



Stakeholder Comment and AESO Reply Matrix

AESO Recommendation Paper – Short-Term Wind Integration

December 16, 2010

4.0 Policy Coherence		
<u>Wind Integration Principles</u>		
<ol style="list-style-type: none"> 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 while recognizing their unique characteristics. 5. Ancillary services are a tool to protect the system from events that cannot be reasonably controlled. 		
Stakeholder	Stakeholder Comment	AESO Replies
Alberta Direct Connect Consumers Association (“ADC”)	The ADC is supportive of these principles	Acknowledged.
Capital Power Corporation	<p>1. The AESO’s recommendation to utilize standby contingency reserves in order to deal with wind ramp downs contradicts with the first principle. Capital Power believes that contingency reserves should not be used to address wind down ramp events as these events do not fall under the definition of “contingency.”</p> <p>The AESO defines Contingency Reserves as “an amount of Operating Reserve sufficient to reduce Area Control Error to zero following loss of generating capacity, which would result from the most severe single contingency all in a manner which adheres to WECC criteria.” Contingency is further defined as “the unexpected failure</p>	<p>The AESO recommends that if the North West Power Pool allows contingency reserve to replace the unexpected loss of wind generation due to a reduction in wind speed, this practice should be followed in Alberta. Until this is allowed, the AESO recommends incremental contingency reserves (volumes beyond the minimum specified by NWPP) be activated from the standby market to manage wind ramp down events in excess of the EMMO capability.</p> <p>The AESO’s position is that utilizing standby contingency reserves to manage wind ramp down events is the best option available that can be implemented given</p>



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	<p>or outage of a system component, such as a generator, transmission line, circuit breaker, switch, or other electrical element.” A wind down ramp event can not be defined as a contingency as it is not an “unexpected failure” or “outage of a system component”. A wind down ramp event is not an unexpected failure; wind down ramp events are expected. In fact, the purpose of short-term, and long-term wind integration, is to determine how to integrate wind given that it is expected to provide intermittent power.</p> <p>Even if the AESO considers a wind ramp down event an “unexpected failure”, using contingency reserves for such events is not in line with the intended use of contingency reserves, as contemplated under the AESO’s Transmission Reliability Criteria. Consistent with NERC/WECC Planning Standards, the AESO requires contingency reserves to deal with the loss of firm load.¹</p> <p>A wind down ramp event is not an “outage of a system component” that can be compared to a contingency event for a firm generator such as an equipment failure. System component is further defined as a “generator, transmission line, circuit breaker, switch, or other electrical element.” A decrease in wind energy due to</p>	<p>the time constraints. Over dispatching the EMMO and thereby using it as a de facto ramping service creates both reliability concerns and price fidelity concerns.</p> <p>.</p> <p>The AESO acknowledges that the use of standby reserves to manage wind ramp down events may not be the long term solution. However, given the time constraints and the requirement to have a solution in place in early 2011, new products and/or market rules for wind were not feasible options in the first phase of work. These options are being explored for the next phase of the wind integration effort.</p> <p>The AESO does not recommend procuring additional standby reserves at this time because it is expected that with forecasting, the existing standby volumes will be sufficient for 1100 MW wind level. At higher levels of wind capacity, incremental standby reserves would be required but the AESO is consulting to develop further measures to manage wind variability to manage greater wind capacity.</p> <p>The AESO recommends that a tool be developed that calculates the real-time ramping capability of the system under the</p>
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	<p>the absence of wind can not reasonably be defined as an outage of a system component, as wind is not a firm generator or other electrical element. This would be comparable to using contingency reserves to firm coal or gas generation for a lack of fuel supply.</p> <p>Additionally, if contingency reserves are being used to help with wind ramping events, they may not be available for their original intended purpose. This, as a result, has negative implications for reliability. We are confused by the AESO view that no additional standby contingency reserves will be needed to maintain reliable operations of the system when its use is expanded to support wind integration. Presumably, standby contingency reserves would be expected to be activated to a greater degree than today therefore driving a need for more.</p> <p>Capital Power does not support the use of standby contingency reserves to balance wind ramp down events.</p> <p>While we acknowledge that the short term solutions available will require tradeoffs, we ask the AESO to move as quickly as possible to moving to a more sustainable, long term solution to integrating wind.</p>	<p>assumption that dispatches are made for energy requirements. When expected ramp up requirements exceed the capability of the EMMO, the AESO will activate incremental standby reserves. The frequency of these activations will depend both on the accuracy of the wind power forecast and the amount of wind power on the system.</p>
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	<p>Capital Power supports market-based approaches to addressing the challenges of wind integration. We encourage the AESO to incorporate wind firming products (e.g. ramp down, reactive power) in the new ancillary service redesign. These products will allow for greater integration of wind and would provide approaches to firming wind that does not require the AESO to use reserves for unintended purposes.</p> <p>2. The AESO's recommendation to use standby contingency reserves to deal with wind ramp downs is contrary to the second principle. Reliability is an inherent problem with wind generation. As such, addressing this reliability issue through standby reserves while at the same time suggesting that no additional reserves are required to meet wind ramp down events, avoids developing a market based solution to this problem (using a reserve product for an unintended purpose is not a market based solution; the reserve product is procured from the ancillary service market but the value of the product is based on a different intended use/usage pattern). While Capital Power understands the AESO's decision to utilize these reserves as a short term solution, a true market-based solution to wind ramp downs is necessary in the long-</p>	
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	<p>run through the development of a wind firming service (or market).</p> <p>3. Capital Power supports the AESO's recommendation to use the EMMO to balance supply and demand. The use of the EMMO would better reflect the real supply and price volatility caused by wind being integrated into the system without being firming. The use of reserves to manage issues caused by non-firm wind can be viewed as an attempt to manage price outcomes, which reduces price fidelity and transparency in the market. For these reasons, Capital Power recommended that the AESO always use the EMMO where possible. The EMMO is better poised to respond to wind ramping events than standby reserves – standby reserves are not quick response generation that can be operated flexibly (standby reserves are typically supplied by coal units, which are slower ramping generation).</p> <p>Capital Power understands that ramp events may be managed through the use of WPM, reserves, and the EMMO. We wish to more fully understand the factors the AESO will consider when it makes the decision to move from using the reserves and the EMMO. The process for deciding on using reserves or EMMO must be</p>	
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	<p>transparent in order to provide comfort that the AESO is not using reserves to manage price outcomes.</p> <p>4. By firming wind through the use of reserves, the AESO’s action will give wind unfair treatment in the marketplace and, thereby, contradict the fourth principle. While we believe that all generation should have access to the marketplace, we do not believe that any type of generation should receive preferential treatment, which results in unfair treatment of other generation. As the number of wind generation project increases, a growing proportion of the power supply in the market will not respond as capacity resources (firm generators). This generation will be allowed to influence and affect the market merit order and market price, unfairly shifting the commercial risks of wind generation to other market participants.</p> <p>Additionally, market participants who provide standby reserves will be activated to a greater degree than under the current regime. Standby resources, generally speaking, are slower response units that are less suitable for use to address fast or short duration events. We would expect that the AESO would have no other option</p>	
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	<p>but to use more standby reserve in advance of a wind event. Can the AESO provide more detail about how this process of using contingency reserves to meet wind needs will work? Will the amounts being procured change? Will the amount of standby being activated increase?</p> <p>Finally, load will bear the cost of reserves. To more fully appreciate the short term integration approach, can the AESO provide some expected scenarios of how they envision these costs being changed by this approach going forward?</p> <p>5. Capital Power agrees with the fifth principle, however disagrees with the AESO's recommendation to use standby reserves to deal with wind ramp down events. Wind ramp down events can be reasonably controlled with the introduction of a wind firming service and therefore do not require ancillary services to protect the system from events that can not be controlled.</p>	
NaturEner	NaturEner agrees with the listed principles and has previously provided comments in this regard in response to the Discussion Paper on Short Term Wind Integration.	Acknowledged.
Suncor	Agree	Acknowledged.
TransAlta	Principle #1:	The AESO will alter principle #1 in forthcoming wind integration papers to



