Alberta Capacity Market

Comprehensive Market Design (CMD 1)
Design Rationale Document

Section 8: Supply Obligations and Performance Assessments

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8. Availability and Performance Assessments

Input from Working Group Members and Industry Stakeholders through SAM 3.0:

- A majority of working group members agreed:
  - There is a need for a performance measurement framework to assess delivery against capacity obligations.
  - Increasing the number of performance measurement events will recognize the uniqueness of the Alberta market and make payment adjustments more manageable.
  - Non-energy emergency alert (EEA) event performance should be measured on resource availability (where “availability” means that the resource is available for energy market dispatch).
- Working group members were concerned that performance assessment periods only consisting of EEA events (as originally proposed in SAM 1.0) could result in aperformance assessment framework that was difficult to manage, would not incent the appropriate behaviour, and could increase capacity costs.
- Many industry stakeholders shared the working group opinion that the performance period should include tight supply cushion hours as well as EEA events.
  - Some stakeholders disagreed with a performance period beyond EEA events, suggesting that:
    - Additional performance periods will weaken the incentive (i.e. any payment adjustment risk) for resources to show up when capacity is needed the most.
    - Measuring the tight supply hours may have a negative impact on variable generators (e.g. there is an inverse correlation between the tight supply hours and high levels of wind generation) which could act as a barrier for certain resource participation in the capacity market.
  - Generally, working group members and stakeholders were supportive of payment adjustments being revenue-neutral; however, some stakeholders suggested that payment adjustments could be returned to rate payers.

Comparison to SAM 3.0 Rationale:

The AESO's payment adjustment framework is largely consistent with the payment adjustment framework generally agreed to by the working group.

- The framework to be implemented will have both availability and performance measures for capacity resources.
- Capacity resources that over-perform during the performance periods will have the opportunity to benefit from strong performance by being eligible to receive over-performance payment adjustmentss funded by the payment adjustments collected from non-performance payment adjustments.
- The AESO is not providing over-availability payment adjustments to the resources that over-perform during the availability assessment periods. The availability measurement averages the performance of these units over the assessment period, allowing these resources' over-performance relative to their unforced capacity (UCAP) rating during some review hours to offset possible underperformance during other review hours. Any unavailability payment adjustments collected during the obligation period will be returned to load customers.

8.1 Overview of Payment Adjustments

In exchange for capacity payments, capacity resources take on an obligation to maintain their availability throughout the year, to perform when called upon by the AESO during shortage conditions, and to offer into the energy market. These performance assessments and payment adjustment mechanisms provide

a resource-neutral mechanism to encourage supply resources to perform in accordance with their obligations. Capacity resources are expected to reflect the cost of payment adjustments, and the cost of maintaining and improving their reliability into their capacity offers. In the long run, the payment adjustment mechanism will provide a financial signal to capacity resource owners to maintain supply adequacy at lowest cost to consumers, as resources with lower performance risk will have a competitive advantage.

Prior to the start of the obligation period, new resources that are delayed in meeting their in-service date and existing resources that anticipate not being available during the obligation period can engage in asset substitution and purchases in rebalancing auctions to reduce their capacity market obligations in order to avoid payment adjustment risk.

Annual and Monthly Payment Adjustment Exposure Cap:

Under-performing resources will be subject to annual and monthly caps on payment adjustment exposure from the combination of availability and performance assessments. The payment adjustment caps are necessary to protect participants from excessively high risk of participating in the capacity market by keeping payment adjustment exposure in line with revenues. This helps maintain the investment attractiveness of the Alberta market. Total payment adjustment exposure will be capped in two ways:

