7 Capacity Market Monitoring and Mitigation

Rationale

Capacity market monitoring and mitigation – background

Due to the structure of capacity markets there may be an incentive and ability for a firm to influence market prices to enhance the value of its capacity asset at the expense of other firms or rate-payers. Firms may attempt to influence market price in a number of ways. They may attempt to physically or economically withhold supply from the market to increase prices and augment the value of their remaining capacity assets, or those firms that have a large enough net-short capacity position may be incented to offer capacity at prices below cost to suppress market prices. The purpose of the market power mitigation mechanisms is to prevent such behaviour that introduces inefficiently high or low market prices to the benefit of one firm, at a detriment to the market as a whole.

The need for market power mitigation

The AESO and the Brattle Group have conducted analysis that evaluated the level of competitiveness in the Alberta market. The AESO has determined that the capacity market in Alberta may provide an opportunity for firms to exercise market power under certain conditions; therefore, market power mitigation mechanisms are appropriate.

7.1 Mitigation of supply-side market power

The need for supply-side mitigation

The need for supply-side market power mitigation arises when a capacity market is concentrated, and certain firms control enough capacity asset volumes to effectively exercise market power. Supply-side market power refers to the ability of a firm or group of firms to withhold capacity from the capacity market to increase prices to benefit its remaining capacity assets.

The level of market concentration in the Alberta capacity market can be assessed by calculating the percentage of the total capacity controlled by the largest firms providing supply. The AESO has calculated that the majority of the fleet-wide unforced capacity supply available in the market is controlled by five firms. The results of that calculation are shown in Table 1 below. Table 1 indicates that five firms in Alberta control over 70% of the entire fleet-wide unforced capacity in the market with the top two firms controlling almost 45% of total supply.

Table 1: Portion of the Fleet-wide Unforced Capacity in the Alberta Market Controlled by the Top 5 Firms

Firm	Offer controls based on fleet-wide unforced capacity (includes wind)
Firm 1	26.0%
Firm 2	17.6%
Firm 3	11.6%
Firm 4	8.8%
Firm 5	6.3%
Grand total	**70.3%**

Table 1 above also indicates that the Alberta capacity market will be sufficiently concentrated to raise concerns of market power. Nevertheless, not all firms that control large amounts of fleet-wide UCAP in Alberta have the incentive to exercise market power. The incentive to exercise market power depends on two factors:

1) how responsive the clearing price is to changes in supply due to withheld capacity; and
2) how much additional capacity a firm has left in the market to benefit from the increased price, after withholding a portion of its portfolio UCAP.

For example, consider a firm portfolio size of 500 MW of UCAP, and a competitive market clearing price of $75/kW-year. By withholding 200 MW of its portfolio's UCAP, the firm could increase the clearing price to $100-kW/year, thereby gaining $25/kW-year on the remaining 300 MW of UCAP in its portfolio. While this course of action would result in a gain of $7.5 million to the firm, it would lose $75/kW-year on the withheld 200 MW of UCAP, resulting in a loss of $15 million. In this example, the firm would not have an incentive to withhold capacity from the market.

The AESO and the Brattle Group have conducted a preliminary analysis to determine at what size of a portfolio a firm begins to be incented to withhold capacity. The results of the analysis are dependent on the shape of the supply curve and demand curve utilized in the base auction. The shape of the supply curve and demand curve will determine how responsive the clearing price is to changes in supply due to withheld capacity. The analysis was conducted using six different demand curve shapes currently under consideration for the Alberta capacity market, and an estimated upward sloping supply curve developed by the Brattle Group. Table 2 shows, for each demand curve option and at three different quantities of withheld capacity, the minimum portfolio size at which a firm would have an incentive to withhold capacity.

Table 2 illustrates that using a demand curve with a price cap at 1.75 times net-CONE, based on a resource adequacy target of 400 MWh of expected unserved energy (EUE), a firm with 1,290 MW of UCAP in its portfolio could profitably withhold 110 MW from the capacity auction. This would result in an increase in the clearing price by 10%, or by $13/kW-year. In general, the results of the analysis indicate that a firm with a portfolio size of 1,100 MW of UCAP or greater may have the incentive to withhold capacity from the Alberta capacity market.