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	<p>We note that a tool in itself cannot ensure anything so we would suggest this be changed to: Any potential suite of wind integration tools must be supportive of the safe and reliable operation of the system.</p> <p>Principle #5:</p> <p>Ancillary service are defined in the Electric Utilities act : Ancillary Services means those service required to ensure that the interconnected electric system is operated in a manner that provides a satisfactory level of service with acceptable levels of voltage and frequency.</p> <p>This definition does not contemplate reasonably controlled.</p> <p>The AESO itself uses a wider definition of AS: http://www.aeso.ca/market/5093.html . These include TMR, black start and load shed scheme services. The following is quoted form the AESO's description of LSS: Load shed schemes primary purpose is stated to balance load and generation after a loss of resources, thereby preserving system stability. The following is quoted from the TMR section of the AESO's ancillary services page: TMR is used to compensate for insufficient local transmission infrastructure relative to local</p>	<p>reflect this comment.</p> <p>The principles reflect the AESO's interpretation of its mandate to integrate wind on the system in a fair, efficient and openly competitive manner while maintaining system reliability. Principle #5 reflects that wind generators can and should control elements of their operation in order to maintain a fair and efficient market.</p>
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	<p>demand. This is used to ensure system reliability until adequate transmission infrastructure is built.</p> <p>We note that these are procured services that do not meet the narrow principle definition provided by principle #5.</p> <p>The concept of “reasonably controlled” is not found in the Act or the Transmission Regulation. What is the source of this principle in determining whether an ancillary service will be procured due to imbalances on the system?</p> <p>We suggest number 5 be reworded to be consistent with the definition provided in the Act.</p>	
UCA	<p>The UCA accepts these principles as guides for this first phase of efforts to integrate wind power projects anticipated to come on line in the next year to two years. Recognition of solution these principles and solutions as short term is important as AESO moves into the next phases of this project.</p>	Acknowledged.
5.0 Analysis		
<p>5.1 Source of ACE Events</p> <ul style="list-style-type: none"> The AESO provided further clarification relative to the discussion paper that wind generation was a contributing factor in about 90% of ACE events. 		

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Stakeholder	Stakeholder Comment	AESO Replies
NaturEner	<p>NaturEner agrees with the general statement of the contribution of wind schedule error to ACE events, but believes that 90% seems high. The AESO should provide more information as NaturEner knows out of experience that part of the issue is to identify the load error and to look at wind as a load reducer rather than an additional generator.</p>	<p>Wind contributes to about 90% of the ACE events seen in the study. It is not, however, the only contributor. The AESO's recommended solution recognizes this finding.</p>
TransAlta	<p>TransAlta would like to highlight that the AESO has based their analysis on a simulation model of possible ACE events rather than historical or current events. The ACE events have not occurred and so any statement must be qualified for proper interpretation.</p> <p>Is it the intention of the AESO to eliminate ACE events by WPM? Or is it the intention of the AESO to control ramp rates it can not accommodate by EMMO by using WPM?</p> <p>An ACE event is an unscheduled flow which can result from many contributions. All system contingencies whether they are as a result of generator fuel issues, generator operations issues, ramping variances by other generators or transmission issues are unscheduled flows. Any tools designed by the AESO to</p>	<p>The AESO's position is that WPM is the most effective way to manage wind ramp up events that exceed the ability of the system to accommodate wind generation.</p> <p>The system wind power limit considers the current wind production, the changes in load, the EMMO capability and the inertia net change. The wind power limit will limit the increase in wind production and therefore if wind is not contributing to an over generation condition it will not be impacted.</p> <p>The AESO will begin consultation WPM provisions in January 2011.</p>

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	<p>implement WPM must also in real time analyze all unscheduled flows to isolate the contribution solely resulting from wind. We are concerned that if the tool is not designed this way, Wind will be curtailed to mitigate the contribution to unscheduled flows that are attributable to other participants.</p>	
<p>5.2 WPM and Regulating Reserve Comparison</p> <ul style="list-style-type: none"> The tradeoff between WPM and regulating reserve illustrates that WPM is about 5 to 10 times more efficient in resolving over generation situations. 		
Stakeholder	Stakeholder Comment	AESO Replies
NaturEner	<p>WPM can only be a short term solution. In the mid and long term the AESO should honour the stated principle: “market solutions are to be preferred ...” WPM should only be used as a last resort and market solutions comparable to the Dispatch Down Service (“DDS”) should be implemented in ramp up situations, in which the generation exceeds the load.</p>	<p>The AESO will release a discussion paper in December 2010 that initiates the consultation process on long-term solutions.</p>
TransAlta	<p>TransAlta acknowledges that Wind Power Management would be cheaper for the AESO to procure than additional ancillary services. However we question if this makes them more efficient or fair. The AESO argues that since Wind can control its ramp it should bear the cost of managing the controllable elements of their operations just as all other generation types must. Other types of generation are</p>	<p>All non-wind generators are required to offer energy and comply with a dispatch. These generators must also comply with dispatches within a specified ramp rate.</p> <p>Under the proposed wind technical rule that was filed in August 2010, the AESO recommended that the wind farms built under the 1999 standard would not be subject to meet the WPM requirements in</p>