1. Annual payment adjustment cap: at 130 per cent of the annual capacity revenue based on the higher of i) the annual base auction capacity price, or ii) the last rebalancing auction price, including both performance and availability payment adjustments.
2. Monthly payment adjustment cap: at 300 per cent of the monthly capacity revenue based on the higher of i) the annual base auction capacity price, or ii) the last rebalancing auction price, including both performance and availability payment adjustments. Given annual unavailability payment adjustment settlement as described in the Section 8.4 below, the monthly payment adjustment cap will be applied to the unavailability payment adjustment amount on an average basis during each year (i.e. divide the total annual unavailability payment adjustment by 12 months, and then apply the monthly cap). The monthly cap will prevent a situation in which an annual revenue sized payment adjustment is charged to a capacity resource in a single month. This monthly cap is not set to 100 per cent of monthly revenue, because in a situation when a capacity resource is being charged a non-availability and a non-performance payment adjustment in the same month, a 100 per cent monthly cap could exempt such capacity resource from one of the payment adjustment amounts, reducing incentives to perform as expected.

8.2 Failure to Deliver for New Resources

The non-delivery process provides a mechanism for the AESO to take action prior to the delivery period if it appears that supply will not be available during the delivery period. This helps to ensure required levels of supply adequacy. This process will apply to new resources at significant risk of failing to come online for any reason (such as construction delays). The non-delivery process encourages resources that have sold capacity to bring that capacity online by the start of the obligation period.

Prior to the final rebalancing auction, the AESO will identify committed capacity resources that are unlikely to be operational by the start of the delivery period. For new resources, this assessment will be based on the completion of the development milestones. Resources identified by the AESO will have two options to address their shortcoming: 1) buy out their obligation in the final rebalancing auction, or 2) engage in asset substitution prior to the final rebalancing auction to cover their obligation with supply from another resource.

The goal of this approach is to have resources manage their non-delivery risk prior to the delivery period and to ensure that the AESO is able to meet its reliability obligations through market mechanisms.

8.3 Updates to Qualified UCAP Ratings

In addition to availability and performance assessment in the delivery period, the capacity resources have an incentive for delivering, and maintaining strong ability to perform because the UCAP rating of capacity resources will be annually updated in each auction prequalification round, taking into consideration their recent operational performance. Strong availability and performance in recent years translates to higher UCAP ratings, and therefore, greater potential capacity revenue in the future year. UCAP values will be assessed and updated for every base and rebalancing auction to reflect changes in the resources' capabilities. Payment adjustments during the obligation period create incentives for sellers to meet their forward capacity obligations before the oibligation period by delivering new supply on time, retaining existing capacity, or by securing a replacement capacity resource through rebalancing auction or asset substitution.

8.4 Unavailability Payment Adjustments

Utilizing tight supply cushion hours for conducting availability assessments is intended to encourage availability when the system is at risk of reliability challenges. These hours will not necessarily correspond to emergency event hours where performance payment adjustments are assessed. Availability will be assessed during the same number of hours as the UCAP assessments described in Section 2.3 in order to align incentives and measurement to periods of greatest reliability risk to the system. The goal of this design element is to encourage readiness to be available and compliance to dispatch instructions during the delivery year, particularly in times when the system is at risk.

As the availability assessment is completed through the delivery period on a large number of hours, providers are able to use periods of higher availability to offset periods of lower availability. Due to this ability to average performance throughout the year, over-availability payment adjustments will not be paid in the availability performance assessment framework. Any unavailability payment adjustment amounts collected will be returned to load customers.

The difference in approach is due to the differing goals of performance incentives. While availability payment adjustments are intended to incentivize resources with capacity obligations to be available, on average, over the delivery year, performance incentives are intended to encourage delivery of energy production, ancillary services or demand reduction during a limited number of emergency hours to at least the level of the resources obligation. The need to encourage availability across the year is not as acute as the need to encourage delivery during emergency events, and does not require payments to over-available capacity. We expect energy and ancillary services' prices to provide a strong enough centive to encourage additional availability from resources that are meeting their capacity obligations.

Availability Assessment Period

Unavailability payment adjustments will be assessed by comparing each resource's capacity obligation to its availability during a fixed number of annual availability assessment hours. Availability assessment will be conducted during the delivery period over the 100 tightest supply cushion hours.

Assessing availability during these hours is consistent with how resource UCAP will be determined. The number of recommended hours for the availability assessment (100 hours annually) is based on the average number of hours historically between 2011 and 2017 in which supply cushion was below 400 MW; conditions which characterize system tightness (see Section 2.3) .

