Alberta Capacity Market

Comprehensive Market Design (CMD 1)
Design Proposal Document

Section 2: Supply Participation

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2 Supply Participation

The AESO will use a two-stage process to determine who can participate in auctions:

1. Prequalification Stage – the AESO will determine what resources are eligible to participate in auctions.
2. Qualification Stage – the process for determining the unforced capacity (UCAP) of resources that have been prequalified by the AESO.

2.1 Prequalification of Capacity Resources

This section defines the prequalification requirements for capacity resources to be eligible to participate in the capacity market for the first time. Once a capacity resource is deemed eligible it will continue to be eligible for future capacity market auctions until such time as the resource delists or the AESO has determined the resource to be ineligible.

2.1.1 General Prequalification Requirements for Capacity Resources

- New capacity resources will be required to submit a prequalification package to the AESO.
- Planned internal generation will have a planned commissioning date that is before the delivery period to be prequalified.
- All capacity resources that have an obligation in the delivery year prior to the delivery year for which the next base auction is being held will be prequalified to participate in that base auction and are deemed qualified capacity resources.
- The minimum size for a capacity resource will be one MW.
- All existing energy-only market generation resources over one MW (estimated UCAP) will be prequalified and deemed to be qualified capacity resources. Existing external resources (import) will be required to prequalify.
- REP Round 1 resources are not eligible, and will not be prequalified.
- All prequalification packages, including delisting, will be subject to review before approval.
- To prequalify a new capacity resource, the resource owner will be required to:
    - Become a pool participant, if not already.
    - Submit a complete prequalification package that includes the appropriate connection request(s).
    - Post full financial assurance to cover risk from the payment adjustment mechanism stemming from non-delivery , which may be refunded upon demonstrating delivery requirements have been met.
    - Agree to meet all project and technical requirements, including supervisory control and data acquisition (SCADA) requirements. All capacity resources will need to provide real-time visibility to the AESO System Controller.

2.1.2 Submission and Approval of the Prequalification Package

- Upon receipt of a complete prequalification package, the AESO will review and assess the submission within the timeline indicated. If the prequalification package is completed to the satisfaction of the AESO, the AESO will prequalify the resource.
- If the prequalification package does not meet the AESO's defined requirements, the AESO may request additional information or reject the prequalification package at the AESO's discretion.
- The AESO will notify all applicants of the results of the prequalification package review.
- The AESO shall have the right to verify and audit all technical, financial, and operational data. The AESO shall have the right to visit the resource site(s) to ensure that there is no project amendment that has not been consented to as required in this section.

2.1.3 AESO Requirements for Prequalification

Before the start of the prequalification window, the AESO will publish guidelines for the capacity auction (auction guidelines). The auction guidelines will contain:

- The provisional date the capacity auction is to start.
- Details of how to apply to prequalify in the capacity auction.
- The timetable for submission and determination of applications which must, in particular, include the closing date for submission of applications.
- Such other information as may be required.

2.1.4 External Capacity Resources Prequalification

External capacity resources are capacity resources located outside of Alberta.

- External capacity resources may prequalify as Alberta capacity resources.
- Export will not be considered a valid demand side capacity resource.
- External capacity resources will be required to:
    - Demonstrate firm transmission service from the external capacity resource to the border of Alberta.
    - Demonstrate that firm transmission service has been obtained to deliver at least the UCAP amount of the capacity resource seeking to be qualified on the transmission system from the external capacity resource(s).
    - Demonstrate that any external capacity resources or portions thereof being registered as Alberta capacity resources are not used as non-recallable capacity resources in any other resource adequacy program.
    - Demonstrate that the source as defined in the transmission service request (TSR) must be a qualified external capacity resource.
    - Be available in the event of an emergency.
    - Be able to produce and report generation data as required by the AESO.

2.1.5 Demand Response Resource Prequalification

Demand Response (DR) is a demand-capacity resource, individually or in aggregate, that can respond to a dispatch issued by the AESO System Controller to reduce metered load – either manually by the customer, or automatically in response to a communication signal.

