# CMD Final Industry Stakeholder Comment Matrix

The AESO invites stakeholders to provide comments on the final Comprehensive Market Design (CMD Final). All feedback (whether it be general or specific in nature) will assist in the development of the suite of ISO rules for the implementation of the capacity market. With respect to comments provided in relation to the "Specific Feedback Questions", please note that your responses will also help to inform future consultation activities, including the topics to be discussed during upcoming stakeholder sessions expected to be planned for the end of July/early August.

Please review the instructions below and submit your feedback to capacitymarket@aeso.ca no later than 3:00 p.m. on Friday, July 20, 2018.

The AESO will post all feedback "as received" on www.aeso.ca by Wednesday, July 25, 2018. Please note that the names of the parties submitting each completed comment matrix will be included in this posting. Please also note that the AESO will not be responding to individual submissions.

## Instructions

- Stakeholders are requested to provide all feedback on CMD Final within this matrix.
  - if it is believed necessary to submit additional supporting documentation, please clearly indicate which section of CMD Final or topic your document refers to. No handwritten comments will be accepted.

- Please input your name and the organization you are representing in the comment boxes provided below each CMD Final section. Your contact information is requested in each section for ease of sorting and compiling feedback from all stakeholders.
  - Press Shift + Return to enter paragraph breaks within a comment box.
  - Comment boxes will automatically expand if additional room for feedback is required.

If you have any questions about this comment matrix, please email capacitymarket@aeso.ca

## CMD Final Glossary

1) *Which, if any, of the defined terms in the glossary do you find vague, confusing, or unnecessary? Please identify each defined term and explain how it may be improved.*

   There are no definitions that are vague, confusing, or unnecessary.

2) *What gaps or disconnects may exist as between the glossary and the sections of CMD Final? Please identify any relevant terms, definitions, and/or specific content in CMD Final.*

   The glossary reflects the sections of the CMD Final. To our knowledge there are no gaps or disconnects between them. We would have preferred the CMD Final specifically address base load renewable electricity sources such as geothermal, with corresponding definitions in the glossary, but because neither the CMD Final nor the glossary address that topic, there remain no gaps or disconnects between them.

3) *Which, if any, of the definitions in the glossary contradict the AESO's current Consolidated Authoritative Document Glossary? Please identify each term and corresponding definition, and describe the concern.*

   To our knowledge there are no contradictions.

4) *Which terms, if any, do you believe are missing from the glossary? Please provide each term that is missing and suggest an appropriate definition.*

   "Energy Efficiency Resource" appears later in the CMD Final but does not appear in the glossary.

   Types of assets, notably the list that appears in asset-specific UCAP calculations (3.1.12) are not defined in the glossary. Including these would be helpful.

5) *Do you have any other feedback specific to the glossary that you would like to provide?*

   No further feedback on this section.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 2: Supply Participation

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   Competitive marker forces are not served by restricting the qualifying assets to those at or greater than 1MW. Geothermal resources in Alberta may produce less than 1MW, yet can contribute to a stable capacity market and help maintain supply adequacy due to their base load and dispatchable qualities.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   No concepts or details are unclear or confusing.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

Assets producing less than 1MW are not able to qualify under this section and therefore are not able to participate in the capacity auction. This excludes geothermal developers and also potentially other renewable energy sources. An option for qualifying assets less than 1MW (other than aggregated capacity assets) should be put in place so that geothermal projects can participate in the capacity market.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   Consider the need for a greater mix of renewable energy sources providing electricity to Alberta's grid, as coal capacity is shut down leading up to 2030 and reductions in greenhouse gas emissions become a greater priority, all while demand is likely to increase. It should be made easier for renewable assets, particularly geothermal assets, to participate in the capacity auction. It seems as if little regard is paid here to the possibility of smaller assets, of which geothermal is likely to be one as the geology of Alberta is best suited for geothermal micro-power generation.

***SPECIFIC FEEDBACK QUESTIONS***

*The AESO is also specifically requesting feedback on the following question(s):*

1) *Is the description of the required thresholds to be classified as a refurbished asset clear? What additional considerations or further detail may be required, regarding the determination of these thresholds?*

2) *Is the description of the mechanics of making refurbishment offers and the associated market clearing mechanism clear? If not, please explain.*

3) *What additional considerations or further detail may be required regarding the conditions under which temporarily delisted assets can return to service during an obligation period?*

The refurbished asset section is clear. The mechanics of making refurbishment offers and the associated market clearing mechanism is described clearly. We have no feedback on additional considerations or further detail.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

This is the key section as far as geothermal energy is concerned. There seems to be a very narrow route for geothermal participation in the capacity market, requiring 1MW or greater capacity from participating assets. The geology of Alberta is such that geothermal assets are likely to produce below 1MW. Yet they can still contribute meaningfully to Alberta's grid, if they are allowed to participate in the capacity auctions. According to this design, they would not be able to participate. This will make it more difficult for geothermal assets to become established in Alberta going forward.