Unavailability Volume Definition

During each year, resources with capacity commitments will be required to demonstrate that their actual availability was at least equal, on average, to their committed UCAP (expected availability) during the availability assessment hours.

- For dispatchable resources, actual availability is the amount of MW offered and available during the 100 tightest availability hours in the obligation period.
- For non-dispatchable resources, actual availability is the amount of energy generated during the 100 tightest availability hours in the obligation period, calculated as follows:

Unavailability (MW) = (Expected Availability, MW – Actual Availability, MW) > 0

where Actual Availability = average availability during relevant tightest supply cushion hours, multiplied by total number of assessment hours.

Unavailability Payment Adjustment Rate

Resources with positive unavailability in each year will be assessed a payment adjustment based on the maximum of the capacity resource's base auction price or the latest rebalancing auction price as follows:

Unavailability Payment Adjustment Rate ($/MWh) = 40% x 1.3 x MAX [Annual Base Capacity Auction Price; Annual Last Rebalancing Auction Price]) / 100 hours

Tying the payment adjustment to the auction clearing prices ensures that the payment adjustment level is consistent with the value of supply reflected in the capacity market demand curve. Including the base auction price in the formula ensures that resources will still be exposed to a payment adjustment commensurate with the capacity payment it receives, and will still have an incentive to be available during the delivery period, even if the rebalancing auction clears at a low price. To the extent the rebalancing auction price is higher, this approach also recognizes the most recent price of capacity, which could be reflective of tighter supply conditions, and hence, greater reliability risk.

The factor of 40% is an allocation factor representing the amount of the total payment adjustment to a unit that will occur through the unavailability payment adjustment mechanism. The AESO's choice of a 60% allocation factor to non-performance payment adjustments reflects a higher importance of the committed capacity being delivered during performance events.

The factor of 1.3 scales the total payment adjustment level up above the capacity auction price. A value greater than 1 ensures that resources failing to deliver are exposed to a net payment adjustment, after accounting for capacity revenues they will receive. A value larger than one also discourages speculative capacity sales because by committing to a capacity obligation the resource is at risk of losing more through poor availability and performance than through what might be earned through capacity payments. The value is believed to be of a magnitude that is sufficient enough for capacity resources to retain the incentive to become available later rather than never, but will not be so large that new entrants will be discouraged from participating.

Unavailability Payment Adjustment Mechanism Exemptions

The AESO is proposing to limit the exemption from unavailability payment adjustments to resources constrained by internal Alberta transmission constraints. If a resource's availability is constrained below its obligation due to a binding transmission constraint, the resource will not be exposed to unavailability payment adjustments on the constrained volume of the capacity obligation. Transmission limitations are beyond the control of participants, and given Alberta's transmission policy, would not be expected as normal course of business by participants. Transmission constraints that are foreseeable sufficiently ahead of time will be considered in capacity market clearing as discussed in Section 4.

There will be no other exemptions to availability payment adjustments. As the UCAP calculation for each asset will reflect reduced commitment levels from observed planned and forced outages as well as de-rated conditions, none of these events will be payment adjustment exempt. Committed resources can use the rebalancing auctions and asset substitution process to avoid unavailability and non-performance payment adjustments.

All capacity resources are expected to be available as committed, and to be able to forecast tight conditions on the system per their best judgment. Additionally, it is expected that capacity resources will price their risk of payment adjustments into their capacity offers, which in the long run will ensure that only the most efficient and high-performing resources are participating in the market.

8.5 Performance Payment Adjustment Payments

Resources failing to deliver during EEA events will be assessed a nonperformance payment adjustment based on the shortfall between their actual and expected performance. Similarly, resources with capacity obligations that over-deliver will receive favourable over-performance payment adjustment . These payment adjustment are intended to create a strong marginal incentive to deliver energy and operating reserves during periods when the system is most in need of supply. By applying a payment adjustment mechanism during EEA events, all resources with capacity obligations effectively face a similar $/MWh incentive, incremental to the energy price, during these events.

