AESO Discussion Paper – Short-Term Wind Integration
Stakeholder Comment Matrix

Section	Subsection	Stakeholder Response
4.0 Policy Coherence	**<u>Wind Integration Principles</u>** The draft principles are intended to outline a preliminary view on the interpretation of FEOC as it relates to the interaction between wind generation, the energy market and ancillary services. This relationship must be explored in order to develop a long-term wind integration plan that is grounded in policy and consistent with the current market design. 1. Any potential suite of wind integration tools must ensure the safe and reliable operation of the system. 2. Market solutions are preferable to administrative solutions. 3. The energy market merit order is primarily a tool for balancing energy requirements on the system. 4. All generation should be treated fairly	Currently the ISO has three papers out for consultation with three different sets of principles. We recommend that the ISO endeavor to create a consistent set of high-level principles that are used to assess potential market solutions or market rules. The high-level principles should be general enough that they can be applied to different policy issues in different contexts and that can be used as the basis for future pieces of work. We request that the ISO clarify its use of the term “balancing”. Specifically, at what point does the ISO shift from using the energy market merit order to determine price via the intersection of supply and demand, to making use of Ancillary Services to manage system events that cannot be reasonably controlled?

	while recognizing their unique characteristics. 5. Ancillary services are a tool to protect the system from events that cannot be reasonably controlled.	

6.0 Short-Term Integration Tools	**6.1 Energy Market Merit Order** Stakeholder feedback on using the EMMO to integrate wind generation is requested with the following key points: • At what point is over-dispatching the merit order for ramp rate unacceptable from a FEOC perspective?	The energy market merit order should only be used to set price. In principle it is inappropriate to use the energy market merit order to manage ramp rates. Over-dispatching of the energy market merit order should only be used to manage unforeseen and unpredictable events. To the extent that an over-dispatch of the energy market merit order can be avoided through the use of other mechanisms such as wind power management or ancillary services it should be.
	• If the need to over-dispatch EMMO can be anticipated prior to real-time, should tools such as incremental ancillary services and/or WPM be used in place of over dispatching EMMO?	As stated in the above principles, ancillary services are a tool to protect the system from events that cannot be *reasonably controlled* (emphasis added). There are a number of different types of generating technologies in Alberta that generate power, and the energy produced can be classified as either controllable or uncontrollable. Historically ancillary services have been procured to increase the reliability of the electric system by backstopping what is typically controllable energy. Capital Power sees this product as something very different from a product that is procured with the intention of making uncontrollable resources controllable.
	• In the long-term, should new ancillary services be developed that will reduce the instances of over dispatching EMMO for ramp rate both for wind and for other reasons?	Until such time that wind is able to declare their offers as firm, we support the use of wind power management to curtail uncontrollable forms of energy to manage system disturbances prior to curtailing controllable energy. Capital Power understands that wind power management can only be used to curtail wind resources as they are ramping up and therefore does not offer a complete solution for managing uncontrollable resources. We recognize that the ISO has very few options for integrating wind in the short run and we believe that the energy market merit order should not be used to manage the ramp rates of uncontrollable resources. Therefore, the only alternative appears to be the

		procurement of ancillary services to manage the ramp rate of wind resources that cannot otherwise be managed via wind power management until such time a wind firming service can be developed. Ultimately wind resources should have the opportunity to firm their offers, either through self supply or via a centrally procured firming service. Should wind chose to firm their offers, they should be treated the same as all other forms of controllable generation (e.g. ability to price into the EMMO) and therefore should not be curtailed via wind power management. Alternatively, if wind chooses not to firm their offers, then wind generated energy should be curtailed prior to controllable forms of generation in the event of a system disturbance.
	6.2 Operating Reserve **<u>Regulating Reserve</u>** • Is it appropriate and FEOC to procure RR day-ahead when the wind forecast suggests they will be required to mitigate wind volatility? • How should the volume, if any, of incremental active regulating reserve be determined? o Based on the volume required to accommodate forecast wind energy? o Based on a tradeoff between the cost of incremental reserve and the value of lost wind production? o Based on the volume required to reliably integrate wind without	As discussed above, it is not appropriate to procure ancillary services to make wind generation controllable; wind resources should be given the option to either firm their energy offers or to accept a lower priority access to the transmission system in response to system disturbances. However, given the lack of tools in the short-run the ISO may need to procure additional regulating reserves to integrate wind generation. We do not support the use of ancillary services as a long-term solution for integrating uncontrollable generation. The amount of regulating reserves procured should be based on the volume required to accommodate the forecast and the volume that is required to reliability integrate wind without relying on the energy market merit order. If the ISO is able to reduce the amount of regulating reserves that it procures through the use of wind power management it should do so.