- DR resources must be retail or self-retail assets belonging to a valid pool participant.
- In addition to general prequalification requirements, a DR project prequalification package will be required to include:
    - A description of the data acquisition procedure, and the analytical methodology that will be used by the DR resource to determine the delivery of demand response curtailment by the DR project, who the likely contributors are, and how they will be procured.
    - A description of how the DR curtailment will reduce demand
- Demand response aggregators will be required to maintain records for all contributors as well as activation notices sent to their contributors specifying the start time, stop times, and dates of DR activations, in addition to a record of contributors demonstrating the eligible portion of the DR resource that the contributor is providing to the demand response aggregator.
- Pre-delivery period commissioning is needed to ensure that a DR resource will be able to deliver capacity when needed by the AESO. Tests must be included as a project milestone once the resource has been developed to prove the new DR resource is functional, allowing the credit requirement for non-delivery to be returned, and the DR resource to receive a capacity payment. The test will check the control systems and processes for dispatch, and also check that a

relationship exists between the provider and the contributing resource that will result in reduced load for at least four continuous hours.

2.1.6 Energy Efficiency Resource Prequalification

- An energy efficiency resource is a capacity resource that achieves a permanent, continuous reduction in electric energy consumption at the end-use customer's site that is not reflected in the peak load forecast used for the auction delivery year.
- Energy efficiency resources will not be eligible in the initial implementation of the market.

2.1.7 Variable Energy Resources Prequalification

- New variable energy resources will be eligible to provide capacity up to their UCAP as long as the resource does not receive indexed renewable energy credit (REC) payments for its committed capacity in a manner similar to the payment mechanism in REP Round 1.

2.1.8 Storage Resources Prequalification

- Storage resources may prequalify as capacity resources provided that the estimated UCAP exceeds the minimum size requirement of one MW and the storage resource can maintain its energy production at the proposed UCAP level for at least four hours.

2.1.9 Aggregate Capacity Resource Prequalification

- Aggregate capacity resources are resources that choose to combine individual resources through multiple locations into a single pool asset to either improve the stability of their UCAP or meet the minimum UCAP size requirement.
- Aggregate capacity resources will be eligible provided that each individual resource of the aggregation is:
    - Able to meet the requirements for an eligible capacity resource, and the aggregate UCAP of the resource is equal to or greater than the minimum UCAP size, or;
    - Have appropriate metering; and,
    - Be located in the same settlement zone.
- Disaggregation of a qualified aggregate capacity resource will require an amended prequalification package be submitted and be subject to prequalification review.
- Aggregation beyond a single enterprise is not permitted unless clear ownership share percentage can be specified for billing purposes.
- A prequalification package for aggregate resources must itemize the individual contributing capacity resources, if available, and demonstrate that the estimated sum of the contributing capacity resource's UCAP is greater than or equal to the minimum UCAP size requirement. Aggregation for the purposes of dealing with seasonality will require the pool participant to demonstrate that aggregate estimated UCAP is greater than or equal to the minimum UCAP size requirement of one MW over the entire term.
- The individual contributing capacity resources of the aggregation must have appropriate metering.

2.1.10 Self-supply Prequalification

Self-supply is load that is served by generation that:

- Is located on the same site at the same point of interconnection to the electric system. Does not include arrangements where loads are served by generation that requires delivery through the transmission system or distribution system, and are not located at the same point of interconnection, except for:
    - Sites with Industrial Systems Designation.
    - Sites under a Duplication Avoidance Tariff.

- The City of Medicine Hat.

- Sites with onsite generation that are net-metered and cannot physically flow their gross volumes due to system connection limitations will be required to self-supply.
- The self-supply site will be required to have a bi-directional net-interval meter at the connection to the system.
- An owner of a capacity resource choosing to self-supply for the first time or change its self-supply status will be required to submit a self-supply designation request before the self-supply deadline for the base auction. Self-supply designations will remain in effect for at least three years.
- The load resource in the self-supply arrangement may offer demand response based on its net load only. The self-supply site cannot be both demand response and supply capacity resource in the same delivery year. The type of capacity resource will be determined as part of the prequalification process.
- The City of Medicine Hat will be considered self-supply.

