

10 Roadmap for Changes in the Energy and Ancillary Services Markets

This section addresses how the energy and ancillary services markets will evolve with the introduction of the capacity market, including requirements to facilitate the delivery of the capacity, to monitor and mitigate market power, to integrate the anticipated generation fleet, and to improve market efficiency.

10.1 Overview of the EAS markets

10.1.1 To facilitate the implementation of the capacity market, certain aspects of the energy and ancillary services (EAS) markets will be evolved and new requirements will be adopted for energy market mitigation. However, the majority of the current aspects of the energy and ancillary services markets will continue including, without limitation:

- (a) dispatch using the information in the energy market merit order to dispatch blocks required to serve demand levels;
- (b) dispatch of the ancillary services market as a separate market;
- (c) unit self-commitment by pool participants;
- (d) single-part bid for submission of priced offers; and
- (e) the pricing methodology in the energy market, including the system marginal price set at marginal block, and the pool price set as an average of 60 system marginal prices.

Subsections 10.2 – 10.6 below outline the obligations for each customer group.

10.2 Obligations in the EAS markets for a generating unit, aggregated generating facility and energy storage facility

Volume obligations

- 10.2.1 A generating unit, aggregated generating facility or energy storage facility that has a maximum capability of 5 MW or greater, regardless of whether or not it has a capacity commitment, must offer its maximum capability volume into the energy or ancillary services markets. Its available capability may be reduced from its maximum capability due to an acceptable operating reason (AOR). It must offer, and be available for dispatch, up to its available capability volume.
- 10.2.2 A generating unit, aggregated generating facility or energy storage facility that has a capacity commitment, and has a maximum capability of less than 5 MW is not required to offer but has the option to offer into the energy market if its available capability is 1 MW or greater.
- 10.2.3 A generating unit, aggregated generating facility or energy storage facility, regardless of whether or not it has a capacity commitment, has the option to offer into the ancillary services market and accepted ancillary services offers will continue to be netted off obligation volumes in the energy market.
- 10.2.4 The existing Section 306.7 of the ISO rules, *Mothball Outage Reporting*, will be withdrawn and replaced with the temporary delisting provisions applicable to both the capacity and energy markets. A generating unit, aggregated generating facility or energy storage facility that has a maximum capability of 5 MW or greater, regardless of whether or not it has a capacity commitment, has a must-offer requirement unless it delists.

Pricing obligations

- 10.2.5 A generating unit, aggregated generating facility or energy storage facility must price its offer between the offer cap (\$999.99) and offer floor (\$0) in the energy market.
- 10.2.6 A generating unit, aggregated generating facility or energy storage facility must self-commit in accordance with the existing ISO rules, and offers may reflect the use of seven price quantity pairs.
- 10.2.7 A generating unit, aggregated generating facility or energy storage facility must submit:
- a) offer control data with offers; and
 - b) the specific amount of offer-control held by each firm in cases where multiple firms control a specific offer block.
- 10.2.8 A generating unit, aggregated generating facility or energy storage facility must submit asset-specific data used in the calculation of asset-specific reference prices, including asset-specific technological parameters, variable operations and maintenance costs, and carbon costs, which will be subject to verification or audit.

Dispatch obligations

- 10.2.9 A generating unit, aggregated generating facility or energy storage facility, regardless of whether or not it has a capacity commitment, must self-commit to be ready to meet dispatch requirements in the energy or ancillary services markets in accordance with existing ISO rules, subject to the subsection 10.2.10 below.
- 10.2.10 A generating unit, aggregated generating facility or energy storage facility, regardless of whether or not it has a capacity commitment, must submit a ramp table (or a ramp curve) that reflects the ramp rate at different MW levels of the asset.
- 10.2.11 The AESO must dispatch the energy and ancillary services markets using the respective energy and ancillary services merit orders, independent of any capacity obligations.
- 10.2.12 The allowable dispatch variance (ADV) for a wind or solar aggregated generating facility will continue to take into account real power capability (see ADV definition that is to become effective on September 1, 2018).

Outage scheduling obligation

- 10.2.13 A generating unit, aggregated generating facility or energy storage facility with a maximum capability of 5 MW or greater, regardless of whether it has a capacity commitment or not, must submit outage information in accordance with Section 306.5 of the ISO rules, *Generation Outage Reporting, and Coordination*.
- 10.2.14 The AESO will not provide approval of outage scheduling. However, the AESO may cancel an outage as required in accordance with the existing ISO rules.

