market with reference to the resource adequacy standard as per the *Electric Utilities Act*. The

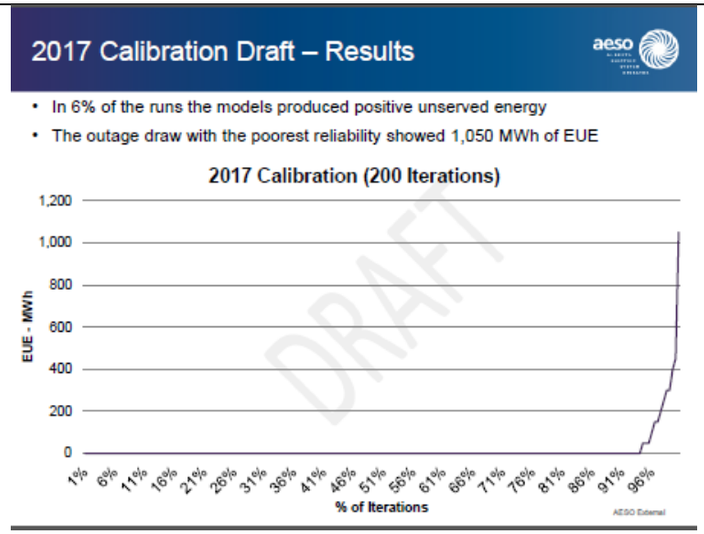
		relative to the minimum procurement volume.[1] Accordingly, Section 207.2 will have an immense impact on both the capacity and the electricity market. This rule will affect how much, and at what price, capacity is procured. As a consequence, this rule will also impact scarcity conditions and energy prices. It is therefore crucial to ensure that the Gross Minimum Procurement Volume is set appropriately. Based on the limited information the AESO made available, the CWG currently considers that the volumes in Section 207.2 are likely inappropriately high. The CWG requires further information, to meaningfully assess this proposed rule. For example, some outstanding questions include: 1. Is UCV from different resources comparable? 2. What information would allow the model to be adequately calibrated? 3. What is the distribution of unserved energy from the model, i.e. how much of the EUE is driven by 'tail' events? 4. Confirmation on the meaning of 'delayed forced outage' and how this is incorporated into the model? 5. How does the model account for the ability to cancel outages? In particular tie-line outages and other outages that can be moved closer to real-time? If not why is this ability in the rule? [1] Suncor disagrees with this proposal as it ignores the legislative mandate in the *Electric Utilities Act* to consider reliability at a reasonable cost. Indeed, this proposal ignores cost.	Government of Alberta has indicated that the resource adequacy standard is a minimum of 0.0011% normalized expected unserved energy. Therefore, the AESO is required to procure capacity to a level such that expected loss of load in an obligation period does not fall below this minimum standard. The following are in response to the CWG's questions: 1. Please see the AESO's reply to the CWG's comment on Appendices 1 & 2 above. 2. The AESO reviewed the distribution of reliability event outcomes and evaluated the performance of simulated variables of the calibrations with actual observations. The AESO is of the view that this information has allowed the model to be adequately calibrated. 3. Please see Attachment F – Procurement Volume Outputs. 4. A delayed forced outage is currently defined as "the unavailability of a facility which is not anticipated and occurs as a result of a deliberate, manual action". These are not currently specified within the model. 5. The model current is not specified to account for delayed forced outages on thermal units due to limitations with outage data. This is a characteristic that the AESO may incorporate for future cycles of the model. Thus, have included in Rule 207.1. It was noted in "Attachment 1 – Gross Minimum Procurement Volume Input and Methodology Review" that for the intertie distribution the AESO identified full outages and have excluded these events from the distribution as to a certain degree they can be cancelled or rescheduled'.
		<u>Industrial Power Consumers Association of Alberta ("IPCAA")</u> It is very clear that the assumptions and the demand forecast used in the AESO's RAM can significantly impact the gross minimum procurement volumes required. Recent changes have reduced the gross minimum procurement volume by over 200 MW. IPCAA	Please see the AESO's replies to TransAlta's comment on subsection 2 above and the CWG's comment on Item #6 below.