2.1.11 Existing Capacity Resources

- Existing qualified capacity resources that have been prequalified by the AESO for previous auctions will be presumed to have met the prequalification requirements for future auctions unless the market participant:
    - No longer maintains pool participant status.
    - Has a resource flagged for a significant decrease in capacity, and submits a restoration plan by the existing capacity delist deadline.
    - Submits a request to remove capacity via a retirement or mothballing delist bid by the existing capacity delist deadline.
    - Has modified the composition of the separate contributing capacity resources defined within the aggregate capacity asset subject to the details outlined in Section 2.2—*Calculation of Unforced Capacity (UCAP) Ratings*.
    - Submits a change to their self-supply designation by the self-supply deadline.
    - No longer holds firm transmission for the delivery year as an external capacity resource.

2.2 Qualification for All Resources

- When a capacity resource has passed the qualification stage in respect of an auction, the qualified capacity resource will be eligible to participate in such auction and will receive a UCAP value for such auction.
- The above qualification process will take place prior to each capacity auction.

2.2.1 General Qualification Requirements for Prequalified Capacity Resources

- In order to qualify, the capacity resource will be required to:
    - Be prequalified for this or qualified for a prior capacity auction.
    - Be a pool asset.
    - Be capable of meeting the availability and performance requirements set out in Section 8—*Supply Obligations and Performance Assessments.*
    - Maintain a UCAP equal to or greater than 1 MW.

2.2.2 AESO Requirements for Qualification

- The AESO will be required to develop:
    - Details of the qualification process, and procedures.
    - The timetable for submission of data requirements, which must in particular include the closing date for submission of data requirements.
    - A UCAP review process.
    - Locational constraints that may impact capacity resource obligations.

2.3 Calculation of Unforced Capacity (UCAP) Ratings

In a capacity auction, a UCAP rating represents the amount of capacity that a capacity resource can be expected to provide, on average, during tight supply and demand conditions. The UCAP amount will be the volume of capacity an eligible resource will be able to offer into the capacity market. The reliability value of one MW of UCAP is meant to be equivalent across different resource types.

Due to the different operating characteristics of variable and dispatchable capacity resources, two approaches will be used to determine capacity resource UCAP. The AESO will use a capacity factor approach for variable capacity resources. This approach will review the actual output of the variable resource during historical periods of tight supply cushion. The AESO will use an availability factor approach for dispatchable capacity resources. This approach will review the dispatched plus the offered energy and operating reserves during historical periods of tight supply cushion.

An annual UCAP is being determined to align with the annual capacity product the AESO is procuring. The table below describes the approach that will be used for each resource type

Resource Type	Resource Volume UCAP Methodology
Existing Wind/Solar/ Run-of-River Hydro	• A capacity factor will be established for these resources. • The capacity factor is based on historical operating data. • The calculation of the capacity factor will use a single-year capacity factor for each of the prior five years. Single-year capacity factors are based upon average energy production observed during the 100 tightest supply cushion hours per year. • The single-year capacity factors for each of the previous five years will be averaged to create the final capacity factor for the capacity resource to be used in the auction. • The capacity factor, when multiplied by the maximum capability, will yield the UCAP of the resource. • Capacity factors will reflect historical derates, forced outages and planned outages and force majeure outages. • Capacity factors will exclude Alberta-driven transmission based outages or derates.
New Wind New Solar New Run-of-River Hydro and New Self-supply	• The UCAP of these new resources will be established using a combination of class-average capacity factors and the new resource's observed capacity factor. A combination of these two metrics will be used until the resource has achieved a five-year history of operations. • Class-average capacity factors shall be determined by the AESO based upon review of operating data for similarly operated or geographically located resources. In the absence of comparable units, the capacity factor may be determined using production estimates using engineering and or historical meteorological studies for resource. The class-average capacity factor will be based upon average energy production observed during the 100 tightest supply cushion hours per year. The AESO will calculate class-average capacity factors for each of the prior five years. • As operating history is realized, the new resource's UCAP will be determined using the resource's single-year capacity factors. Single-year capacity factors are based upon average energy production observed during 100 tightest supply cushion hours per year. The single-year capacity factors will be supplemented with the class-average capacity factors in order to obtain five years average capacity. • The capacity factor, when multiplied by the maximum capability, yields the capacity value for the new capacity resource. This provides the UCAP of the resource. • Capacity factors will reflect historical derates, forced outages and planned outages and force majeure outages. They will exclude Alberta-driven transmission-based outages.