10.3 Obligations in the EAS markets for a load or aggregated load asset**Volume obligations**

- 10.3.1 A load or an aggregated load asset that has a capacity commitment of 5 MW or more must actively participate in the energy market by submitting an offer for its obligation volume into the energy or ancillary services markets. A load or an aggregated load asset that does not have a capacity commitment may continue to bid into the energy market.
- 10.3.2 A load or an aggregated load asset that has a capacity commitment of less than 5 MW is not required to actively participate in the energy market by submitting an offer, but it has the option to participate if its capacity commitment is 1 MW or greater.

- 10.3.3 A load or an aggregated load asset that does not have a capacity commitment will continue to have the option to submit an offer of at least 1 MW into the energy and ancillary services markets, or may continue to act as a price responsive load or demand response asset.
- 10.3.4 A load or an aggregated load asset that offers into the ancillary services market and has accepted ancillary services offers will continue to have these volumes netted off its energy market volume.
- 10.3.5 The existing Section 306.7 of the ISO rules, *Mothball Outage Reporting*, will be withdrawn and replaced with the delisting provisions applicable to both the capacity and energy markets. A load or aggregated load that has a capacity commitment of 5 MW or greater has a must-offer requirement unless it delists. A load or aggregated load that has not cleared in a capacity auction will not have a must offer requirement.
- 10.3.6 A load or aggregated load with a capacity commitment is eligible to provide ancillary services products, including load shed service for imports (LSSi).

Pricing obligations

- 10.3.7 A load or an aggregated load asset with a capacity commitment must price its energy market volumes between the offer cap (\$999.99) and offer floor (\$0) for the energy market.
- 10.3.8 A load or an aggregated load asset with a capacity commitment will receive seven price quantity pairs similar to a generating unit or aggregated generating facility providing offers into the energy market.
- 10.3.9 A load or an aggregated load asset that has a capacity commitment may submit an offer into the energy market in one of two forms (i.e., dispatched “down to” a volume or dispatched “down by” a volume), but must identify which form they subscribe to.
 - (a) A load asset that is dispatched “down to” is also known as a firm consumption level asset and must be offered into the market as a MW level that the firm consumption level asset, if dispatched, will not consume above. A firm consumption level asset must have real time telemetry in place so the AESO system controller will be able to calculate how much load will be reduced when the firm consumption level asset is dispatched
 - (b) A load asset that is dispatched “down by” is also known as a guaranteed load reduction asset and must be offered into the market as the amount of MW that the guaranteed load reduction asset will, at minimum, reduce by.
- 10.3.10 A load or aggregated load must submit:
 - (a) offer control data with offers; and
 - (b) the specific amount of offer control held by each firm in cases where multiple firms control a specific offer block.

Dispatch obligations for a load with a capacity commitment

- 10.3.11 A load or aggregated load with a capacity commitment that has submitted prices and volumes into the energy or ancillary services markets is consuming energy until it becomes in-merit and is subsequently dispatched to reduce its consumption.
- 10.3.12 A load or aggregated load asset with a capacity commitment must self-commit to be ready to meet dispatch requirements similar to existing dispatch requirements for a generating source asset (i.e., a load asset must specify a ramp rate and reduce its consumption within 10 minutes of a dispatch), subject to the requirement to submit a ramp table (or a ramp curve) that reflects the ramp rate at different MW levels of the asset.
- 10.3.13 After a load or aggregated load with a capacity commitment is dispatched, some or all of the load or aggregated load may not be available to receive a new dispatch to increase consumption levels for a length of time. If this is the case, the load must restate its available capability and have an acceptable operational reason (AOR) for restating its energy. When the load or

aggregated load is again capable of coming back up, a restatement indicating its capability must be made and the load may come back up after it is dispatched.