		continues to be concerned that the procurement volume is too high, which will lead to detrimental results in the integrated capacity and energy and AS markets.	
		TransAlta Corporation (“TransAlta”) TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO’s November 29, 2018 replies to Appendix 1 of TransAlta’s November 14, 2018 submission. Please also see the AESO’s reply to TransAlta’s comment on subsection 2 above.
		Utilities Consumer Advocate (“UCA”) Gross Minimum Procurement Volume directly affects the capacity market objective of reliability at the lowest cost to consumers. If the procurement volume is set too low, the market will possibly not achieve its reliability objectives. If the volume is too high, the market will over procure capacity resulting in unreasonable costs for consumers and distortions in the energy market. It is disappointing that the AESO has not utilized a comprehensive energy and capacity market pricing models to test outcomes to ensure that the lowest cost overall is being delivered to consumers.	The AESO provided integrated capacity and energy market revenue modelling in January 2018 and in July 2018. Please see the AESO’s November 29, 2018 reply to TransAlta’s comment on Item #5 in TransAlta’s Appendix 1 submitted on November 14, 2018.
5	your views on any analysis conducted or commissioned by the AESO supporting Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume*	ATCO Electricity Generation ("ATCO") The level of analysis and assumptions that the AESO has provided to stakeholders continues to be inadequate. ATCO requires a more transparent approach to the resource adequacy modelling than the AESO is currently using. It is difficult, without having seen the model, to evaluate the conclusions that the AESO has made with regard to the revisions of the following inputs: Biomass Unit Planned and Forced Outages, Capacity to Maintain Regulating Reserves, and Intertie Distribution. ATCO finds it likely that since the AESO is continuing to make alterations to the modelling at this late stage of consultation that further technical workgroup assistance would be beneficial to the efficacy and accuracy of the final version of the resource adequacy model. Stakeholders require time to comprehensively review the complete modelling assumptions and to potentially request further analysis of the AESO related to its	Please see the AESO’s reply to TransAlta’s comment on subsection 2 above.

		modelling.	
		Capital Power Corporation (“Capital Power”) Greater transparency and analysis around price responsive load and potential future demand response (DR) in the capacity market is missing. Please see comments on backcasting and historical calibration above.	Please see the AESO’s reply to Capital Power’s comment on subsection 2 above.
		The Cogeneration Working Group (“CWG”) The CWG appreciates the information provided in Attachment 1 of Section 207.2, which provides some insight as to why the Gross Minimum Procurement Volume changed from the previous draft. However, as highlighted at various stages throughout consultation, there is still not enough information available to generally evaluate the AESO’s reliability modeling. As stated throughout the consultation process, the assumptions the AESO has relied on in its reliability modeling are required to meaningfully comment on the demand curve and any rules relating to the demand curve. The CWG believes that that reduction in Gross Minimum Procurement Volume is a step in the right direction. However, the proposed Gross Minimum Procurement Volume still appears to be high – a concern that can only be addressed through a proper evaluation of the AESO reliability model. In addition to this concern, the CWG has the following specific comments regarding Attachment 1 of Section 207.2: (A) Table 2 and 3 are mislabeled: the title for the first row should in each case be “UE (MWh)” not “EUE (MWh)”. There is an important distinction between unserved energy (UE) and expected unserved energy (EUE). Unserved Energy is the observed or modeled amount of firm load that is shed under a specific set of circumstances. Expected unserved energy is the probability weighted average of the UE over all possible circumstances. The average values in row 1, column 2 for	Please see the AESO’s reply to TransAlta’s comment on subsection 2 above. The following are provided in response to the CWG’s specific comments regarding Attachment 1 of Section 207.2: (A) The AESO agrees that the column labeled “actual” in the first row of the Tables 2 and 3 denotes unserved energy, not expected unserved energy. This, however, does not change the reasonableness or conclusions of the 2017 calibration. The average values in row 1, column 2 for Tables 2 and 3 are the EUE for 2017 and 2018, not approximations. (B) The AESO has provided updated distributions for the 2017 and 2018 calibration results in Attachment F – Procurement Volume Outputs. The AESO notes that there were EEA events in 2017 and 2018, but there was no unserved energy due to resource inadequacy (as of December 19th for 2018). The 2017 and 2018 calibration distributions are consistent with the observed 2017 and 2018 actuals. This demonstrates that the probabilistic model is reasonable. If results had been inconsistent with the distribution range, it may have been indicative of a mis-specified probabilistic model. (C) The AESO understands that CWG is proposing to use a signal point load forecast to calculate EUE. The AESO disagrees with this proposal. Expected unserved energy is dependent on future load, which is uncertain due to economic and weather factors. The AESO accounts for this uncertainty through economic and weather scenarios in the RAM, which is

		Tables 2 and 3 can serve as approximation for the EUE. However, this must be done with caution to the extreme shape of UE distribution. (B) The Calibration Results provided in Tables 2 and 3 provide no insight into the appropriateness of the AESO's reliability model. On June 14, 2018, the AESO provided the following two slides in a presentation titled "Resource Adequacy Modeling update" (https://www.aeso.ca/assets/Uploads/Resource-Adequacy-WG-Update-Jun-14-V5.pdf). **2017 Calibration – Set Up** • As part of the validation process the AESO has used the current version of the model to simulate actual 2017 resource mix and load • Simulated this case with 200 outage draws to provide a distribution of reliability outcomes • The model uses outage draws from parameters based on events that occurred in the previous 5-year period AESO External	an industry best practice.