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	<p>not asked to limit their ramp below its operational capability although this could be argued to be within their operational control.</p> <p>TransAlta thanks the AESO for the analysis in 5.2 which, taken at face value, provides evidence that for the existing wind capacity of 629 MW the use of Wind Power Management is not required in the typical 600 MW/hr EMMO situation. Whereas, again taken at face value, Wind Power Management may be required if wind capacity doubled to approximately 1260 MW. It seems reasonable to assume that the new capacity in the doubling assumption will have Wind Power Management capability in accordance with proposed Rule 502.1 and would be sufficient to manage the expected wind variability on the system.</p> <p>TransAlta also questions the AESO’s assessment that WPM is more efficient for resolving over generation situations. We acknowledge that the approach would be cheaper for the AESO to procure. We would ask the AESO to consider the costs required to Wind producers and the AESO, for putting in WPM equipment, control systems and processes in place. The small incremental cost of adding additional</p>	<p>the proposed technical rule because it is not cost effective. However, they will be required to comply with all directives and market requirements as established in the rules and procedures</p> <p>Using incremental regulating reserves as the primary solution is unfair to other generators that must control their operations, and loads that would pay for incremental reserves to manage wind ramp events that are controllable by wind generators.</p> <p>Additionally, purchasing incremental regulating reserves is inefficient. The AESO has a duty to manage ancillary services costs (EUA Section 17(f)) and ensure that these costs are prudent (EUA Section 30(2)). The analysis in the paper indicated WPM is 6 times more effective in mitigating over generation conditions associated with wind ramping events. This finding was on the basis that regulating reserve could be procured only for those hours required, i.e. the AESO would have a “perfect” forecast of wind ramping events. Since regulating reserve must be purchased prior to real-time and WPM is a real-time tool, the actual difference in relative efficiency would be much greater and dependent on the forecast accuracy.</p>
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	<p>Ancillary services to balance the system during a wind ramp do not seem unreasonable.</p> <p>What is material, and must be considered, are the costs involved in wind farms providing the equipment and control systems to put WPM into effect and the costs for the AESO to put WPM tools in effect. The AESO should undertake a cost benefit analysis of the costs and effort required to put WPM in place versus the process for reserves which is already in place.</p> <p>In perspective the annual power pool market is about \$5 billion or over \$400 million per month. Reserves on an annual basis cost less than \$300 million or \$25 million per month.</p> <p>It should be pointed out for the 600 MW/hr EMMO ramp simulation example that, in the double wind capacity situation, the expected wind energy curtailment is 0.1% as compared to requiring an expected additional 1.4% of regulating reserves energy. Both numbers are small and not material.</p> <p>Based on the numbers provided, the RR increase in the period was 0.2% for the four</p>	<p>Notwithstanding the efficiency advantage of utilizing WPM over incremental regulating reserve, the AESO notes that WPM would be required in any event in order to manage unanticipated events even if incremental regulating reserves were purchased. The requirement to respond to dispatch or directive by the system controller is a fundamental requirement of participation in the Alberta market.</p>
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	<p>months of February through May 2010. The cost of such increased RR would cost \$0.6 million or about \$50,000 per month.</p> <p>In the doubling case, even accepting the 1.4% RR number, the numbers are also not material. Using the same values as above this equates to \$350,000 per month. As a percentage of the \$400 million per month pool price energy market this is about 0.09%, i.e. 9/100th of 1%.</p> <p>Another way of looking at this would be to consider that if the average pool price dropped by 9/100th of 1% the cost of the increased reserves would be covered. Wind is known to result in reduced pool prices.</p> <p>The AESO must consider changes to the pool price and induced pool price volatility of WPM where energy at less than the marginal price is withdrawn from the system and must be replaced by higher priced marginal energy. The 15 minute interval adjustments will induce price perturbations and volatility.</p> <p>What is also not known is whether the time period chosen for the analysis is representative of future similar time periods and what the estimates of curtailed production would be on an annualized</p>	
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	<p>basis? Can four months be extrapolated to a year and is that year representative of future years? Implicit in the simulation analysis is the assertion that the conclusions made are accurate for all future circumstances. Such an assertion is unfounded given the simplistic and unrepresentative analysis which cannot be extended to draw any conclusions other than those appropriate for the specific four month period.</p> <p>Wind energy production is highly seasonal. One wonders why a November through February time period, which is a much higher wind production period, was not chosen for the analysis.</p> <p>One also wonders if in the doubling case the expected geographic diversity of new wind farms across Alberta was taken into account.</p> <p>The analysis does not disclose the assumptions about what percentage of the wind farms were assumed to have WPM capability. As proposed, wind farms approved under standards prior to the 2004 wind standard are exempt from WPM and this is approximately 300 MW. In theory, units with WPM capability may as such face a higher share of the curtailment than</p>	
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	<p>the average numbers indicate. A more transparent analysis would show the percentage of energy curtailed from wind farms which are WPM capable.</p> <p>The AESO should provide the reserves required for the exempt units and should also ensure the proposed tool can isolate the contribution from such exempt units so that non-exempt units are not burdened with the defacto provision of WPM services for the exempt units.</p> <p>WPM means curtailment of production and the uncertainty of the extent of such curtailments will undermine investor confidence to invest in new wind farms. As well, it will make it more difficult for wind developers to find financing for their projects or, if available, will be at higher cost.</p> <p>Doubling the existing wind capacity in the time period means the AESO must have in the analysis redispatched other production and presumably inserting an additional 524 GWh of \$0 wind energy would have had a downward pool price impact. The value of this pool price impact has not been disclosed.</p>	
<p>6.0 Recommendations</p>		



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6.1 Energy Market Merit Order		
<ul style="list-style-type: none"> The AESO recommends that the EMMO continue to be used as the primary tool to balance supply and demand in the market The AESO recommends that EMMO dispatches to accommodate wind power should not include dispatches solely intended to achieve a higher system ramp rate. The AESO recommends that a tool be developed that calculates the real-time ramping capability of the system under the assumption that dispatches are made for energy requirements. 		
Stakeholder	Stakeholder Comment	Replies
Alberta Direct Connect Consumers Association (“ADC”)	The ADC agrees with this approach. The EMMO should be used for energy requirements, not ramping requirements	Acknowledged.
ENMAX Energy Corporation	<p>EEC agrees with the AESO that EMMO dispatches should (at least in principle) not include dispatches solely intended to achieve a higher system ramp rate. It is EEC’s understanding, however, that dispatching up the merit order to achieve a required ramp rate is a frequent—perhaps even daily—occurrence in response to large load ramps. EEC also understands that this can occur regardless of the amount of wind generation that’s online or the rate of change thereof. EEC would therefore appreciate some clarification with respect to the following:</p> <p>(1) Will the concept of using non-EMMO methods to handle ramps be independent of whether a given ramp rate results from load only or load plus wind?</p> <p>(2) If so, what changes to historic dispatch</p>	<p>The AESO currently manages ramping requirements through the use of the EMMO and regulating reserve. Since load ramps are predictable, the AESO is able to purchase extra regulating reserves for the hours when the required ramp rate exceeds the typical EMMO capability.</p> <p>The AESO does not expect significant changes to historical dispatch patterns for non-wind related events due to the short-term recommendations. WPM is required to manage the unpredictable and variable nature of wind ramps.</p> <p>The use of WPM will be governed by the capability of the EMMO to accommodate a given change in production. Changes in load and intertie schedules will impact the</p>