Table 2: Preliminary Market Power Incentive Test Results

	550 MW Withheld	225 MW Withheld	110 MW Withheld
Flattest Alberta Curve *400E 1.6x Net CONE Cap*	2,090 MW *$50/kW-yr*	1,770 MW *$20/kW-yr*	1,630 MW *$10/kW-yr*
Middle Alberta Curve *400E 1.75x Net CONE Cap*	1,760 MW *$63/kW-yr*	1,420 MW *$26/kW-yr*	1,290 MW *$13/kW-yr*
Steepest Alberta Curve *400E 1.9x Net CONE Cap*	1,550 MW *$77/kW-yr*	1,210 MW *$32/kW-yr*	1,080 MW *$16/kW-yr*
Flattest Alberta Curve 100E 1.6x Net CONE Cap	2,790 MW $34/kW-yr	2,440 MW $14/kW-yr	2,310 MW $7/kW-yr
Middle Alberta Curve 100E 1.75x Net CONE Cap	2,310 MW $43/kW-yr	1,980 MW $18/kW-yr	1,840 MW $9/kW-yr
Steepest Alberta Curve 100E 1.9x Net CONE Cap	2,020 MW $52/kW-yr	1,690 MW $21/kW-yr	1,560 MW $11/kW-yr

Since the publication of CMD1, the AESO has conducted further analysis on the minimum portfolio size required for a firm to be able to profit from withholding capacity. The AESO examined the minimum portfolio of UCAP required to profitably raise the clearing price by 10% based on the demand curve expected for capacity procurement. In this analysis, the AESO examined the price change along the demand curve and did not use an upward-sloping supply curve. However, the AESO performed the assessment above and below the inflection point on the demand curve to account for the fact that withholding capacity assets at different segments of the demand curve will have different impacts on auction price. The10% increase in clearing price utilized is the average price impact caused by a firm withholding capacity assets as measured on both demand curve segments. This analysis indicated that a firm with approximately 1050 MW of UCAP is able to profitably raise the clearing price by at least 10% through withholding capacity assets. Additional sensitivity analysis illustrated that a small increase in the portfolio size would allow a firm to be able to profitably increase the clearing price by 15%.

The above findings demonstrate that the Alberta capacity market is structurally concentrated, such that there are several firms currently existing in the market that have the incentive and potential ability to exercise market power. To ensure that capacity market results are reflective of competitive outcomes, the AESO has therefore determined that ex ante supply-side market power mitigation measures are necessary. The market power screen threshold will be set at the portfolio UCAP size at which a firm would break-even by economically withholding capacity so as to expect to increase the clearing price by 10%.

The supply-side mitigation measures utilized in other capacity markets provide context and comparison for the measures proposed by the AESO. Table 3 provides a summary of the supply-side mitigation mechanisms employed in several other capacity markets. All the markets described in Table 3 utilize the same supply-side mitigation measures being adopted by the AESO. These are:

a) a must-offer requirement to mitigate physical withholding of capacity;

b) a market power screen to determine which firms could potentially exercise market power;

c) a default offer price cap that applies to all firms that fail the market power screen; and

d) an asset-specific offer price cap for a firm that has failed the market power screen but can demonstrate that its qualified capacity asset's costs are higher than the default offer price cap.

Table 3: Supply-side Mitigation Measures in Other Jurisdictions

Component	PJM	ISO-NE	NYISO	UK	Ireland
Must-offer requirement	Yes	Yes	Yes	Yes	Yes
Market power screen	3 Joint pivotal supplier	Pivotal Supplier	Pivotal Supplier	All resources are mitigated	All resources are mitigated
Default offer price cap	Net-CONE x previous three balancing ratios	Dynamic Delist Bid is the cap; Estimated cost of supplying capacity	Higher of projected auction price or net going forward costs	50% of net-CONE	50% of net-CONE
Asset-specific offer price caps	Yes, based on net going forward costs	Yes, based on net going forward costs	Yes, based on net going forward costs	Yes, based on net going forward costs	Yes, based on net going forward costs

The rationale for each mitigation measure proposed by the AESO is provided below.

7.1.2 Must-offer requirement

The must-offer requirement and the delisting process have been designed to prevent physical withholding in the capacity market. A must-offer requirement is employed by each jurisdiction in Table 3. Requiring all qualified capacity assets to offer into the capacity auction facilitates competitive prices for all firms and rate-payers.

