

Recommendation:

1. Wind Power Forecasting - Centralized Forecasting Model

The AESO recommends that a centralized forecasting model be implemented in Alberta.

	Stakeholder	Comment	AESO Response
1.1	EPCOR Supports	<p>EPCOR conditionally supports the implementation of a centralized forecasting model in Alberta provided that:</p> <ul style="list-style-type: none"> • there is sufficient evidence indicating forecasting accuracy can be significantly improved by the forecast to predict ramp direction, timing, magnitude and rate of change and, • the costs associated with the wind power forecasting services and the collection and provision of data to the forecasting service provider are collected directly from individual wind generators through market fees or tariff charges <p>EPCOR understands that there are significant challenges associated with forecasting wind in Alberta as indicated in the recommendation paper. Although the working group feels that these challenges are the primary drivers behind implementing centralized forecasting in Alberta as soon as possible, EPCOR has concerns with the prudence of attempting to forecast wind, given the difficulties experienced to-date with achieving accurate forecasts. EPCOR understands that wind power forecasts and forecast accuracy are essential to the reliable operation of the electric grid, however; it is difficult to support the recommendation given that there appears to be a lack of evidence that the investment will be fruitful. There needs to be a satisfactory resolution to this uncertainty prior to choosing a forecaster.</p>	<p>While experience with the wind forecasting pilot project indicated that forecasting wind patterns in Alberta is relatively difficult in comparison to other jurisdictions, it was also found that:</p> <p>Information regarding the accuracy and uncertainty of the forecast can be provided and would assist the AESO in making risk assessments, operational decisions and ensuring reliable operation of the grid. The forecasts can be tuned and used for multiple purposes such as predicting the timing and magnitude of wind ramps.</p> <p>Some weather/wind patterns are highly predictable (i.e. up to 48 hours in advance) and the use of other meteorological data (i.e. severe weather information) would assist in determining the accuracy of the wind forecast.</p> <p>Accordingly, the forecasting service provider will be required to provide a wind forecast including accuracy and uncertainty information and also provide the capability to predict ramping conditions.</p> <p>The AESO considers it important to implement a centralized forecasting model as quickly as possible to become familiar with the forecasting techniques/tools and to refine these techniques prior to the large scale integration of wind on the AIES.</p> <p>The AESO plans to establish a Standing Wind Power Forecasting Work Group as recommended by the wind forecasting pilot project work group to provide input and advice to the AESO on aspects of the wind power forecasts such as improvements to increase accuracy, the need for additional meteorological towers, multiple forecasters and technical</p>

	Stakeholder	Comment	AESO Response
			<p>requirements and performance requirements for a forecaster. With experience, it is expected that forecasting accuracy, knowledge respecting the certainty of the forecasts and the ability to forecast wind ramps with greater certainty can be improved over time.</p> <p>The AESO plans to consult with industry on cost recovery for wind power forecasting in the context of its 2010 General Tariff Application, which is to be filed in the 3rd quarter of this year.</p>
1.2	Greengate Power Corporation Supports	<p>As a reliability tool for the safe and reliable operation of the power system, it is appropriate for AESO to implement a centralized forecast. It is necessary however that AESO ensure that costs are reasonable for the parties that must bear them. Should wind facility owners bear the cost of forecasting, it must not be punitive in the event that significant incremental wind capacity is delayed in coming online, i.e., a front-end load cost. An approach would be to base any per MW costs borne by developers on the anticipated full wind power build-out capacity that triggers the need for a forecast, with the differential cost between generation that does not require forecast and that amount that triggers the need for a forecast carried by AESO. This would prevent wind facility owners from being penalized for delays in the completion of wind projects resulting from market conditions, physical interconnection limitations, or other impediments.</p>	<p>The AESO strives for fair allocation of the cost and will use a RFP process to select a forecasting vendor and confirm that the forecasting service costs are reasonable.</p> <p>With respect to recovery of wind power forecasting costs, see the AESO response to EPCOR's comments in section 1.1.</p>
1.3	Load Coalition Supports (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities	<p>Minimizing the forecast load variability discussed on p.16 is clearly critical to the reliable operation of the AIS, and to the expected growth in wind resources. In the early stages of forecasting skill development, a centralized approach is clearly preferable for the noted reasons of efficiency, economics, uniform quality and accuracy (p.62). To the extent that this becomes a material cost, its recovery from customers should be addressed in the AESO tariff proceedings. Some level of cost sharing between loads who benefit from this generation and the wind generators themselves would seem appropriate.</p>	<p>With respect to recovery of wind power forecasting costs, see the AESO response to EPCOR's comments in section 1.1.</p>