	• Self-supply resources will be required to indicate future load expectations to the AESO.
REP 1 Assets	Not eligible to participate in the capacity market.
External Resources	• The volume of capacity that may be delivered by an external resource may be limited by the volume of capacity the AESO allows to flow over an intertie. External resources will use the minimum of firm transmission to the Alberta interconnection allocated for the resource by the resource holder, the Alberta scheduling limit for that intertie, or the observed historical scheduled energy flow plus operating reserves during defined tight supply cushion hours. • UCAP determination for external resources will follow a two part process: 1. Determination of the capacity-value limit of the intertie: The capacity volume limit of an energy flows and operating reserve obligations as observed during the 100 tightest supply cushion hours per year over the previous five years. The capacity value limit of an intertie will be determined without adjustment for: forced and planned derates, forced and planned outages or force majeure. The limit will reflect any intertie scheduling limitations. 2. Determination of the UCAP of the named external capacity resource: A UCAP value will be determined separately for an external capacity resource providing capacity into Alberta's over an intertie. An external capacity resource will have a capacity value determined in the same manner as an internal capacity resource. The AESO may require historical production data from external capacity resources in order to complete these calculations. The qualification of external capacity resources will be subject to Section 2.1.3.
Existing Thermal Resources **Gross Cogeneration Resources** **Existing Storage Resources**	• An availability factor will be established for these resources. • The availability factor will be based on historical declarations of availability capacity. • The calculation of an availability factor will use a single-year availability factor for each of the prior five years. Single-year availability factors are based upon average available capacity observed during the 100 tightest supply cushion hours per year. • The single-year availability factors for each of the previous five years will be averaged to create the final availability factor for the capacity resource to be used in the auction. • The availability factor, when multiplied by the resource's maximum capability, will yield the UCAP of the resource. • Availability factors will reflect historical derates, forced outages and planned outages and force majeure outages. • Availability factors will exclude Alberta driven transmission based outages or derates.
New Thermal resources/ Coal-to-Gas conversions/ New Gross Cogeneration	• The UCAP of these new resources will be established using a combination of class-average availability factors and the new resource's observed availability factor. A combination of these two metrics will be used until the resource has achieved a five year history of operations. • Class-average availability factors shall be determined by the AESO based upon review of operating data for similar operated resources. The class-average availability factor will be based upon average availability observed during the 100 tightest supply cushion hours per year for these similarly operated resources. The AESO will calculate class-average availability actors for each of the prior five years. • As operating history is realized, the new resource's UCAP will be determined using the resource's single-year availability factors. Single-year availability factors are based upon average availability observed during 100 tightest supply cushion hours per year. The single-year availability factors will be supplemented with the class average