2017 Calibration	Min	Average	Max	Actual
EUE (MWh)	0	17.5	1,050	0
LOLH (Hours)	0	0.085	2	0
EEA Event (Hours)	0	0.27	10	5 (2 events)

		 The CWG notes that on both slides, the AESO made the previously explained error of mislabeling UE as EUE. This error was identified to the AESO in an industry wide presentation of the material on July 27, 2018. The CWG also notes that Table 2 in Attachment 1 to Section 207.2 is effectively an update of the table reproduced directly above, labelled "2017 Calibration – Set Up". Accordingly, the CWG has assumed that the second slide, also reproduced directly above, labelled "2017 Calibration Draft – Results" can be used to assess the appropriateness of Table 2 and Table 3 in Attachment 1 to Section 207.2. The CWG notes that, based on the shape of the distribution of UE in the 2017 Calibration Draft – Results, reproduced above, scenarios under which UE occurs are very rare. In both Tables 2 and 3 in Attachment 1, the AESO provides its	

		Revised 2017 Calibration Results and Revised 2018 Calibration Results (the "Calibration Results") for the reliability model. It is not clear how the AESO is using these calibration results to validate the reliability model or provide any indication of the appropriateness of the reliability model. Simply because the reliability model likely results in the observed zero UE does not mean that the reliability model adequately represents the system or that the assumptions are reasonable. The data provided is also not sufficient for market participants to perform their own assessments of the appropriateness of the reliability model. The CWG submits that the AESO engage market participants to discuss an appropriate method of calibrating the reliability model. (C) In Table 4 and 5 the AESO provides five load forecast scenarios. It appears that the AESO is also using these load forecast scenarios to model what is required to meet the reliability standard. It is not appropriate to use load forecast scenarios (or scenario analysis generally) for this purpose. Scenario analysis is based on selecting probabilities for the outcomes. There are inherent limitations to selecting these probabilities. Additionally, the limited scenarios used in scenario analysis produces too few results in order to confidently produce an average that reflects the expected outcome. In the CWG's view, in order to determine expected unserved energy, the appropriate method is to use best available forecast for assumptions that can be forecasted, *e.g.* uses "expected" load, and use simulation for assumptions that can't be otherwise forecasted, *e.g.* concurrent forced outages, with the average over a significant number of simulations being a reasonable approximation for the expected result (subject to passing an appropriate convergence test). The CWG submits the AESO should revise its modeling approach accordingly. The CWG further notes that the AESO also has the opportunity to use two rebalancing auctions for a delivery period to procure further capacity, if required.	

		Industrial Power Consumers Association of Alberta (“IPCAA”) The RAM uses historical data, while with the implementation of the capacity market may change participant behavior, especially in areas such as generator outages. A more intuitive model of determining generator outages might be more appropriate in the RAM to account for changes in behavior as a result of the capacity market drivers.	The RAM considers historical outage information as well as projected changes. The AESO is unclear what IPCAA means by a “more intuitive model of determining generator outages”.
		TransAlta Corporation (“TransAlta”) Please see our response to subsection 2(a) and (b) above.	Please see the AESO’s reply to TransAlta’s comments on subsection 2 above.
		Utilities Consumer Advocate (“UCA”) The UCA supports the AESO’s refinements made to the Resource Adequacy Model (RAM) and a reduction in the gross minimum procurement volume. However, with the analysis provided, the UCA is not convinced that an additional 38MW of capacity above the forecasted existing fleet for 2021/22 is needed. It would be helpful for the AESO to show the procurement volume in prior years using the same modeling techniques in order to demonstrate that the model outputs are reasonable	The 2017 and 2018 calibrations demonstrate that EUE was below the resource adequacy standard in these years, meaning that the procurement volumes for 2017 and 2018 would have been less than the capacity available from the market. Please see the AESO’s reply to the CWG’s comment on Item #5 above
6	whether you agree with Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume* taken together with all ISO rules and in light of the principle of a fair, efficient and openly competitive market	Capital Power Corporation (“Capital Power”) Greater requirements for transparency, disclosure of assumptions and data as well as backcast information needs to be mandated in the rule for stakeholder to determine if the gross minimum procurement volume supports the principle of a fair, efficient and openly competitive market.	Please see the AESO’s reply to TransAlta’s comments on subsection 2 above.
		The Cogeneration Working Group (“CWG”) Based on the limited information the AESO made available, The CWG submits that Section 207.2 will lead to inefficient over-procurement of capacity, which leads to unnecessary consumer costs. The CWG further submits that over-procurement will result in depressed energy prices that provide inadequate price signals,	Please see the AESO’s reply to TransAlta’s comments on subsection 2 above. The AESO does not agree that Proposed Section 207.2 will lead to over-procurement of capacity. The gross minimum procurement volumes in Section