Alberta should take note of California as an example to follow. California also operates on a capacity market, but has a 0.5MW minimum resource capacity size. This is a much more reasonable threshold for participation in the capacity market and would give smaller geothermal assets (likely to be more common in Alberta given the nature of Alberta's geothermal resources) an opportunity to participate.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 3: Calculation of UCAP

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   This section seems designed to adequately meet the desired end state and criteria. It is good that the formulae for UCAP calculation for each asset type are available and transparent. The formulae appear to be designed to measure the most likely range of capability of each asset type, which will help maintain supply adequacy.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   There are no unclear or confusing concepts or details in this section.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   Geothermal assets are not provided a method for UCAP calculation, while other less reliable renewable sources such as wind, solar, and run of river hydro are included. If a goal of this section is to provide comprehensive formulae for the calculation of UCAP for different types of assets, geothermal assets should be included. This is especially true if our suggestion is heeded to provide a greater opportunity for geothermal participation in the capacity auctions.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   We have no additional feedback for this question.

***SPECIFIC FEEDBACK QUESTIONS***

1) *Is the regression-based approach to determining UCAP for gross dispatched self-suppliers clear? What additional considerations or further detail may be required, to sufficiently describe this approach?*
2) *What additional considerations or further detail may be required regarding the process for determining external resource UCAPs?*
3) *What additional considerations or further detail may be required regarding the UCAP refinement process?*
4) *Should the list of events under which a refinement request can be submitted as provided in section 3.2.2.a.i be further defined? If so, please provide your suggestions.*

The regression-based approach seems adequately clear. We have no knowledge of additional considerations or details that may be required to sufficiently describe the approach. Nor do we have additional feedback regarding the process for determining external resource UCAPs beyond what we have already stated in previous questions, or the UCAP refinement process. The list of events under which a refinement request can be submitted seems adequate, with the sole exception of "act of public enemy" which could use additional clarification as to how it is distinguished from other events such as vandalism. Overall, geothermal assets should be included more in all sections of the CMD.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

No additional comments.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 4: Calculation of demand curve parameters

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   This section is important to maintaining system adequacy, key to the desired end state and criteria. In our view this section sets a reasonable standard for system reliability and the calculation of the demand curve.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   There are no problems with clarity or confusion in this section.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   Once again geothermal sources are left out. This is particularly important for this section because the base load, dispatchable nature of geothermal technology makes it a key component to help minimize system outages and meet demand even at both peak and trough periods. A special output profile should be created for geothermal generators. The nature of geothermal technology is such that significant initial capital cost makes way over time to less substantial operating costs; most expenses relating to geothermal projects are concentrated in the initial drilling and construction. As a result, calculations of gross-CONE and net-CONE for geothermal projects are unique compared to other energy sources, and could affect the demand curve calculations in meaningful ways if geothermal was included in the CMD.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   No additional comments.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

Look to California for an example of a system that provides a place for renewable resources such as geothermal in a capacity market. California has been through this process already, and learned from mistakes made. Alberta has the opportunity to learn from California and implement a system that works right from the start. We should learn from California's example and make it easier for smaller geothermal assets, as well as other smaller renewables, to participate in the capacity market.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 5: Base auction

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   While this base auction should help create a stable capacity market, can it truly be competitive if geothermal resources are excluded from participation?

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   There are no clarity issues with this section.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   The structure and schedule of the base auction as described in the CMD is adequate. There are no gaps or disconnects in the structure of the base auction itself, only in the types of technologies able to qualify to participate.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   See additional comments below.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

With three years before the start of the first obligation period, there is time for geothermal projects to emerge in Alberta able to help meet Alberta's future electricity demand, with reliable and renewable energy. Provision should be made for inclusion of geothermal projects in the base auction. Perhaps geothermal projects will not be ready in time for the first base auction, but preparation now for their inclusion in the market will save the need to do anything about them later. Once again, note California and how it incorporates renewables into its capacity market. It does not set an unnecessarily-high barrier to entry in terms of required capacity size. Alberta should emulate this system.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 6: Rebalancing auction

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   It appears as if the rebalancing auction accounts for all potential outcomes of the base auction, taking steps to meet demand in each scenario.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   This section is just as clear as the previous section. Clarity is not the issue with these auctions.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   Once again the structure of the auctions in the CMD is adequate. There do not appear to be gaps or disconnects in the design of the auctions themselves, though a separate auction for geothermal resources with an emphasis placed on their ability to provide base load dispatchable electricity would be a helpful addition.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   No further comments.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