- 10.3.14 A load or aggregated load with a capacity commitment must restate price and volume quantities to accurately reflect its capability whenever required, similar to the obligations requiring a generator to maintain accurate energy offers.
- 10.3.15 A load or aggregated load with a capacity commitment, in the event of equal prices anywhere in the merit order including at \$999.99, will be dispatched last in the group bids and offers. For example, energy offers will be dispatched and exports bids would be dispatched at \$999.99 before a load or aggregated load with a capacity commitment is dispatched.
- 10.3.16 A load or aggregated load with a capacity commitment does not receive additional payments in the energy market for reducing load. However, the load or aggregated load avoids the energy costs by not consuming energy and receives capacity payments.

Outage scheduling obligations

- 10.3.17 A load or aggregated load with a capacity commitment must submit outage information, similar to the requirements in Section 306.5 of the ISO rules, *Generation Outage Reporting and Coordination*.
- 10.3.18 A load or aggregated load that does not have a capacity commitment must continue to comply with Section 306.3 of the ISO rules, *Load Planned Outage Reporting*.
- 10.3.19 The AESO will not provide approval of outage scheduling. However, the AESO may cancel an outage as required in accordance with the existing ISO rules.
- 10.3.20 Section 202.2 of the ISO rules, *Short-Term Adequacy and Supply Shortfall*, will be amended to contemplate a load or aggregated load with a capacity commitment.

10.4 Obligations in the EAS markets for an import asset

Volume obligations

- 10.4.1 An import asset with a capacity commitment must offer its obligation volume into the energy or ancillary services markets for all hours, unless it delists. This is different than the existing requirements for an import asset where the must-offer obligation only applies to hours when delivery is submitted.
- 10.4.2 An import asset that does not have a capacity commitment will continue to have no obligation to offer its volumes into the energy or ancillary services markets.
- 10.4.3 An import asset has the option to offer into the ancillary services market, regardless of whether it has a capacity commitment. Accepted ancillary services offers will continue to be netted off obligation volumes in the energy market.

Pricing obligations

- 10.4.4 An import asset will have the option to request and receive a priced asset with seven price-quantity pairs per interconnection to be used to offer into the energy market.
- 10.4.5 An import asset may request a priced asset in addition to a current price-taker asset:
- (a) An import asset that chooses to be a price taker for some or all of its volume must use its price-taker asset for offers.
 - (b) An import asset that chooses to price its offers must use the priced asset and price its offer between the offer cap (\$999.99) and above the offer floor (\$0) in the energy market.
- 10.4.6 For scheduling purposes, an import price taker asset is treated differently than an import priced asset. The import priced asset will submit or adjust a scheduled interchange transaction that reflects its real-time dispatch (dispatched only when in-merit).

10.4.7 An import asset must submit:

- (a) offer-control data with offers; and
- (b) the specific amount of offer-control held by each firm in cases where multiple firms control a specific offer block.

Dispatch obligations

10.4.8 An import asset offer will continue to have a defined schedule and ramp period, as required currently.

10.4.9 A priced import asset must self-commit to be ready to meet dispatch requirements.

10.4.10 The AESO must dispatch an import asset from the merit order on a minute-by-minute basis during the hour, up to the available transfer capability of the respective intertie paths. Import assets will be dispatched when in-merit from lowest to highest price until the available transfer capability limit is reached. Balancing authorities can schedule on 15 minute intervals. The scheduling timeline for interties is considered to be within the dispatch tolerance rules, as described below.

10.4.11 The AESO must dispatch imports based on the respective energy market merit orders, independent of any capacity obligations (an import asset with a capacity commitment will not have priority dispatch). If available transfer capability is available and the import asset with a capacity commitment is in merit, it is dispatched. If available transfer capability is not available for all in merit offers, offers are dispatched in order and a volume may not be dispatched.

10.4.12 A priced import asset must ensure balancing authorities and transmission providers along the transmission path into Alberta will approve interchange transactions for schedule changes during the hour (i.e., having an e-tag request denied for scheduling practice reasons is not an acceptable operational reason (AOR)).

10.4.13 When dispatched up or down, the interchange transaction ramp should start as soon as practical after the dispatch is received. E-tag(s) must be submitted or adjusted, and approved for the dispatched volume. It is understood that it may take a participant some time to procure transmission and e-tag the transaction and some jurisdictions will only change interchange schedules on 15 minute intervals. When an import asset is dispatched the interchange transaction ramp must start no later than 35 minutes after the asset is dispatched.