	planning to rely on tools such as over dispatching the EMMO? • Should standby RR be activated in near-real time to manage the system over and above current RR levels? o Activating standby reserve would need to be done prior to an actual problem because moving reserve from standby to active make a situation worse as the unit activated alters its generation to provide the service. o Is it appropriate and FEOC to activate standby RR near real-time (T-2 or even T-30min) when the near real time wind forecast and system conditions suggest they will be required to mitigate wind volatility? • In the long-term, should regulating reserve be split into a load following product and an AGC product?	The ISO should not use standby reserves to manage wind ramps. Currently the triggers for activating standby reserves include; under forecast of active reserves by the ISO or the contingency of an active reserve provider. The ISO should not change its protocol for activating standby reserves to accommodate wind ramping events. We do not support the use of ancillary services as a long term solution for integrating uncontrollable generation. Wind generators should have the option to firm their energy offers, either through a centrally procured product or through self supply. The technical requirements of the product may differ depending on the direction of wind ramping, however, there should be a market solution developed for firming wind. This product would not be an ancillary service, and the costs should not be attributed to load.
	6.2 Operating Reserve **<u>Contingency Reserve</u>**	

	• Should the AESO use mandatory active contingency reserve to manage unexpected decreases in wind generation if allowed by NWPP?
	• Should the AESO carry incremental active contingency reserve to insure against decreases in wind generation?
	  o This reserve could be tailored for specific hours when wind is forecast to ramp down and load forecast to ramp up, for example.
	  o The alternative is likely to fully dispatch EMMO for ramp rate requirements when wind energy unexpectedly declines.
	  o This is consistent with the use of contingency reserve to replace lost generation from other resources.
	• Should standby contingency reserve be activated in near-real time to manage the system, i.e. the system would carry more than the minimum active contingency reserve in some hours to manage wind variability?
	  o Reserve would need to be activated prior to an actual problem.
	  o The accuracy of the wind forecast inside T - 2 or even T - 30 minutes will determine the likelihood of activating standby reserve only when required.
		Capital Power understands that the volume of contingency reserves procured is determined by the single largest contingency. Currently, the single largest contingency in Alberta is Genesee 3 (450 MW). Is it the case that wind generation with correlated wind profiles could replace Genesee 3 as the single largest contingency? If so, will the ISO have to procure more contingency reserves?

	• Should unexpected decreases in wind generation be treated equivalently to other generation contingencies, i.e. the system carries sufficient contingency reserve to manage unexpected loss of generation?	Capital Power does not agree that the use of contingency reserves for a loss uncontrollable generation is consistent with the use of reserves to replace lost controllable generation. However, what other options does the ISO have in the interim to manage the ramp rates of uncontrollable generation, without using the energy market merit order?
	6.3 Wind Power Management • Under what conditions is it appropriate to use WPM? o In advance of conditions that might place the system at risk? For example, if wind is at a high level and expected to ramp down concurrently with the morning load ramp up, should WPM be used	Until such time that wind is considered controllable it should be curtailed using wind power management prior to curtailing controllable resources. If the ISO is unable to manage system disturbances through wind power management then ancillary services may be required in the near-term. The energy market merit order should only be used as a last resort.