Performance Assessment Period

Performance assessment periods will occur during EEA events, when the system is in need of all available capacity in order to maintain reliability, and operating reserve targets. Any time the AESO declares an EEA level 1 (i.e. all available resources are in use) or higher (i.e. EEA level 2: load management procedure is in effect; EEA level 3: firm load interruption is imminent), the performance assessment period will begin, and declaration of EEA 0 (i.e. a termination alert issued when energy supply is sufficient to meet AIES load and reserve requirements) will be an end time of a performance assessment period. These events are hard to predetermine, and as such, there will be no explicit prior notification before such periods occur. Likewise, there is no maximum duration of the performance events that can be predicted or pre-defined ahead of time. The AESO will continue to provide the real-time supply adequacy report to market participants which may be a help in identifying periods of tight supply adequacy.

Performance Volume Definition

Performance of a capacity resource is calculated as the resource's expected performance minus the actual performance, measured during performance assessment periods in MWh. The capacity resource's expected performance is multiplied by the balancing ratio (which is intended to adjust required performance volumes to reflect system conditions) to determine the volume subject to an over-performance or non-performance payment adjustment .

The balancing ratio is the ratio of energy and reserves produced by committed resources during a performance event to the total committed capacity in that delivery year, and is a number less than or equal to 1. The balancing ratio is intended to adjust required performance volumes to reflect system conditions. The ratio is also meant to adjust an individual resource's capacity market obligation in a performance period to its pro rata share of the total capacity market need during the performance event.

Non-Performance Payment Adjustment Rate

Non-performance payment adjustments will be set based on the higher of base capacity auction price or the latest rebalancing auction price, which would link the payment adjustment rate to the resource's maximum available revenues from the capacity market. The base capacity price and rebalancing auction price will be reset every auction period, and the payment adjustment level will be adjusted accordingly.

The non-performance payment adjustment rate will be calculated using the following formula:

Non-performance payment adjustment rate ($/MWh) = (60% x 1.3 x MAX [Annual Base Capacity Auction Price; Annual Last Rebalancing Auction Price]) / Expected EEA hours

The formula is based on the maximum of the base capacity auction price and the last rebalancing auction price, expressed on an annual basis. Tying the payment adjustments to the auction clearing prices ensures that the payment adjustment level is consistent with the value of supply reflected in the capacity market demand curve. Including the forward auction price in the maximum ensures that resources will still be assessed at to a payment adjustment commensurate with the capacity payment it receives, and will still have an incentive to be available during the delivery year, even if the rebalancing auction clears at a low price.

The factor of 60% preceding the non-performance payment adjustment rate formula is an allocation factor, representing the amount of the total expected payment adjustment a non-delivering unit will incur through the performance payment adjustment mechanism. The AESO's choice of a 60% allocation factor reflects the ultimate focus of capacity construct and payment adjustment mechanism: ensuring delivery during periods of supply shortfall.

The factor of 1.3 scales the total payment adjustment level up above the capacity auction price. A value greater than 1 ensures that resources failing to deliver are exposed to a net payment adjustment, after accounting for capacity revenues they will receive. A value larger than one also discourages speculative capacity sales because by committing to a capacity obligation the resource is at risk of losing more through poor availability and performance than through what might be earned through capacity payments. The value is believed to be of a magnitude that is sufficient enough for capacity resources to retain the payment adjustment mechanism to become available later rather than never, but will not be so large that new entrants will be discouraged from participating.

Normalizing by the expected EEA hours ensures that on average, the total non-performance payment adjustment for a non-delivering resource will be 1.3 times the relevant capacity price. Due to variability in system conditions, the number of EEA hours during which performance payment adjustments are assessed will vary from year to year. Since the payment adjustment rate is based on the expected number of hours, it will not vary as much from year to year as the actual number of EEA hours. The specific value of expected EEA hours will be revised each year based on reliability modelling.