10.4.14 A priced import asset block may set system marginal price when dispatched.

10.4.15 An import asset will be paid based on the scheduled energy in the interchange transaction (e-tag) during the settlement interval.

10.5 Obligations in the EAS markets for an export asset

Volume obligations

10.5.1 An export asset will continue to have no obligation to bid its energy volume into the energy market. However, the export asset must submit a bid in order to deliver energy.

Pricing obligations

10.5.2 An export asset will have the option to request and receive a priced asset with seven price-quantity pairs per interconnection to be used to bid into the energy market.

10.5.3 An export asset may request a priced asset in addition to a current price taker asset:

- (a) An export asset that chooses to be a price taker for some or all of its volume must use its price taker asset for bids.
- (b) An export asset that chooses to price its bids must use the priced asset and price its bid less than \$999.99.

- 10.5.4 For scheduling purposes, a price-taker export asset is treated differently than a priced export asset. For example, the energy component of a scheduled interchange transaction is treated as a dispatch for a price-taker asset whereas a priced asset will be dispatched when it is in-merit.

Dispatch obligations

- 10.5.5 An export asset will continue to have a defined schedule and ramp period.
- 10.5.6 A priced export asset must self-commit to be ready to meet dispatch requirements.
- 10.5.7 The AESO will dispatch an export asset from the merit order on a minute-by-minute basis during the hour, up to the available transfer capability of the respective intertie paths. An export asset will be dispatched when in-merit from highest to lowest price until the available transfer capability limit is reached if its block is at or below the marginal block dispatched. The scheduling timeline for interties is considered to be within the dispatch tolerance rules, as described below in subsection 10.5.10.
- 10.5.8 The AESO will dispatch exports based on the respective energy market merit orders.
- 10.5.9 A priced export asset must ensure balancing authorities and transmission providers along the transmission path into Alberta will approve interchange transactions for schedule changes during the hour (i.e., having an e-tag request denied for scheduling practice reasons is not an acceptable operational reason (AOR)).
- 10.5.10 When dispatched, the interchange transaction ramp should start as soon as practical after the dispatch is received. E-tag(s) must be submitted and approved for the dispatched volume. It is understood that it may take some time for a participant to procure transmission and e-tag the transaction and some jurisdictions will only change interchange schedules on 15 minute intervals. When an export asset is dispatched, the interchange transaction ramp must start no later than 35 minutes after the asset is dispatched.
- 10.5.11 An export priced asset block may set system marginal price when dispatched.
- 10.5.12 An export asset will pay based on the scheduled energy in the interchange transaction (e-tag) in the settlement interval.

10.6 Obligations in the EAS markets for a long lead time asset

The existing requirements for a long lead time asset are anticipated to remain the same with additional delivery obligations for a long-lead-time asset with a capacity commitment.

Volume obligations

- 10.6.1 A long lead time asset must offer its available capability volume into the energy market if such volume is over 5 MW.
- 10.6.2 A long lead time asset must self-commit. A generation asset that has a start-up time of greater than 1 hour is considered a long lead time asset when it is offline.
- 10.6.3 A long lead time asset participating in the energy market must enter a start time at least 2 hours before the start of the settlement interval.
- 10.6.4 A long lead time asset must notify the AESO before synchronizing to the Alberta interconnected electric system.
- 10.6.5 The long lead time asset must have an energy offer in the energy merit order to receive a dispatch.
- 10.6.6 The existing Section 306.7 of the ISO rules, *Mothball Outage Reporting*, will be withdrawn and replaced with the temporary delisting provisions applicable to both the capacity and energy markets. A generation asset that has a capacity commitment of 5 MW or greater has a must-offer requirement unless it delists.

Pricing obligations

- 10.6.7 A long lead time asset must price its offer between the offer cap (\$999.99) and offer floor (\$0) in the energy market.
- 10.6.8 A long lead time asset must self-commit in accordance with the existing ISO rules and offers must reflect the use of seven price quantity pairs.
- 10.6.9 A long lead time asset must submit:
- a) offer control data with offers; and
 - b) the specific amount of offer-control held by each firm in cases where multiple firms control a specific offer block.
- 10.6.10 A long lead time asset must submit asset-specific data used in the calculation of asset-specific reference prices, including asset-specific technological parameters, variable operations and maintenance costs, and carbon costs, which will be subject to verification or audit.