	Stakeholder	Comment	AESO Response
	Consumer Advocate (UCA) – submitted on a joint basis)		
1.4	Mainstream Renewable Power Supports (MRP)	MRP agrees that a system of central forecast has advantages of efficiency and consistent quality. However, the quality of a central forecast is not constant and it can be improved by providing timely data feeds from <u>upstream</u> weather stations and <u>downstream</u> WFP activity. In other words, it is not enough to simply have a central forecaster; all available data feeds need to be explored and implemented.	The AESO plans to explore the use of additional data similar to what is suggested by Mainstream Renewable Power. In this respect, the AESO intends to establish a Standing Wind Power Forecasting Work Group to provide ongoing input and advice to the AESO on several aspects including: need for additional meteorological towers, use of severe weather information, use of multiple forecasters, accuracy metrics, etc. The AESO also intends to continue to post to its website, reports and metrics on wind generation and the aggregate wind power forecast once it is in place. Also please see AESO's response to EPCOR's comment in section 1.1.
1.5	TransAlta Supports	Wind Forecasting is to serve the needs of the AESO and the forecasts need to be focused/tuned towards their operational requirements. We would also expect a single central forecaster would be most economic.	The AESO acknowledges TransAlta's comment regarding a single central forecaster being most economical.
1.6	TransCanada Energy Supports	A centralized forecasting model would seem to provide the most reliable and consistent forecast to the industry.	The AESO acknowledges TransCanada's comment that a centralized forecasting model would seem to provide the most reliable and consistent forecast to the industry.
1.7	B(9) Power Opposes	Oppose. Alberta refineries, gas plants, cogeneration plants, hydro facilities, coal fired power plants, etc NEVER hand over their control-room-keys to the AESO. Government of Alberta is about "getting out of the business of being in business" (Klein) Forecasting must never be controlled by AESO but rather operated from a secure, impartial place like Market Surveillance Administrator (MSA) or AUC or third party firm with reporting directly to industry. This forecasting requirement is not forced upon any other types of generation or load in the province. Discriminatory treatment of wind power generation.	Under the current ISO Rules, conventional generation (i.e. other than wind generation) is obligated to comply with the Must Offer Must Comply (MOMC) requirements. In accordance with the MOF, the requirement for wind generators to "forecast" wind generation is a reasonable and fair alternative to the MO (must offer) obligation that is applicable to conventional generation. All conventional generation must comply with directives or dispatch instructions from the AESO. The wind power management requirements are

	Stakeholder	Comment	AESO Response
			<p>acceptable alternative to the MC (must comply) obligations established for conventional generation.</p>
1.8	ENMAX Opposes	<p>ENMAX would have no objection to the use of centralized forecasting models if they facilitated the integration of wind generation in a market-based, economically responsible manner. However, based on the results of the AESO's forecasting pilot project, it is not clear that centralized forecasts will be any more accurate than the collective wisdom of market participants, or that they will be of sufficient accuracy to materially benefit power system operations. It is therefore not clear why the AESO believes spending more money on forecasting will provide value.</p> <p>ENMAX is also concerned that, when the AESO takes full responsibility for something, market participants may perceive that they are absolved of that responsibility; the result may be more central planning and less market response. In this particular case, wind generators may collectively feel less responsibility to examine other methods of integrating their facilities through mechanisms such as energy storage or wind-following contracts.</p>	<p>The AESO is responsible for integrating wind generation into the AIES in a reliable, fair, efficient and openly competitive manner. In this respect, the AESO considers that enhanced wind forecasting techniques are a foundation for achieving these objectives and necessary to assist the AESO in making risk assessments, operational decisions and ensuring reliable operation of the grid. It is expected that forecasting accuracy and knowledge respecting the forecasts can be improved over time. As note in the response to EPCOR's comments in section 2.1, incentives to that effect will be addressed in the Wind Power Forecasting Services – Request for Proposals.</p> <p>Please also refer to AESO's response to EPCOR's comments in section 1.1.</p> <p>Under the current market framework, the ISO has the duty and is responsible to procure, manage and recover the costs for the provision of ancillary services. ENMAX is suggesting a different market model under which wind generators would be required to "firm" up their output or self-manage variability to some standard through mechanisms such as bi-lateral wind following contracts and/or energy storage technologies. These suggestions merit further review in the context of future market design.</p>

Recommendation:

2. WIND POWER FORECASTING – RFP ASAP

The AESO recommends that solicitation (RFP), evaluation and selection of a centralized forecasting service provider should proceed as soon as practicable.