	proactively or should a solution such as activating standby contingency reserve be used? o When the wind ramp is not forecast? This implies the AESO purchase sufficient ancillary services to accommodate forecast ramps. o When the wind ramps up more rapidly than the EMMO can accommodate without over dispatching? This allows wind production to increase only as fast as the EMMO can ramp down and implies that incremental ancillary services will not be purchased to accommodate potential wind ramp up events. o Under supply surplus conditions? • Should the AESO establish a WPM market solution or is pro-rata appropriate? o How would a WPM market interact with the solution for supply surplus and/or congestion management? o Would participation be limited to wind facilities and how would costs be allocated? • In the long-term, should the AESO develop an ancillary service that accommodates wind ramps up by reducing production from in merit generators and/or wind facilities themselves? o Is this an appropriate cost for load to bear since wind can manage this	Until such time that the rules allow wind to fully participate in the market are established, wind power management may be required. Although, wind power management should be used to curtail uncontrollable energy prior to controllable forms of generation in response to system disturbances, the wind power management protocol should be fairly designed such that wind facilities contributing to the problem are curtailed prior to wind facilities that are not. No, it is not appropriate to use ancillary services paid for by load to accommodate wind ramps. Wind generators should have the option to firm their energy offers, either through a centrally procured product or through self supply.

	operational challenge through a WPM protocol?	
	6.4 Wind Power Forecast • Should the system be able to accommodate forecast wind generation? o Purchase sufficient reserve to accommodate forecast wind generation. o The alternative is to rely on more WPM and /or over dispatching EMMO. • Should the wind power forecast for individual facilities (or the aggregate wind forecast) resemble a must offer must comply obligation in the long-term? o If the forecast creates obligations for wind facilities, does it also create obligations for the system to absorb the forecast without using WPM?	In the short-run the ISO should rely on wind power management as the primary tool for managing uncontrollable generation. The ISO should procure enough reserves using the wind power forecast while taking into account its ability to use wind power management. In the long-term if wind firms its energy offers through the use of ISO procured firming service, then wind will pay its share of the incremental system costs resulting from its integration and additional ancillary services will not be required. Wind generators should have the ability to make firm energy offers just like other forms of generation and they should be subject to the same must offer must comply requirements that other forms of generation are subject to. If wind energy is controllable then the system should be able to accommodate all wind energy in the merit order under normal conditions. It would be inappropriate to use wind power management to curtail controllable energy. If curtailments are required, all controllable energy should be treated the same.
	6.5 Summary of Integration Options **<u>Short-Term Requirements</u>** • Determine the volume, mix and procurement strategy for incremental ancillary services as	As long as wind is not controllable the ISO should use wind power management as the first option for managing uncontrollable

	wind capacity increases • Develop a process to implement WPM • Develop guidelines on the use of WPM in real time or near real time	resources. If wind power management is ineffective or unavailable the ISO may then be forced to procure enough ancillary services to avoid using the energy market merit order to manage system disturbances.
	6.5 Summary of Integration Options **<u>Potential Long-Term Direction</u>** 1. Mitigate wind power primarily through the use of centrally procured ancillary services o Minimal use of WPM o No must offer must comply obligation for wind o A ramping service would be developed 2. Mixed solution o WPM used to mitigate wind ramp up events o Reserve to mitigate wind ramp down events o A ramping service may be developed o Could entail a form of must offer must comply obligation for wind generators particularly to control ramp ups 3. Create similar obligations for wind generators as exist for other generators	In the long-term wind should be subject to the same must offer must comply requirements that all other forms of generation are subject to. We do not support the use of ancillary services as a long-term solution for integrating uncontrollable generation. Wind generators should have the option to firm their energy offers, either through a centrally procured product or through self supply. The technical requirements of the product may differ depending on the direction of wind ramping; however, there should be a market solution developed for firming wind. This product would not be an ancillary service, and the costs should not be attributed to load.

	o Wind power forecast could be part of a must offer must comply obligation o Could require wind to be firm at T – 2 o Wind firming service developed either by the market or by AESO	