Dispatch obligations

- 10.6.11 A long lead time asset, regardless of whether it has a capacity commitment or not, must self-commit to be ready to meet dispatch requirements in accordance with existing ISO rules, subject to subsection 10.6.12 below.
- 10.6.12 A long lead time asset with a maximum capability of 5 MW or greater, regardless of whether or not it has a capacity commitment, must submit a ramp table (or a ramp curve) that reflects the ramp rate at different MW levels of the asset.
- 10.6.13 The AESO will dispatch the energy and ancillary services markets using the respective energy and ancillary services merit orders, independent of any capacity obligations.
- 10.6.14 The AESO will issue a dispatch to a long lead time asset if the long lead time asset is online and in-merit.
- 10.6.15 The AESO may issue a directive to a long lead time asset to come online during supply shortfall if the long lead time asset is not online, in accordance with the supply shortfall procedures outlined in Section 202.2 of the ISO rules, *Short-Term Adequacy and Supply Shortfall*. The AESO will only direct a long lead time asset to come online if the AESO expects to be short of regulating reserves (i.e., Energy Emergency Alert 2).
- 10.6.16 A long lead time asset, when directed to bring the long lead time asset online, may either:
- (a) refuse the directive and elect to receive a dispatch in the energy market (in which case the AESO will also cancel the directive); or
 - (b) accept the directive to be directed to minimum stable generation (MSG) and directed above MSG if required as per ISO supply shortfall procedures, to maintain operating reserves.
- 10.6.17 When the AESO directs a long lead time asset online, the long lead time asset is entitled to be paid in accordance with the following:
- (a) If the long lead time asset refused the directive and elected to receive a dispatch in the energy market, the energy revenue based on pool price (excluding start-up costs); or
 - (b) If the long lead time asset complied with the directive, the long lead time asset's start-up costs (excluding energy revenue).

Outage scheduling obligations

- 10.6.18 A long lead time asset with a maximum capability of 5 MW or greater, regardless of whether it has a capacity commitment or not, must submit outage information in accordance with Section 306.5 of the ISO rules, *Generation Outage Reporting, and Coordination*.
- 10.6.19 The AESO will not provide approval of outage scheduling. However, the AESO may cancel an outage as required in accordance with the existing ISO rules.

10.7 Monitoring and mitigation of market power in the energy market

10.7.1 *Ex ante* energy market mitigation will be developed to supplement the existing *ex post* monitoring and mitigation.

10.7.2 An *ex ante* market power mitigation test is a three-part test of offer volumes and prices, applied separately in each delivery hour:

- (a) **Market power screen.** Determines if a firm has structural market power (net of obligations).
- (b) **No-look scarcity test.** If the market is sufficiently tight in a delivery hour, there will be no market power mitigation in that delivery hour irrespective of generator concentration or offer prices.
- (c) **Asset-specific reference price.** Calculates the maximum price level that a generator would be expected to offer energy at if it had no market power based on the asset-specific short-run marginal costs adjusted through the use a market-wide marginal cost multiplier to account for cycling and start-up costs, or a scarcity multiplier to account for scarcity market conditions.

10.7.3 An offer price fails the market power mitigation test if the following three conditions are satisfied:

- (a) a specific firm has market power (net of obligations);
- (b) the energy market is not sufficiently tight (i.e., the no-look level does not occur); and
- (c) an offer price is above the relevant asset-specific reference price.

If an offer price fails the market power mitigation test, it will automatically be restated to the relevant asset-specific reference price. An offer that passes the market power mitigation test will not be price mitigated. All delivered energy will continue to be paid pool price regardless of whether a specific offer or bid is mitigated.

10.7.4 The AESO may provide reports on *ex ante* market power mitigation. Further details will be developed by the AESO and will be subject to further consultation.

Monitoring – market power screen

10.7.5 The AESO will implement a market power screen for each firm after T-2, as close to the delivery hour as reasonably practicable, using the available or forecast data outlined in subsection 10.7.8.

10.7.6 The market power screen will use the residual supplier index metric, which is a firm-specific measure of structural market power. Implementation of the market power screen will require all firms to submit offer control information at the time it submits its offers (rather than the current requirement of up to 30 days later).