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	<p>patterns are likely, and what effect will this have on pool prices?</p> <p>(3) If not, what specific criteria will be used to distinguish the two cases?</p> <p>(4) If the “assumption [is] that dispatches are made for energy requirements,” how will this affect the AESO’s approach to congestion management, in which the AESO proposes to dispatch up the merit order to reflect congestion, not supply/demand balance?</p>	<p>ability of the EMMO to handle wind ramping requirements.</p> <p>The approach in congestion management is consistent with the recommended approach for WPM. In both cases, EMMO dispatches are given to reflect supply demand balance. With congestion, some portion of generation is unable to reach the market, so the AESO must dispatch further up the merit order to balance supply and demand. In the AESO’s view, this single price in an energy only market best reflects supply demand fundamentals at the time of congestion.</p>
NaturEner	<p>NaturEner agrees that the EMMO should continued to be used as the primary balancing tool. Please refer to the comments NaturEner provided to the Wind Integration Discussion Paper in this regard.</p> <p>NaturEner supports the development of a tool to calculate the real-time ramping capability of the system.</p>	Acknowledged.
Suncor	Agree	Acknowledged.
TransAlta	TransAlta agrees that the EMMO should be used as the primary tool to balance supply and demand in the market.	A fast ramping service was not part of the scope for the short term recommendation. The AESO will consider this comment for the long term plan.

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	<p>The AESO should not dispatch the EMMO to achieve a higher ramp rate. Fast ramp ancillary services should be procured instead of over dispatching the EMMO.</p> <p>How will the AESO develop a tool to calculate real time ramping capability of the system? Will market participants be required to input ramp rates in real time? There would be many factors that contribute to a unit’s ramp rate, such as what level the unit is currently producing, how many units are online at the facility, fuel conditions etc. Will the AESO ramp rate tool calculate the ramp rate quickly enough for it to be effective in determining which course of action to be taken, especially with all the input variables?</p>	<p>The ramp down capability of the EMMO ranges significantly based on the real time position of the market. Participants will not be required to submit any more information than is required currently in order to implement the recommendations in the short-term paper. The AESO will use the available information to calculate the ramp rate based on real-time conditions.</p>
TransCanada	<p>TransCanada supports the AESO’s commitment to only dispatch the EMMO to balance supply and demand and not “over-dispatch” to achieve a higher ramp rate.</p> <p>TransCanada supports the development and implementation of a tool to estimate real-time ramp rate and publishing the system ramp rate in real time.</p>	Acknowledged.
UCA	<p>The analysis provides sufficient support for these three points with respect to the use of EMMO for wind integration.</p>	Acknowledged.
6.2.1 Regulating Reserve		

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Stakeholder	Stakeholder Comment	AESO Replies
<ul style="list-style-type: none"> The AESO recommends that regulating reserves should not be purchased or activated from standby to accommodate wind ramping up. Analysis indicated that regulating reserve was not as efficient at mitigating wind ramp up events relative to WPM. Wind ramping up is a controllable event, which suggests that it should not be managed with ancillary services paid for by load 		
Alberta Direct Connect Consumers Association (“ADC”)	<p>ADC agrees that wind ramping is a controllable event and therefore costs to manage should not be paid for by load. WPM should be used in every possible scenario.</p> <p>The ADC however would not object to Wind generators contracting with another generator to come off the system as a substitute for WPM if they felt that was commercially beneficial.</p>	A market based service in place of pro rata WPM will be considered as part of the next phase of the wind integration work.
NaturEner	NaturEner believes that WPM should only be used as a last resort. A “Wind DDS” should be established, as a market based solution to deal with the technical limits of the system in ramp up events. NaturEner agrees that a ramp up event is a controllable event and therefore should not be dealt with ancillary services, unless the NWPP proposes a different solution.	A market based service in place of pro rata WPM will be considered as part of the next phase of the wind integration work.
TransAlta	In the Final Recommendations (June 18, 2009) for implementing the MOF the AESO stated: <u>Final Recommendation and Action Plan</u> After considering stakeholders’ comments, the AESO has determined that	As noted in the AESO’s response to TransAlta in section 5.2, WPM is more efficient than incremental regulating reserves in managing wind ramp up events.



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	<p>the use of the Potential MW protocol and prorate allocation for wind power management provides generators a fair and efficient mechanism to compete for system access in conditions where curtailment is required. This approach will also capture any benefits associated with diversity of various wind regimes in Alberta. The AESO also confirms its proposal that the energy market merit order (EMMO), followed by ancillary services (AS) will be used prior to the triggering of the WPM protocol.</p> <p>This clearly states that ancillary services will be used and be sequentially used before WPM.</p> <p>TransAlta would recommend that procured reserves should be used for wind ramp up and ramp down situation. Once all the ancillary services are used, then WPM should be used. If WPM is used first, then it is unfairly targeting one type of generation over the others. How would you expect to promote renewable resources if they are not allowed to run when they are able. We would argue that Wind Power Management is discriminatory in terms of treatment in comparison to other generation types and thus inconsistent with the Alberta Department of Energy’s June 2005 Policy</p>	<p>The recommendation paper does suggest that WPM is the final step taken in managing a wind ramp up event. Regulating reserves and EMMO dispatches will be used prior to WPM. The recommendation is to not purchase incremental regulating reserves – usage of the existing regulating reserve and the EMMO are consistent with the MOF recommendation.</p> <p>The AESO suggests that the requirement to respond to dispatch or directive by the system controller is a fundamental requirement of participation in the Alberta market. WPM is an example of this type of responsibility and represents a fair and efficient means to deal with wind ramp up events in excess of the market’s ability to absorb.</p>
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	<p>recommendation for wind to ensure that rules allow for integration of wind facilities into market design and interconnected system in a non-discriminatory and transparent manner.</p> <p>If the AESO were to procure fast ramp services then this could be as efficient as WPM depending on the ramp rate. If the AESO were to pursue WPM as a solution for wind ramping up, this will limit future solutions such as wind following services.</p> <p>We consider the efficiency conclusions drawn from the analysis in Table 3 to be incomplete and thus requiring further work before conclusions can be drawn.</p> <p>Is “controllable event” the right criteria for suggesting that an ancillary service not be paid for by load? This concept is not found in the Act or the Transmission Regulation. What is the source of this criteria?</p>	
UCA	Agreed	Acknowledged.
<p>6.2.2 Contingency Reserves</p> <ul style="list-style-type: none"> • The AESO recommends that the loss of wind energy due to a decrease in wind speed should be treated as a generation contingency. As such, contingency reserves should be used to replace this energy. • The AESO recommends that existing standby reserves (spinning and supplemental) be activated when there is a risk required ramp rate will exceed the available ramp due to a wind ramp down event. These standby activations will result in Alberta carrying more than the minimum level of contingency reserves in some hours. 		