Over-Performance Payment Adjustment Rate

As described above, the over-performing resources with capacity obligations are eligible to receive payment adjustment payments funded from 100% of the collected non-performance payment adjustments. Over-performance payment adjustments are additive to the energy and ancillary services prices, creating strong incentives to deliver energy and capacity during shortage events.Over-performance payment adjustments will be made for each MWh of over-delivery during EEA events, and will be paid at the $/MWh over-performacne payment adjustment rate:

Over-performance Payment Adjustment Rate ($/MWh) = Total Collected non-performance payment adjustment funds / All eligible for over-performance payment adjustment MWh

The over-performance payment adjustment rate is defined in this way in order to ensure that performance payment adjustment s are a revenue-neutral from the perspective of the AESO and customers. All non-performance payment adjustment funds collected from under-performing resources are distributed to over-performing resources proportional to their over-performance.

Over-performacne payment adjustment payments will also allow resources to recover from non-performance payment adjustments through strong performance during future events.

Non-performance Payment Adjustment Exemptions

The AESO is proposing to limit the exemption from payment adjustments to resources constrained by internal Alberta transmission constraints. If a resource's availability is constrained below its obligation due to a binding transmission constraint, the resource will not be exposed to under-performacne payment adjustments on the constrained volume of the capacity obligation. Transmission limitations are beyond the control of participants, and given Alberta's transmission policy, would not be expected as normal course of business by participants. Transmission constraints that are foreseeable sufficiently ahead of time will be considered in capacity market clearing as discussed in Section 4.

There will be no other exemptions to availability or performance payment adjustments. As the UCAP calculation for each asset will reflect reduced commitment levels from observed planned and forced outages as well as de-rated and force majeure conditions, none of these events will be payment adjustment exempt. Committed resources can use the rebalancing auctions and asset substitution process to avoid unavailability and non-performance payment adjustments.

All capacity resources are expected to be available as committed, and to be able to forecast tight conditions on the system per their best judgement. Additionally, it is expected that capacity resources will price their risk of payment adjustments into their capacity offers, which in the long run will ensure that only the most efficient and high-performing resources are participating in the market.

8.6 Supply Obligations and Performance Assessment vis-a-vis the Capacity Market Criteria

The capacity market can achieve desired reliability objectives by creating a real and measurable supply adequacy product in which to assess whether capacity resources met their capacity market obligation and incent providers to live up to their obligation. The incentives are designed in such a way that a wide variety of technologies should be able to compete to provide capacity while ensuring a fair, efficient, openly competitive (FEOC) market. Costs to consumers are minimized by creating a product for which value can be demonstrated via delivery. The capacity market incentive mechanisms, outcomes and relevant data are also transparent.

Leveraging best practices and lessons learned from other capacity market implementations to inform the payment adjustment framework is expected to maintain investor confidence and trigger sufficient private investment.

[1] Forced outage means the unavailability of a facility which is not anticipated as part of a legal owner's regular maintenance, and occurs as a result of an automatic or accidental action. (Source: p.11, AESO Consolidated Authoritative Document Glossary, https://www.aeso.ca/assets/downloads/Consolidated-Authoritative-Document-Glossary-March-21-2017-2.pdf)

[2] Planned outage means the full or partial unavailability of a facility which is anticipated as part of a legal owner's regular maintenance, including for the purposes of construction, commissioning or testing, and occurs as a result of a deliberate manual action. (Source: AESO Consolidated Authoritative Document Glossary, https://www.aeso.ca/assets/downloads/Consolidated-Authoritative-Document-Glossary-March-21-2017-2.pdf)

[3] In Alberta's current definition, force majeure means any occurrence, and its effects, which: (a) is beyond the reasonable control of the market participant; (b) could not have been avoided through the use of good electric industry practice, or by the exercise of reasonable diligence; and (c) prevents a market participant from performing its obligations under the ISO rules, ISO tariff or reliability standards, as applicable; but does not include a lack of finances or any occurrence which can be overcome by incurring reasonable additional expenses. (Source: p. 11, AESO Consolidated Authoritative Document Glossary, https://www.aeso.ca/assets/downloads/Consolidated-Authoritative-Document-Glossary-March-21-2017-2.pdf)