7.1.3 – 7.1.5 Market power screen

The market power screen proposed by the AESO is a structural test designed to identify firms that have a UCAP portfolio large enough to exercise market power. Those firms who pass the market power screen will not be mitigated.

While any price increase caused by withholding capacity would lead to price distortion and an increase in consumer costs, setting a lower threshold percentage may result in over-mitigation due to possible estimation errors of portfolio UCAPs. Therefore, the AESO proposes to set the threshold for the market power screen at the UCAP size that would enable a firm to profitably increase capacity price by at least 10% through economic withholding of its capacity assets.

The AESO also proposes to establish a firm's portfolio size by calculating the average price impacts caused by withholding capacity assets at above and below the inflection point of the demand curve. This methodology is transparent and independent of the assumptions regarding withheld UCAP size, or the estimation of how qualified capacity assets are offered into the auction.

Market power mitigation measures will not be applied rebalancing auctions. The majority of capacity will be procured and cleared in the base auction; therefore, the capacity to be cleared in a rebalancing auction is expected to be minimal. Therefore, both the ability of a firm to profitably withhold capacity to raise the capacity price, and the potential for the clearing price for the rebalancing auction to have an impact on the overall procurement cost, are limited. Not applying market power mitigation measures to a rebalancing auction will reduce the risk of over-mitigation.

While the AESO will not apply market power mitigation measures to a rebalancing auction, a rebalancing auction will be included as part of the auction competitiveness assessment (see subsection 7.3.3). Should this assessment indicate that rebalancing auctions also require mitigation, the market power mitigation measures may be applied to future rebalancing auctions.

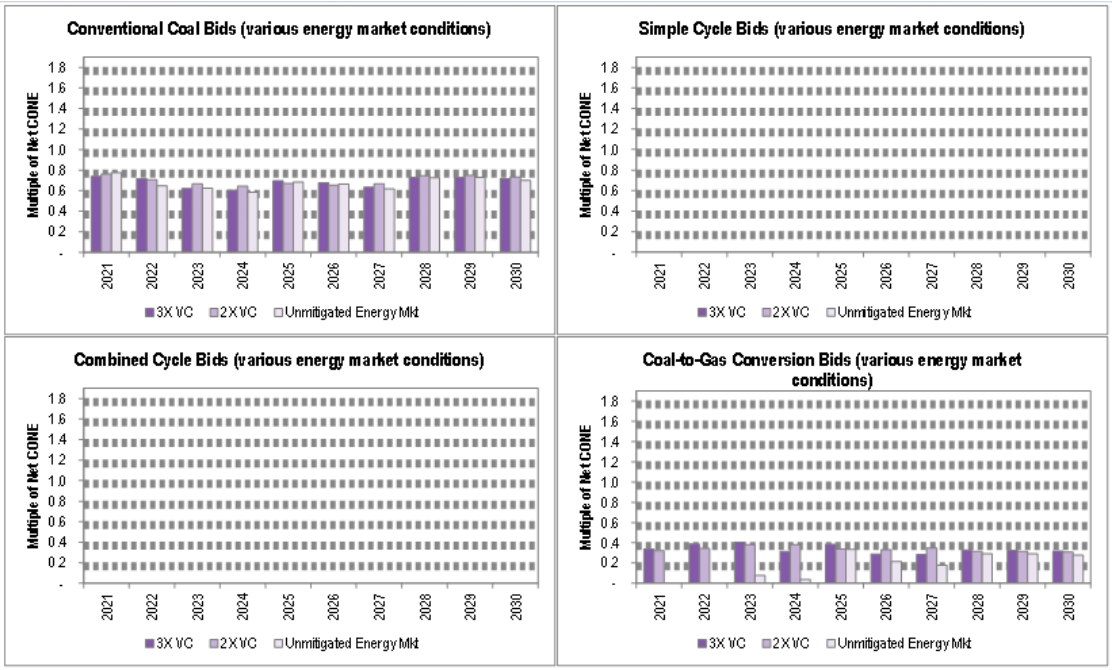
7.1.6 Default offer price cap

The use of a default-offer price cap is an administratively efficient mechanism (i.e., no subjective assessment a firm's behaviour), and focuses mitigation efforts on those assets that have the greatest incentive to exercise market power.