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<ul style="list-style-type: none"> The AESO recommends that if the North West Power Pool allows contingency reserve to replace the unexpected loss of wind generation due to a reduction in wind speed, this practice should be followed in Alberta. 		
Stakeholder	Stakeholder Comment	AESO Replies
Alberta Direct Connect Consumers Association (“ADC”)	The ADC does not support that loss of wind energy is a contingency event. Other generator types bid their generation volume into the market with knowledge of security in fuel supply. Contingency reserves are procured for unforeseen outages. Loss of wind is not unforeseen. As such, the incremental cost of contingency reserves should be paid for by the wind generators.	Standby contingency reserves represent the most fair and efficient means to manage wind ramp down events while phase 2 work is underway to examine further options to manage wind variability. Given the time constraints that the solution be in place by 2011, the only other option available to manage wind ramp down events in phase 1 is to rely on EMMO dispatches for ramp rate. The AESO suggests that using standby contingency reserves is more consistent with the existing market design than the alternative.
ENMAX Energy Corporation	ENMAX supports the use of contingency reserves as a short-term wind integration measure, though it disagrees with yet another allocation of costs to loads. Has the AESO: (1) estimated the incremental cost of the additional reserves? (2) considered whether the probability of deployment of contingency reserves will change materially?	Standby contingency reserves represent the most fair and efficient means to manage wind ramp down events while phase 2 work is underway to examine further options to manage wind variability. Given that business drivers require that the solution be in place by 2011, the only other option available to manage wind ramp down events in phase 1 is to rely on EMMO dispatches for ramp rate. The AESO suggests that using standby contingency reserves is more consistent with the existing market design than the alternative. Incremental costs and the likelihood of deployment will depend on the



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		<p>implementation and accuracy of the wind power forecast as well as the actual level of wind on the system. The AESO does not have estimates at this time given the uncertainty around these factors.</p>
<p>NaturEner</p>	<p>NaturEner agrees that the loss of wind should be treated as the loss of fuel source, and Contingency Reserves are the appropriate means to handle ramp down events. It also seems very advisable to follow the practices and efforts of the NWPP to most efficiently integrate wind generation in the operation of the wider grid in WECC. The practices of the NWPP should be followed and implemented by the AESO.</p> <p>NaturEner would like to suggest that the AESO start supporting the use of reserves as currently the AESO is one of the two BA's voting against this use of reserves. Tariff issues are cited by the AESO as a reason for the concern. NaturEner would like to understand which specific tariff issues the AESO is referring to with the purpose to address these in this process.</p>	<p>The AESO plans to use standby contingency reserves to manage wind ramp down events while potential solutions are examined in the next phase of work. The use of contingency reserves may or may not change with the development of new tools, services or market rules.</p> <p>The AESO did not support the previous NWPP proposal because it did not present a well defined protocol for how and when the reserve sharing pools would be used to manage wind events. The AESO supports the idea that contingency reserves can be used to manage 'extreme' wind events but does not believe contingency reserves are an appropriate tool to 'firm' wind energy schedules for commercial reasons as this would result in frequent calls on contingency reserves that are required to maintain system reliability.</p> <p>The AESO notes that although the NWPP proposal passed the Operating Reserves Committee, the NWPP Balancing Authorities vetoed the proposal and the proposal has not been implemented..</p>



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Suncor	Agree	Acknowledged.
TransAlta	TransAlta would like to request information on how the AESO will be dispatching Contingency reserves. Would the AESO be activating standby reserves based on the ramp rate of the units or would it be pro rata of all the available units with standby contingency reserves. What criteria would be used to determine which units will be given energy directives? Would units with a faster ramp or units located closer to the wind facilities be directed more often?	The AESO will be activating standby reserves based on the ASMO (Ancillary Service Merit Order). The energy directives will be performed when needed by the system controller using the existing procedures. Ramp rate is not a consideration and location is not a consideration except under situations when congestion is an issue.
TransCanada	TransCanada supports the use of contingency reserves when it is forecast that the decrease in wind energy (ramping down) will be greater than the ramp rate achieved via the EMMO when the appropriate amount of energy (not over-dispatching) is dispatched on.	The AESO plans to use standby contingency reserves to manage wind ramp down events while potential solutions are examined in the next phase of work. The use of contingency reserves may or may not change with the development of new tools, services or market rules.
UCA	<p>For the 1100 MW of foreseeable wind power in this first phase, the limited reliance on contingency reserves for ramping down beyond the capability of EMMO is reasonable.</p> <p>UCA supports continued analysis to identify future cost effective solutions to wind power ramp rates.</p>	<p>Acknowledged. The AESO is examining further options and a discussion paper will be released in December 2010.</p> <p>The AESO plans to use standby contingency reserves to manage wind ramp down events while potential solutions are examined in the next phase of work. The use of contingency reserves may or may not change with the development of new tools, services or market rules.</p>

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6.3 Wind Power Management		
<ul style="list-style-type: none"> The AESO recommends that wind generation ramping up be treated as a controllable event. WPM is the most efficient means currently available to manage wind ramp up events, and wind generators should bear the cost of managing the controllable elements of their operations, just as all other generation types must. The AESO recommends that WPM be used to control the increase in wind energy only when the rate of wind energy increase exceeds the ability of the EMMO to accommodate it and the system is at risk of an over generation condition. WPM will not be used when wind generation has not contributed to an over generation condition, nor will it be used when wind generation is ramping more rapidly than the calculated limit but there is no risk of an over generation condition. 		
Stakeholder	Stakeholder Comment	AESO Replies
Alberta Direct Connect Consumers Association (“ADC”)	The ADC is supportive of this position	Acknowledged.
ENMAX Energy Corporation	EEC agrees that generators should bear the cost of managing the controllable elements of their operations (though it does <u>not</u> agree that loads should necessarily bear the costs of generators’ uncontrollable elements). EEC notes, however, that “The AESO does not recommend that the incremental variable costs associated with the use of LSSi, GRAS or other services or infrastructure investments contemplated should flow through to the users of the product” (<i>Intertie Restoration</i> paper). The use of services is obviously controllable—customers choose whether to use them or not—so by extension the WPM logic means users should pay. Consequently, the AESO’s position on restoration costs appears to be inconsistent with its WPM position (and with the fundamental economic principle of <i>user pay</i>).	<p>The AESO’s view is that wind ramping up in excess of the capability of the EMMO is a controllable event therefore wind power management should apply.</p> <p>The pro rata calculation will occur at a specific time and the limits that apply to individual facilities will apply for up to a 20 minute period. The limits will represent allowable increases to current production.</p> <p>The AESO is obligated by the Transmission Regulation to restore the capacity of the intertie and in order to do this services are required. LSSi and GRAS services protect the system against the uncontrollable loss of the intertie such that it can operate at the mandated level. This is not inconsistent with the WPM logic.</p>