No further comments.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 7: Capacity market monitoring and mitigation

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   Not permitting smaller geothermal assets to participate in the capacity market may make it more difficult to uphold the desired end state for Alberta's capacity market, because access to geothermal's dispatchability and base load capacity would be lost. Note California's 0.5MW minimum capacity threshold, compared to the 1MW requirement proposed in this CMD Final.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   There is sufficient clarity in this section.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   This section does not have any apparent gaps or disconnects, though we suspect the absence of geothermal projects under 1MW will be felt.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   Geothermal assets are more likely to be able to profitably withhold capacity if needed, due to the dispatchability of the resource. Market mitigation may work more efficiently with the inclusion of geothermal assets, though they will have trouble qualifying under the existing rules for supply participation.

***SPECIFIC FEEDBACK QUESTIONS***

***1)*** *What additional considerations or further detail may be required regarding how the AESO will conduct the ex ante market power screen to identify firms that will be subject to capacity market mitigation?*

***2)*** *What additional considerations or further detail may be required regarding the determination of asset specific offer caps?*

We have no comments on these sections.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

No additional comments.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 8: Supply obligations and performance assessments

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   We agree with and support the importance of closely monitoring the performance of assets under the capacity market system so as to make sure they abide by their obligations and maintain supply adequacy.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   There are no clarity issues with this section.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   There do not appear to be any gaps or disconnects in this section.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   No additional comments.

***SPECIFIC FEEDBACK QUESTIONS***

***1)*** *What additional considerations or further detail may be required regarding how the AESO will assess whether demand response assets have obtained a sufficient load volume prior to the second rebalancing auction?*

***2)*** *What additional considerations or further detail may be required regarding how the performance of external capacity assets will be measured during availability and delivery assessment periods?*

3) *Should the list of events under which availability and delivery assessments will not be conducted as provided in section 8.2.39 be further defined? If so, please provide your suggestions.*

   CanGEA has no comments on these issues.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

No additional comments.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 9: Settlement and credit requirements

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   The payments outlined in this section will benefit those assets that are able to provide more reliable capacity to the electricity grid. We support this process, especially as it will tend to benefit any geothermal participants in the capacity market due to the reliably base load, dispatchable quality of geothermal technology. This will encourage continued supply adequacy.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   There are no clarity problems with this section.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   There do not appear to be gaps or disconnects in this section.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   No additional comments.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

No additional comments.

No additional comments.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**

## CMD Final Section 10: Roadmap for changes in the Energy and Ancillary Services Markets

***GENERAL FEEDBACK QUESTIONS***

1) *Please provide your feedback as to whether the design in this section meets the desired end state and criteria set out for Alberta's capacity market design?*

   We have no comments on this issue.

2) *Which, if any, of the concepts or details discussed in this section are unclear or confusing? What should be added or clarified in the ISO rules to address this?*

   Since many smaller geothermal assets will be unable to participate in the capacity market, this section's discussion of how alternate markets will continue is particularly relevant to geothermal developers. Additional clarity would be helpful with regard to whether there will be price mitigation available for geothermal assets under this market. Which asset types qualify as "energy-limited assets" are not clear. Will geothermal assets be granted their own asset-specific reference price? It is likely the minimum stated asset-specific reference price of $25/MWh will not be economically viable for geothermal assets.

3) *What gaps or disconnects may exist in this section? What should be added or clarified in the ISO rules to address this?*

   There do not appear to be significant gaps or disconnects in this section.

4) *In addition to 2) and 3) above, what other factors or information should the AESO consider as it drafts the ISO rules for this section?*

   No additional comments.

***SPECIFIC FEEDBACK QUESTION***

***1)*** *What additional considerations or further detail may be required regarding the determination of the asset-specific reference price for non-thermal, energy-limited assets?*

   See (2) above.

***ADDITIONAL COMMENTS***

*Please add any additional comments you may have on this section here.*

Observe the example of California's capacity market, where there is a smaller minimum capacity to participate (0.5MW as opposed to the 1MW proposed in the CMD Final). This allows smaller renewable sources, such as geothermal assets, to participate in the capacity market. Geothermal assets in particular, due to their dispatchable base load nature, would contribute meaningfully to guaranteeing supply adequacy in the capacity market, per the desired end state and criteria. Alberta should seriously consider adopting some aspects of California's capacity market design, particularly the lower barrier to entry for asset capacity.

**Name: Nathan Coles Organization: Canadian Geothermal Energy Association (CanGEA)**