	availability factors in order to obtain five years average availability. • The availability factor, when multiplied by the maximum capability, yields the capacity value for the new resource. This provides the UCAP of the resource. • Availability factors will reflect historical derates, forced outages and planned outages and force majeure outages. They will exclude Alberta-driven transmission-based outages. • In the absence of comparable units, the availability factor may be determined using production estimates and engineering studies for resources.
Self-Supply (Existing)	• A capacity factor will be established for these resources. • The capacity factor will be based on observed net-historical generation data. • The calculation of a capacity factor will use a single-year capacity factor for each of the prior five years. Single-year availability factors are based upon average production plus dispatched, but not directed, operating reserves observed during the 100 tightest supply cushion hours per year. • The single-year availability factors for each of the previous five years will be averaged to create the final capacity factor for the capacity resource to be used in the auction. • The capacity factor, when multiplied by the maximum generation output observed over the previous five years, will yield the UCAP of the resource. • Capacity factors will reflect historical derates, forced outages and planned outages and force majeure outages. They will exclude Alberta-driven transmission-based outages or derates.
Large Hydro **The Bow River system, Brazeau and Big Horn**	• An availability factor will be established for these resources. The Availability Factor will be based on historical declarations of Availability Capacity. • The calculation of an availability factor will use a single-year availability factor for each of the prior five years. Single-year availability factors are based upon average available capacity observed during the 100 tightest supply cushion hours per year. • The single-year availability factors for each of the previous five years will be averaged to create the final availability factor for the capacity resource to be used in the auction. • The availability factor, when multiplied by the resource's maximum capability, will yield the UCAP of the resource. • Capacity factors will reflect historical derates, forced outages and planned outages and force majeure outages. They will exclude Alberta-driven transmission-based outages or derates.
New Large-hydro	• Given the uniqueness of new large-hydro capacity resources, the UCAP of these resources will be determined through the evaluation of engineering data and or meteorological data.
Capacity Demand Response	• There are two types of demand response for which UCAP will need to be determined: demand response which reduces consumption to a pre-established level, referred to as “down-to-demand response” and demand response which reduces consumption by a predetermined amount, referred to as “down-by-demand response.” 1. Down-to-demand response The AESO will calculate an Average Tight Supply Cushion Load (ATSCL) to establish the upper boundary of a "down-to" demand resource (DR) capacity resource based on the average consumption during the 100 tightest supply cushion hours in Alberta over the last one-year historical period.

	The Emergency Event Maximum Consumption Level (EEMCL) is the maximum demand level that the DR resource commits to consume during a capacity performance period. The difference between the ATSCL and EEMCL will then be multiplied by a load derating factor in order to establish a UCAP for the resource. The derating factor is analogous to the forced and outage derating applied to thermal units. The approach to determining the derating factor will be established during the detailed design process of the capacity market. 2. Down-by-demand response The AESO will calculate an average ATSCL to establish the upper boundary of a "down-by" DR capacity resource based on the average consumption of its load during the 100 tightest supply cushion hours in Alberta over the last one-year historical period. In prequalifying, the down-by resource owner will declare an amount of energy that the resource will reduce consumption by when required during performance events. This volume will be multiplied by a load derating factor in order to establish a UCAP for the resource. The derating factor is analogous to the forced and outage derating applied to thermal units. The approach to determining the derating factor will be established during the detailed design process of the capacity market.
Energy Efficiency	• Not eligible for the initial auction. The AESO will release a schedule to determine future participation requirements.
Storage Resources (New)	• An availability factor will be established for these resources. Given the uniqueness and lack of historical comparators for new storage resources in Alberta, the UCAP of these resources will be determined through the evaluation of engineering data. The UCAP of a storage resource will be capped at its maximum sustainable four-hour discharge capability.

2.4 Credit Requirements for Participation as a New Capacity Resource

To mitigate the risks associated with new entry, the AESO will impose capacity market credit requirements on new resources selling into forward capacity auctions and rebalancing auctions. The credit requirement consists of 15 per cent of annual net-CONE with a minimum value of $7.30/kW-year. Consistent with other existing forward capacity markets, the AESO will impose its credit requirement of 15 per cent of annual net-CONE for each delivery year. Under this framework, a resource clearing three forward auctions would incur a total credit requirement of 45 per cent of annual net-CONE before delivery begins. To reflect the diminishing risk of non-delivery for a new resource as it progresses through its development, the AESO will reduce the credit requirement in accordance with project development milestones such as commencement of construction, commercial operation date, etc.

Guidelines governing payment for the capacity market credit requirement for new resources will be consistent with the AESO's existing credit policy, which includes such things as limits on unsecured credit, and acceptable forms of secured credit for participants across the AESO's markets.