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	<p>Additional detail on how WPM will be allocated on a <i>pro rata</i> basis across wind facilities that are ramping up would be appreciated, given that on a minute-by-minute basis, a given generator may be ramping up or down. Additional detail on the calculation of the EMMO ramp rate would also be appreciated, since it seems to EEC that a “pure” EMMO dispatch protocol allows for ramping only from the marginal unit (and ancillary service providers)</p>	<p>The AESO will estimate the ramping capability of the EMMO based on the premise that dispatches are anticipated to be for energy.</p>
NaturEner	<p>The AESO has not discussed in this paper other ways in which wind generators could “bear the cost” of managing ramping events. NaturEner recommends that the AESO pursue a market based solution should to handle ramping up events, in parallel with WPM. AESO should establish a day ahead, market based, “Dispatch down” service, similar to the existing DDS. Suggested mechanics:</p> <ul style="list-style-type: none"> - Generators would offer into the pool to “dispatch down” their unit in a ramping event for the following day. - Wind generation would offer to pay a premium to stay online, which is a comparable to the cost incurred by WPM. - Neither party sees the prices. 	<p>These concepts will be further evaluated in the long term plan.</p> <p>The pro rata calculation will be based on actual or potential generation in MW at the time a WPM directive is issued.</p>

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	<ul style="list-style-type: none"> - Generators would receive hourly pool price + premium. - This market based solution provides the choice to the wind generator of paying a fee to stay online instead of being curtailed through WPM. <p>This framework needs to be developed in order to provide options to wind generators. Incentive mechanisms currently available in Alberta (such as carbon offset) and any future incentive programs may, create an economic situation where it is desirable for a wind generator to remain in operation and pay a fee, rather than being curtailed. The AESO should encourage this market solution.</p> <p>Accordingly, NaturEner believes that the AESO should only use WPM as a last resort if the wind event exceeds the “dispatch down” service that the AESO was able to sell.</p> <p>The recommendation paper proposes a pro rating approach across wind facilities in a ramping event without clarifying the basis for the pro rating calculation (scheduled energy, scheduling accuracy, nameplate capacity, etc.).</p>	
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	<p>NaturEner believes that the WPM should be prorated based upon the schedule error of each generator unit. Where a wind unit does not provide a forecast, then a persistence forecast could be substituted. Using scheduling accuracy as the basis of pro rating creates an incentive for wind farms to provide the best quality of forecasting which should also assist the AESO in managing the ramping events</p>	
<p>Suncor</p>	<p>Suncor needs to better understand how the controllable elements will be applied. This is not clearly defined in the paper as presented. This comment is further detailed in following sections.</p>	<p>The AESO suggests that the requirement to respond to dispatch or directive by the system controller is a fundamental requirement of participation in the Alberta market. WPM is an example of this type of responsibility for generators with the physical capability to limit production.</p> <p>The AESO will hold a workshop in January 2011 to further discuss the concepts in the Short-Term Wind Integration Recommendation paper in order to provide clarity as required.</p>
<p>TransAlta</p>	<p>Is wind ramping up a controllable event for all the wind facilities? If Wind ramping up is a controllable event then it should be held to the same dispatch tolerance or variance that is applied to other generators by the AESO. The AESO allows a ramping band for generators, thus if wind is compliant within this ramping band, then the AESO should accommodate the power, as it does</p>	<p>Wind generators do not currently participate in the market through an offer. As such, there are no current compliance standards that apply to wind with respect to ramp rates, although all wind generators must comply with a directive to curtail production. Wind generators are also not required to wait for a dispatch prior to increasing or decreasing output, nor do</p>

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	<p>for other generator types.</p> <p>Should the AESO not accept all MW when a unit is a price taker? If generators were to price in all their MW at zero, and if the AC were to increase due to an operational reason, such as better fuel, would the AESO not have to dispatch up the unit? Does the AESO not have to accept all imports it has capacity for, since they are a price taker? How is this different from wind ramping up? The AESO should be able to reasonably forecast wind and the ramp associated with it.</p> <p>WPM should be used when the rate of wind energy is faster than the EMMO ramp rate and when all A has been used. WPM should be used as a last resort.</p> <p>How will the AESO determine when wind generation has not contributed to an over generation condition? If wind is not the main contributor to an over generation condition, then it should not be the one to bear the full cost of the solution. By using WPM, wind would bear the full cost. How is this fair?</p> <p>WPM should only be invoked to the extent that wind power can be shown to contribute to over generation. Wind power is not the</p>	<p>they submit an Available Capacity (AC).</p> <p>The AESO agrees that a wind power forecast will be very useful for managing wind ramping events, and has proposed that all wind facilities participate in the provision of real-time data collection required to improve forecast accuracy.</p> <p>WPM is a fair and efficient means of controlling wind ramp up events. Wind does not currently control its production and the system absorbs its variability. Operational studies indicate that this is not sustainable with the wind capacity expected on the system in 2011. The AESO has recommended WPM as a tool for the system controller to reliably operate the grid in real-time. WPM is the final step used to manage a wind ramp up event as existing regulating reserves and the EMMO will be utilized prior to invoking WPM.</p> <p>Market based services and other options for wind integration will be explored in the next phase of the wind integration initiative.</p>
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	<p>only contributor to over generation and wind power should only be curtailed to the extent of its own contribution.</p> <p>Is there a tool to calculate who is the cause of the over generation? Can this calculation be done quickly enough?</p> <p>Has the AESO contemplated, instead of pro-rata that they could have voluntary ramp down? For example: using DDS, wind facilities could put in bids to ramp down. Another option would be for the AESO to procure DDS services. This should be easy to implement since the AESO already has this product in place. When the AESO is unable to accommodate the ramp rate of wind, then generators who have put in bids can be ramped down in wind's place. This service would ensure that the system is reliable and thus should be paid by load.</p>	
TransCanada	TransCanada supports the AESO's proposed use of WPM	Acknowledged.
UCA	The use of WPM for the conditions described is a reasonable expectation of wind generators to assist with the integration of this resource by controlling upward ramping beyond the ability of energy market adjustments	Acknowledged.