The proposed default offer price cap of 50% of net-CONE was based on an assessment of net going-forward costs for different technology types conducted by the AESO. This analysis estimated net going- forward costs that would need to be recovered in the capacity market, based on different energy market operation assumptions including three different energy market mitigation scenarios. The AESO analysis shows that combined-cycle and simple-cycle gas-fired generation have expected energy and ancillary services revenues above their net going-forward costs. The net going-forward costs of coal-to-gas conversion units that need to be recovered in the capacity market are less than 20% to 40% of net-CONE (the higher number applying before conversion costs are expended and the smaller number applying after conversion costs become sunk costs). The net going-forward costs for conventional coal units that need to be recovered in the capacity market range from 60% to 80% of net-CONE depending on the year and energy market mitigation scenario.

The results of the AESO analysis are shown in Figure 1.

Figure 1: Preliminary estimate of net going-forward costs by technology type



The foregoing analysis provides the rationale for setting the default offer price cap at 50% of net-CONE. This level will allow most technology types to recover their full net going-forward costs and reduce the need for assets to apply for an asset specific offer price cap.

7.1.7 – 7.12 Asset-specific offer mitigation

Asset-specific offer mitigation facilitates the participation of a qualified capacity asset that has avoidable net going-forward costs higher than the default offer price cap, thereby enabling the legal owner of such qualified capacity asset to submit offers at levels reflective of avoidable net going-forward costs. In addition, providing the option for asset-specific offer price caps is intended to avoid over-mitigation, which can drive capacity assets out of the market.

Avoidable net going-forward costs are the costs that can be otherwise avoided by the legal owner of a capacity asset. Such costs are dependent upon whether the capacity asset temporarily delists, or continues to participate in the capacity, energy or ancillary services markets. Using avoidable net going-forward costs as the basis for asset-specific offer price caps is intended to more accurately reflect the price at which the legal owner of a qualified capacity asset, without market power, would be willing to offer into the capacity auction. It is an estimate of the marginal cost of making capacity

available for the delivery period, taking into consideration expected margins from energy market operation. In all delist economic reviews, the expected net energy and ancillary services revenues will be deducted from the avoidable go forward fixed costs of the asset.

As an asset-specific offer price cap is based on avoidable net going-forward costs, a firm that requests an asset-specific offer price cap will be required to submit an asset's avoidable net going-forward costs, include supporting evidence in relation to such costs. Measures to ensure the accuracy of these costs will be required to confirm that submitted costs are reflective of true costs.

A firm may utilize the dispute resolution process if a dispute between the firm and the AESO regarding to assets' avoidable net going-forward costs arises.

7.2 Mitigation of suppliers with net-short positions

The need for mitigation of net-short capacity positions

A firm that has a large enough net-short position (i.e., the firm would benefit from a reduced capacity-auction clearing price due to a load serving obligation that requires it to pay for capacity) may have the ability and incentive to offer capacity into the market below cost in order to reduce prices in the capacity market. This outcome would harm all other firms in the capacity market, and could potentially discourage future capacity investment.

The Brattle Group has conducted a preliminary assessment to estimate the minimum net-short capacity position needed to create the incentive to make uneconomic offers into the capacity market. Similar to the supply-side incentive test described above, the results of this assessment depend on the shape of the final demand curve used in the capacity auction, the cost of the capacity to be offered below cost, and the overall size of a firm's net-short position. The analysis tests the six different demand curves under consideration for use in the Alberta capacity market and is based upon the assumption that the capacity offered below cost is equal to 1.2 x net-CONE. Table 4 illustrates that a firm would need to have a net-short position of at least 370 MW to be incented to offer 110 MW of capacity into the market below cost. Under other demand curve assumptions, the net-short position needed to have this incentive increases.