		resulting in inefficient real-time outcomes. Consistent over-procurement in the base auction creates an arbitrage opportunity between the base and the rebalancing auctions. By selling capacity in the base auction and buying it back in the rebalancing auction, a market participant could make a profit without having any actual delivery obligation or contributing to system reliability. This may create inappropriate incentives for participation in the rebalancing auctions, inconsistent with the principle of a fair, efficient and openly competitive market.	207.2 represent the capacity required to meet the resource adequacy standard.
		TransAlta Corporation ("TransAlta") TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO's replies to Appendix 1 of TransAlta's November 14, 2018 submission in the AESO Replies to TransAlta's Appendix 1 matrix. Please also see the AESO's reply to TransAlta's comments on subsection 2 above.
		Utilities Consumer Advocate ("UCA") The UCA is concerned that if the procurement volume is too high this will impact the efficiency and competitiveness of the market.	The AESO acknowledges the UCA's comment.
7	whether you would suggest any alternatives to Section 207.2 of the ISO Rules, *Gross Minimum Procurement Volume*	Capital Power Corporation ("Capital Power") An alternative that includes price responsive load and DR in the probabilistic modeling to avoid potential under or over procurement.	Please see the AESO's reply to Capital Power's comment on Appendices 1 & 2 above.
		The Cogeneration Working Group ("CWG") See previous comments.	Please see the AESO's reply to CWG's previous comments.
		Industrial Power Consumers Association of Alberta ("IPCAA") Given the sensitivity of the gross minimum procurement volume to the RAM inputs, it would be more appropriate not to fix the number in the rule. Fixing the number will make it necessary to continually update the rule	Please see the AESO's reply to IPCAA's comment on subsection 2 above.

		TransAlta Corporation (“TransAlta”) TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO’s November 29, 2018 replies to Appendix 1 of TransAlta’s November 14, 2018 submission. Please also see the AESO’s reply to TransAlta’s comments on subsection 2 above.
		Utilities Consumer Advocate (“UCA”) See UCA comments on item 3.	Please see the AESO’s reply to the UCA’s comment on Item #3 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	Capital Power Corporation (“Capital Power”) 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 including likely DR. However, these aspects are missing from the currently proposed rule. In addition, market participants need more transparency and assumptions information to assess the reliability and reasonable costs principles.	Please see the AESO’s replies to Capital Power’s comment on Appendices 1 & 2 above and TransAlta’s comments on subsection 2 above.
		The Cogeneration Working Group (“CWG”) Based on the limited information the AESO made available, the CWG submits that Section 207.2, in conjunction with the other demand curve rules, would lead to excessive costs to consumers. Current estimates suggest that the AESO’s demand curve results in a marginal cost of reliability that is at least an order of magnitude too high relative to the cost of lost load and therefore by no means reasonable.	Please see the AESO’s replies to TransAlta’s comments on subsection 2 above and the CWG’s comment on Item #6 above.
		TransAlta Corporation (“TransAlta”) TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO’s November 29, 2018 replies to Appendix 1 of TransAlta’s November 14, 2018 submission. Please also see the AESO’s reply to TransAlta’s comments on subsection 2 above.
		Utilities Consumer Advocate (“UCA”) The UCA is concerned that the cost may not be reasonable for the	Please see the AESO’s replies to IPCAA’s and TransAlta’s comments on

		reasons stated above. Given that the AESO has made changes to the gross minimum procurement volume since August 2018, the UCA submits there is a need for more transparency regarding AESO's modelling, assumptions and continuous monitoring process to ensure that future corrections are accounted for and consumers are not paying for more reliability than is needed.	subsection 2 above.
9	whether you agree that the proposed provisional rule supports the public interest and why or why not	Capital Power Corporation ("Capital Power") Capital Power has no comments at this time.	
		The Cogeneration Working Group ("CWG") Based on the limited information the AESO made available, the CWG does not consider Section 207.2 to be in the public interest as explained in Items 6 & 8.	Please see the AESO's reply to the CWG's comments on Item #6 and #8 above. Please also see the AESO's reply to TransAlta's comment on subsection 2 above.
		TransAlta Corporation ("TransAlta") TransAlta response filed in Appendix 1 to our November 14, 2018 submission have not changed.	Please see the AESO's November 29, 2018 replies to Appendix 1 of TransAlta's November 14, 2018 submission. Please also see the AESO's reply to TransAlta's comments on subsection 2 above.
		Utilities Consumer Advocate ("UCA") See UCA comments on items 1-8 above. If the cost is too high the public interest is not supported.	Please see the AESO's replies to the UCA's comments on Items #1 through #8 above.