6.4 Wind Power Forecast

- The AESO recommends that the wind power forecast be integrated into the wind integration portfolio in order to increase the

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<p>effectiveness of all tools.</p> <ul style="list-style-type: none"> Since wind generators currently do not offer firm energy offers due to the intermittent nature of their ‘fuel’, a wind power forecast requirement has been identified as a reasonable alternative that provides information to both the system controller and the market on the expected operation and participation of wind aggregated generating facilities. 		
Stakeholder	Stakeholder Comment	AESO Replies
Alberta Direct Connect Consumers Association (“ADC”)	The ADC is supportive of this.	Acknowledged.
ENMAX Energy Corporation	The AESO states that accurate forecasts would allow it to reduce the amount of WPM because the system controller will be better prepared to dispatch the EMMO for an expected event than for an unexpected one. While accurate forecasts can clearly be helpful, the ability of the system to physically accommodate a given amount of wind generation is not a function of the forecast. Does this recommendation mean that the AESO will allow temporary over-generation based on a forecast that wind is about to decline?	Even with an accurate forecast, the AESO still has to meet WECC requirements and keep the ACE within permissible limits. An accurate forecast allows the capability of the system to absorb wind to be optimized in a cost effective manner, regardless of the set of solutions.
NaturEner	It is not clear whether the AESO is expecting forecasting data from the individual wind farm sites in addition to the AESO forecasting and, if so, at which intervals. NaturEner supports the integration of the wind power forecast into the wind integration portfolio.	The forecasting requirements are part of the proposed wind technical rule 502.1 which was filed with the AUC in August 2010.
Suncor	Agree	Acknowledged.
TransAlta	Unless the intention is to also communicate	Wind generators do not currently

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	<p>on expected use of WPM in conjunction with the forecast then this is misleading and “on expected operation and participation” should have added “except as curtailed by WPM” which reduces both the forecast expectation and participation.</p> <p>There is no generation in Alberta that is 100% firm all the time. All are subject to operational issues which can be caused due to changes in available fuel. These operational issues if they meet the definition as defined by the AESO of an acceptable operational reason are deemed to be valid for not providing firm energy to the pool. Wind as a “fuel” is an AOR for changes in output. Acceptable Operational Reason iii) re-positioning a generating asset within the energy market to manage physical or operational constraints associated with the asset. In the case of a generation facility this means restating your AC to a lower level in real time</p>	<p>participate in the market through an offer. As such, there are no current compliance standards that apply to wind with respect to ramp rates, although all wind generators must comply with a directive to curtail production. Wind generators are also not required to wait for a dispatch prior to increasing or decreasing output, nor do they submit an Available Capacity (AC).</p> <p>The AESO suggests that the requirement to respond to dispatch or directive by the system controller is a fundamental requirement of participation in the Alberta market. WPM is an example of this type of responsibility and represents a fair and efficient means to deal with wind ramp up events in excess of the market’s ability to absorb.</p>
TransCanada	TransCanada believes the AESO has already consulted enough on the use of Wind Power Forecasting and should be well on the way to implementing Wind Power Forecasting and publishing the forecast in real-time.	The AESO is currently posting a day ahead wind power forecast based on global environmental data. The second phase of the wind forecast project is pending approval of the wind technical rule.
UCA	More accurate wind forecasting techniques support increased efficiency of EMMO, WPM and contingency reserves. This	Acknowledged.

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	makes the forecast a fundamental improvement for the system.	
7.0 Next Steps		
<p>7.0 Next Steps The next steps in the wind integration program include:</p> <ul style="list-style-type: none"> • Receive stakeholder feedback on the phase one implementation plan. • Continue to integrate the wind power forecast into AESO systems. • Continue development of the tool to calculate and disseminate the system wind power limit. • Implement practices and any necessary new ISO rules or rules changes to use WPM and incremental ancillary services in a transparent manner. • Release of Phase 2 discussion paper that examines incremental tools and market features for integrating wind on the system. • Monitor and analyze the frequency of use and effectiveness of phase 1 tools. 		
Stakeholder	Stakeholder Comment	Replies
Capital Power Corporation	Capital Power asks that the AESO identify what they deem to be short-term and long-term for purpose of wind integration. We do not support the use of this approach as a solution to wind integration issues. We ask the AESO to provide the market some assurances/certainty of the short-term application of this approach by providing some timelines about when the long-term integration approach will be implemented. We agree that the effort would be best spent on developing a market approach for wind firming products	The AESO will release a long-term discussion paper in December 2010. Consultation on options available to integrate wind will begin in Q1 2011 and the AESO will develop a recommendation by Q2 or Q3, following consultation.

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NaturEner	Please identify more firm timelines on the steps. NaturEner agrees with the order of the steps.	See above.
Suncor	<p>Suncor is recommending that an additional step should be added to the “next steps”. The recommended additional step is to have a workshop with stakeholders to provide more detail and clarity on the proposed System Wind Power Limit. The only intention in this request is to be provided with more information on the following</p> <ul style="list-style-type: none"> • How the limit is implemented at the wind farm (need more clarity on the technical application of the limit and how it relates to the previous (2004) and currently proposed (2010) Wind Technical Standards (502.1). • Who the limits will be applied to? (grandfathering provisions and clarity) • Where and how WPM will be applied in a regional context. Will it be applied per AESO operational areas or across operational areas? To further clarify this point; will wind farms that are not causing the WPM requirement also be required to participate in the WPM application in real time? What are the boundaries of this application? 	The AESO will provide more details to the proposed System Wind Power Limit during the rule consultation process and is willing to hold a stakeholder workshop to provide clarity and gather feedback on the system wind power limit.
TransAlta	How will the AESO incorporate phase two	The AESO will be open to all options in

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	with phase one? Are the solutions used in phase one carried forward to phase two? Some of the solutions in phase one may be chosen due to the ease of implementation but may not be the optimal solution. The time required to change IT systems and rules might prevent a solution from being agreed upon in phase one, but could be viable in phase two. Will the AESO be open to all options in phase two regardless of the results in phase one?	phase two.
TransCanada	TransCanada supports the advancement of the recommendations in this paper as a step toward longer term solutions to Wind Integration but would like the AESO to commit to reviewing the effectiveness and applicability of these short-term solutions once the long-term solutions have been implemented.	The AESO will be reviewing the effectiveness of the short term solutions once implemented.
UCA	Agreed	Acknowledged.
8.0 Appendix		
<p>8.2.1 System Wind Power Limit The system wind power limit for the next interval is calculated as the greater of:</p> <p><u>A</u></p> <ul style="list-style-type: none"> • Current wind production; plus • 6.5 MW per minute increase <p><u>Or B</u></p> <ul style="list-style-type: none"> • Current wind production; plus 		