Table 4: Preliminary estimate of net-short capacity position incentive test

	550 MW Net Short	225 MW Net Short	110 MW Net Short
Flattest Alberta Curve *400E 1.6x Net CONE Cap*	1,200 MW *$31/kW-yr*	770 MW *$14/kW-yr*	640 MW *$7/kW-yr*
Middle Alberta Curve *400E 1.75x Net CONE Cap*	1,150 MW *$33/kW-yr*	640 MW *$18/kW-yr*	520 MW *$9/kW-yr*
Steepest Alberta Curve *400E 1.9x Net CONE Cap*	1,100 MW *$35/kW-yr*	650 MW *$17/kW-yr*	480 MW *$9/kW-yr*
Flattest Alberta Curve 100E 1.6x Net CONE Cap	1,050 MW $38/kW-yr	570 MW $21/kW-yr	460 MW $10/kW-yr
Middle Alberta Curve 100E 1.75x Net CONE Cap	990 MW $42/kW-yr	530 MW $24/kW-yr	380 MW $12/kW-yr
Steepest Alberta Curve 100E 1.9x Net CONE Cap	950 MW $46/kW-yr	500 MW $25/kW-yr	370 MW $13/kW-yr

Some firms in Alberta may a have net-short capacity position, such as a competitive retail entity or a self-supplying load. However, under the capacity cost-allocation structure directed by the government, retailers are not expected to be exposed to capacity cost. Self-supplying loads that are configured on a net-to-grid metering basis will not have a net-short capacity position because they are not permitted to offer into the capacity market (i.e., they would not be assigned a UCAP). In addition, none of the self-

suppliers whose UCAP is determined on a gross metering basis currently have a net-short position large enough to allow them to profitably exercise buyer-side market power. Based on this, the AESO has determined that no mechanism for mitigating net-short (or buyer-side) market power is required at this time. This may need to be reviewed in the future if changes to portfolio compositions, UCAP determination for self-suppliers, or capacity cost allocation structure occur.

The AESO has also determined that implementation of a minimum-offer price requirement (MOPR) on identified net-short firms for the purpose of mitigating market power that may arise due to net-short positions in the Alberta market, is not required at this time. This is due to the preliminary expectation that there are no firms with a large enough net-short position to create the incentive and ability to gain from artificially suppressing capacity prices. The incentive analysis conducted by the Brattle Group, as described above, indicates that a firm in Alberta would need to have a net-short capacity position over 370 MW to be incented to make uneconomic offers into the capacity market.

A preliminary analysis of the Alberta market suggests that no firms are likely to have such a large net-short position. The main difference between Alberta and other capacity markets, where net-short capacity positions would be more likely, is that there are no load serving entities (LSEs) in Alberta with captive customers and that control a small amount of supply. LSEs with captive customers would be able to build a new capacity asset and recover costs from its ratepayers, while offering the capacity into the market below cost. Although this is not expected to be a significant concern in Alberta, there are certain firms, such as Regulated Rate Option (RRO) providers, competitive retail entities, or self-supplying loads that may have a net-short position. Based on the market structure and conditions faced by each of these firms, it is unlikely that they would have a net-short position large enough to provide the incentive to suppress market prices.

- **RRO providers.** The RRO providers in Alberta either do not own capacity assets or are prohibited to share information with an affiliated provider that owns capacity assets. Therefore, although the RRO providers are “naturally” net-short and may be exposed to the capacity market price, they do not have the ability to exercise buyer-side market power in a capacity auction.
- **Competitive retail entities.** Most competitive retail providers in Alberta do not own capacity assets. Even those competitive retail providers that do control some capacity do not have captive customers, implying that they do not have stable and predictable net-short or long capacity positions. If their load migrates to another provider, a net-short capacity position can turn into a net-long position, eliminating the incentive to suppress prices. In addition, pursuant to the capacity cost allocation methodology proposed by the government, these retail entities (despite competitive net-short position) are not exposed to the capacity price because the capacity cost is passed to consumers through the tariff.
- **Self-supplying loads.** The Brattle Group’s analysis indicates that a net-short position of over 520 MW is necessary to create the incentive to suppress prices. However, the net-short positions of self-suppliers are limited due to the size of their industrial processes. In addition, the self-supplying loads whose UCAP is determined on a net metering basis would not have a UCAP to offer into the capacity market if they are net short.

7.3 Reporting of auction statistics and market competitiveness

Auction statistics and capacity market assessments may assist in ensuring the capacity market is competitive, efficient and supporting Alberta’s reliability needs. This process is also intended to provide sufficient information to support business decisions, investor confidence, and allow for industry engagement on potential capacity market design flaws and possible solutions.