10.7.7 A firm may submit to the AESO a value of physical and financial supply obligations to be deducted from the firm’s portfolio in the calculation of its residual supplier index. The submitted value may be subject to *ex post* audit by the AESO.

10.7.8 The residual supplier index for a market participant in delivery hour t is set out in the following expression:

$$RSI_{it} = \frac{Total\ Alberta\ Supply_t + Total\ Alberta\ Import\ Capability_t - (Supply_{it} + Imports_{it} - Obligation_{it})}{Total\ Alberta\ Demand_t + Total\ Alberta\ Exports_t}$$

where:

Term	Definition
Supply _{it}	The supply available from generating asset i in delivery hour t, including the full capability of units as measured by AC that may be offered in the energy or ancillary services markets and long lead time assets that have not been synchronized to the system.
Total Alberta Supply _t	The supply available from all generating assets located in Alberta in delivery hour t. Specifically, $\text{Total Alberta Supply}_t = \sum_{j=1}^n \text{Supply}_{jt}$ Where the variable j indexes the n generating assets located in Alberta.
Total Alberta Import Capability _t	The total available transfer capability into Alberta in delivery hour t.
Imports _{it}	The imports offered by firm i in delivery hour t. This value will not exceed <i>ImportATC_t</i> for any firm in delivery hour t.
Obligation _{it}	The physical supply and financial obligations of firm i in delivery hour t that was submitted to the AESO.
Total Alberta Demand _t	The demand for electricity within Alberta in delivery hour t.
Total Alberta Exports _t	The total volume of exports scheduled in delivery hour t.

10.7.9 A firm is identified by the market power screen as having market power in delivery hour t if its residual supplier index is less than 1.0.

Monitoring – no-look scarcity test

10.7.10 If the supply cushion for a given delivery hour is forecast by the AESO to be less than 250 MW after T-2, electricity will be deemed to be sufficiently scarce such that no further testing of market power by the AESO will be conducted. There will be no mitigation of any offers or bids in the associated delivery hour (i.e., settlement hour at T).

10.7.11 The AESO will create a new report to inform the market of the supply cushion level and whether the no-look scarcity test will be implemented for a delivery hour. The AESO intends to use the same data to create this new report that it uses to produce its *Supply Adequacy Report*, with adjustments to serve the purpose of the no-look test.

Mitigation – asset-specific reference price and multiplier

10.7.12 The asset-specific reference price for asset j in delivery hour t will reflect its operating costs, including carbon costs and cycling, as defined by the following formula:

$$RP_{jt} = M * (HR_j * FP_{jt} + VOM_j + Carbon\ Cost_t * Asset\ Specific\ Carbon\ Efficiency\ Factor_j)$$

where:

Term	Definition
M	The price multiplier.
HR _j	The heat rate of asset j.

Term	Definition
FP_{jt}	The fuel price relevant to asset j in delivery hour t.
VOM_j	The variable operating and maintenance cost of asset j.
$Carbon\ Cost_t$	The carbon cost in Alberta that is set as a matter of public policy for a delivery hour t measured in dollars per tCO ₂ e, e.g., \$30 per tCO ₂ e.
$Asset\ Specific\ Carbon\ Efficiency\ Factor_j$	The asset's rate of carbon emissions associated with energy production net of its Output Based Allocation (OBA) and is measured in tCO ₂ e per MWh, using data consistent with that collected under the <i>Carbon Competitiveness Incentive Regulation</i> .

10.7.13 The AESO will use the following fuel prices when determining the asset-specific reference price:

- (a) For a natural gas-fired asset, the natural gas price used in the fuel price is the daily Alberta natural gas price for the day in \$/gigajoule.
- (b) For a coal-fired asset, the coal price submitted to the AESO that has been pre-approved.

10.7.14 For other assets, including an import asset or a non-thermal, energy-limited asset, the asset-specific reference price will be set based on a formula that captures the concept of opportunity cost.

10.7.15 For an import asset, the asset-specific reference price is defined by the following formula:

$$RP_{jt} = MidC(on\ peak) + \min\{100, M * MidC(on\ peak)\}$$

where MidC (on peak) is the day-ahead, on-peak price in the Mid-Columbia market (for delivery on the same day as the energy market in Alberta) and M is the price multiplier.