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<ul style="list-style-type: none"> • Expected increase (decrease) in load in the next interval; plus • EMMO ramp rate down capability; plus • Interchange Net Schedule Change (more exports or lower imports are positive, more imports or lower exports are negative) 		
Stakeholder	Stakeholder Comment	Replies
ENMAX Energy Corporation	<p>Has the AESO determined what the interval will be?</p> <p>It is stated that the interchange schedule is known and firm prior to real time. How would the implementation of dynamic scheduling impact the calculation of wind power ramp limits?</p>	<p>The system wind power limit interval is a configurable parameter. Initially, it will be determined at a minimum of every 20 minutes.</p> <p>Dynamic scheduling would result in priced bids and offers on the intertie which would be reflected in the ramping capability of the EMMO.</p>
NaturEner	No Comment	
Suncor	As detailed above, the System Wind Power Limit has been introduced without clarification by the AESO to stakeholders on the actual implementation and analysis of the feasibility of this request. In order to accomplish WPM provisions, clarity is required and feasibility needs to be assessed by wind farm owners	The AESO will hold a workshop in January 2011 to further discuss the concepts in the Recommendation paper in order to provide clarity as required.
TransAlta	This only has meaning relative to the real time capacity factor of the aggregate wind farms. If there is, for example, an installed capacity of 700 MW then the 65 MW in ten minutes has different meanings when the	The AESO agrees that WPM will be more or less likely to be enacted at different times, partially dependant on the current wind output. The intent of the minimum allowable increase of 6.5 MW per minute is

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	output is at or near 700 MW, or when the output is at or near zero, or when the output is at or near the midpoint of 350 MW. The probability of the ramp changes throughout the production range relative to the installed capacity.	to ensure that WPM is not used to manage other system events, i.e. wind generation will be allowed to increase, albeit slowly, regardless of the expected intertie schedule and change in load.
8.2.2 Pro Rata Distribution of the SWPL <ul style="list-style-type: none"> Each wind aggregated generating facility subject to the WPM protocol will receive a pro rata share of the overall system wind power limit. The ‘potential MW’ data element required by the proposed ISO Rule 502.1 will be utilized in the pro rata calculation in lieu of actual production in situations where a facility has been limited and the data is available 		
Stakeholder	Stakeholder Comment	Replies
NaturEner	Again NaturEner strongly believes that the pro rata allocation should take the scheduling error history, and with that the quality of wind forecasting info, into consideration	Wind does not currently submit offers (schedules) into the EMMO and therefore there is no history of scheduling error. However, the AESO is willing to discuss this option in the next phase of the wind integration work.
Suncor	<p>Suncor requires more clarity and detail on how pro rata provisions will be applied. While “potential MW” data and 502.1 are referenced, it is not clear which section of 502.1 applies and how this relates to pro rata applications.</p> <p>Furthermore, and as mentioned above, Suncor requires more clarity of where and how WPM / pro rata distribution will be applied. Will it be applied within an AESO operational area at particular points or will it be applied across a number of operational</p>	<p>The AESO will hold a workshop in January 2011 to further discuss the concepts in the Recommendation paper in order to provide clarity as required.</p> <p>The pro rata calculation will be based on actual or potential generation in MW at the time a WPM directive is issued for each facility.</p> <p>WPM will be applied on a system basis and is not location specific. All generators subject to the WPM protocol will receive a</p>

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	<p>areas? Will wind farms that are not causing the WPM requirement (the exception being those wind farms that are grandfathered due to physical limitations) also be required to participate in the WPM application in real time? What are the boundary conditions of the application of WPM and pro rata distribution?</p>	<p>limit that will restrict the increase in production from a facility relative to the production at the time the limit was sent.</p> <p>Wind generators that have flat or decreasing production will not be impacted by this limit although they will still have a limit in place because the system controller does not have certainty over which wind generators will ramp in which direction.</p>
TransAlta	<p>At any time various wind farms will be ramping up or down or staying the same. Individual wind turbines within a wind farm at any time will be ramping up or down or staying the same. As such “pro rata” to each wind farm should be pro rata to each wind farm ramping up and which is also subject to WPM.</p>	<p>As noted previously, the pro rata calculation will be based on actual or potential generation in MW at the time a WPM directive is issued for each facility. Wind farms with flat or decreasing production will not be impacted although they will still be subject to a limit.</p>
<p>8.2.3 Impact of Transmission Constraints</p> <ul style="list-style-type: none"> A wind aggregated generating facility that has had its production limited by a Remedial Action Scheme (RAS) or the Transmission Constraints Management (TCM) protocol is not exempt from WPM due to system ramp rate considerations 		
Stakeholder	Stakeholder Comment	Replies
NaturEner	<p>The AESO should provide more detail on the specific mechanics of this suggestion, especially since the TCM rule as well as the RAS rule have not yet been implemented (nor do they seem to have general industry agreement). It is difficult to comment on statements, which are based on rules still in a consultation process</p>	<p>A wind generator subject to a limitation due to TCM and/or RAS will be limited by the factor that results in the lowest limit.</p>

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Suncor	Agree	Acknowledged.
TransAlta	A RAS will either runback generation to a specified level or trip the unit. A unit subsequent to a RAS can not increase its generation without a directive from the system operator. It is possible that pro rata application of WPM in an area will reduce generation enough to alleviate the RAS. In such circumstances the generator subject to the RAS should have the RAS eliminated and be replaced by WPM directives.	A wind generator subject to a limitation due to TCM and/or RAS will be limited by the factor that results in the lowest limit.
8.2.4 Supply Surplus Considerations		
<ul style="list-style-type: none"> Supply surplus rules will operate independently of WPM. A facility limited by the WPM protocol is not exempt from the supply surplus protocol. Similarly, a facility that has had its output limited via the supply surplus protocol is not exempt from WPM. 		
Stakeholder	Stakeholder Comment	Replies
NaturEner	No Comment	
Suncor	Agree	Acknowledged.
TransAlta	If wind is limited by supply surplus, according to the AESO, pro rata calculations would be based on potential MW. This is different than TCM calculations, which is based on actual production.	The Supply Surplus Recommendation Paper states: “Dispatch flexible blocks of the \$0 offers for partial volumes on a pro-rata basis and direct wind generation on a pro-rata basis.” The details of the potential pro rata methodologies noted by TransAlta have not yet been determined but the AESO notes TransAlta’s concern.
General		
Stakeholder	Stakeholder Comment	Replies
NaturEner	NaturEner agrees with the general direction	Acknowledged.

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	<p>the AESO is taking on this issue. The suggestions outlined in the comment matrix focus on:</p> <ul style="list-style-type: none"> • Using Wind Power Management as a last resort • Implementing a service comparable to DDS as a market solution before using WPM • Supporting the AESO's efforts with the North West Power Pool 	
TransCanada	<p>TransCanada is generally supportive of the AESO's Wind Integration efforts and offers comments on the Paper in the attached comment matrix. Where we offer no comments TransCanada takes no position on those specific points at this time</p>	Acknowledged.