10.7.16 For a non-thermal, energy-limited asset, there will be no offer price mitigation (in effect, the asset-specific reference price will be the energy market offer price cap of \$999.99) provided that offers for the predetermined products in predetermined quantities from these assets were made into the ancillary services market, independent of whether they have cleared or not. If such ancillary services offers are not made, then the relevant asset j in delivery hour t will be assigned an asset-specific reference price defined by the following formula:

$$RP_{jt} = M * (30Ravg)$$

where 30Ravg is the 30-day Rolling Average Pool Price that was most recently published by the AESO at the time mitigation occurs; and M is the price multiplier

10.7.17 The asset-specific reference price will be calculated by applying a price multiplier as follows:

- a) When the supply cushion is over 1000 MW, the asset-specific short-run marginal costs will be adjusted through the use a market-wide marginal cost multiplier of 3x in order to account for overall operating costs including cycling and start-up costs.
- b) When the market is scarce, as measured by a supply cushion of 1000 MW or less, a scarcity multiplier will be used, adjusting the market wide marginal cost multiplier of 3x reflecting operating costs to a multiplier of 6x reflecting scarcity conditions.

10.7.18 An asset may submit to the AESO an exception request for the asset-specific reference price and, in doing so, must submit its actual short-run marginal cost. If such an exception request is approved by the AESO, the asset-specific reference price would be set at the approved level.

10.7.19 The minimum asset-specific reference price for any offer will be \$25/MWh.

10.7.20 If a firm is identified in the market power screen but the offer for its asset for a given delivery hour is below the asset-specific reference price, the offer will be unaffected.

10.7.21 Market power screen and mitigation apply to both capacity and non-capacity resources on a firm-wide offer control basis.

Mitigation – ex post monitoring and mitigation

10.7.22 *Ex post* monitoring and mitigation is expected to continue by the AESO and the MSA.

10.8 Roadmap reforms in the EAS markets

10.8.1 The following design changes are included in the market roadmap (i.e., not included as part of the capacity market implementation) and will be reviewed and implemented as part of the ongoing evaluation of the market and day to day operations.

10.8.2 Design changes in relation to energy market pricing may include the following:

- (a) raising the offer cap above \$999.99;
- (b) negative pricing and a move away from the administrative clearing of the supply surplus events; and
- (c) shortage pricing and a move away from the administrative management of supply shortfall events.

10.8.3 Design changes in relation to dispatch and flexibility requirements may include the following:

- (a) dispatch certainty through tightened dispatch tolerance, ramp by block, and delay times (delay times in moving towards a dispatch would be capped at some maximum less than 10 minutes);
- (b) introduction of a ramp product; and
- (c) shorter settlement (i.e., 15 minute settlement) for a transmission-connected asset, with the exception of retail loads, where hourly settlement will be applied.

10.9 Out-of-Scope Reforms in the EAS Markets

10.9.1 The following design changes will not be included as part of the capacity market implementation or market roadmap, although they may be considered by the AESO as part of a separate evaluation at another time should the need arise. The reason for this categorization is outlined in the rationale document though a brief explanation as summarized here.

- (a) **Locational marginal pricing:** given the current policy in relation to unconstrained transmission and recent system build-out, pricing on transmission grid is not required at this time.
- (b) **Security-constrained unit commitment:** centralized unit commitment will be evaluated in the future if identified by reliability issues caused by increasing supply surplus events or as part of an integrated solution like time ahead market. A self-commitment model maintains the risk with generators and sends incentive for flexible resources.
- (c) **Security Constrained Economic Dispatch (SCED):** SCED is currently out of scope as a comprehensive dispatch methodology, although some elements of the methodology will be used to enhance the dispatch tool and are already reflected in current pricing methodologies.
- (d) **Intertie dynamic scheduling.**
- (e) **Co-optimization of energy, and ancillary services:** the efficiency gain in relation to moving from the current separate markets to co-optimized markets was small.
- (f) **Day-ahead Market (DAM):** the value of a DAM is heightened if concerns about market power are not mitigated or if the market values moving to a security-constrained unit

commitment model in order to manage reliability risk. As a separate design element, the DAM effectively acts as a financial trading model, which most participants can manage independently outside of the market. The proposed market power mitigation approach encourages forward trading for large companies.