2.1	Stakeholder	Comment	AESO Response
	EPCOR Supports	EPCOR agrees that the selection of a centralized forecasting service provider should proceed as soon as practicable (subject to the conditions outlined above) due to the vast number of wind projects that are in the queue and set to come online in the relatively near future. Given our concerns around forecast accuracy we believe that the RFP should include technical requirements and performance standards that the forecaster is required to meet in order to ensure that the end product will meet the needs of the system.	The RFP addresses minimum forecast requirements, expected accuracy standards, quality control processes and provisions to incent improvements to service levels and ongoing performance.
	Greengate Power Corporation Supports	It is important that AESO be diligent in selecting forecasting tools aimed at assisting operator in managing variability, as well as, MW ramps while not unduly penalizing wind owners with unnecessary curtailment. For example, accuracy in predicting ramps is an important attribute for all parties. Some transparency, but not necessarily direct industry participation, is needed for facility owners and developers to determine if the AESO is making the proper selection on their behalf. After all, the forecast is an AESO tool to manage the safe and reliable system operation. Arriving at the selection criteria for the RFP that closely aligns with the needs of the AESO as well as owners and developers is imperative. Forecasting must reduce facility (preferably eliminate) curtailment (aside from that resulting from oversupply) and the selection criteria must maintain this focus. While it is somewhat unlikely that significant wind capacity will come online over the near-term, it is important that the AESO become familiar with the forecasting tools to be procured and therefore commencing immediately to procure forecasting software is likely prudent.	<p>The AESO has had discussions with wind power facility operators, CanWEA, and other ISO's with respect to what should be included in the RFP and took that input into account when it proceeded to draft the Forecasting Services RFP. The requirements in the RFP address the needs of the AESO and wind facility operators. The selection criteria in the wind power forecasting RFP are based on minimum requirements and additional requirements outlined in the RFP. The selection criteria will consider the qualifications, knowledge, skills, abilities and experience of a forecaster that are relevant to both the minimum and additional requirements.</p> <p>The RFP will be posted on the AESO website.</p> <p>As noted in the AESO's response to the comments of EPCOR in section 1.1, the AESO also intends to establish a Standing Wind Power Forecasting Working Group to provide ongoing input and advice to the AESO on several aspects. The AESO will also continue to post to its website, reports and metrics on wind generation and the aggregate wind power</p>

	Stakeholder	Comment	AESO Response
			<p>forecast once it is in place.</p> <p>The AESO expects that increased accuracy in forecasting wind power can reduce operational issues associated with wind integration and also lessen the need for, and cost of, other mitigating measures including wind curtailment.</p>
2.3	<p>Load Coalition Supports (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)</p>	<p>The AIS's ability to reliably use wind resources is clearly linked to forecasting accuracy. The sooner forecasting skills development is initiated, the sooner this resource can expand its energy provision to the system.</p> <p>To the extent that the AESO's forecasting pilot project demonstrated significant differences in forecasters' capabilities, consideration should be given to initially retaining multiple forecasting providers. Once the data provision processes have been well established, the incremental costs of diversity in the pure forecasting function will likely be small compared to the potential benefits.</p>	<p>See AESO's response to EPCOR's comments in section 1.1.</p> <p>The forecasting pilot did not demonstrate significant differences in the capabilities of the various forecasters, which suggests that retaining multiple forecasters is not necessary or cost effective. Therefore, the AESO proposes to proceed with procurement of a single forecaster and review the ongoing performance with input from the proposed Standing Wind Power Forecasting Work Group and industry. The cost/benefit associated with additional forecasters as well other refinements may also be considered by the work group.</p>
2.4	<p>Mainstream Renewable Power Supports (MRP)</p>	<p>What criteria will be used for the RFP? The pilot project lasted one year and only after several months of data can the quality of the forecasts be differentiated.</p> <ul style="list-style-type: none"> • How long will the selection process take? • Will a selection be based on forecasting method or on forecasting performance? <p>Any process should involve the members of wind industry since cost allocation is likely.</p>	<p>See AESO's response to EPCOR's comments in section 2.1 regarding criteria for the RFP.</p> <p>See AESO's response to Greengate Power Corporation's comments in section 2.2 regarding the selection criteria.</p> <p>The timeline for the selection process will be outlined in the RFP with a target of having forecast data and information available to the AESO by the end of 2009.</p> <p>As noted in the AESO's response to EPCOR's comments in section 1.1, the AESO plans to file a 2010 General Tariff Application in the 3rd quarter of this year and will address cost recovery for wind forecasting services in that application.</p>

	Stakeholder	Comment	AESO Response
2.5	Shell Supports	Given that wind generators will assume responsibility and costs for forecasting, representatives of the wind industry must be involved in the solicitation, evaluation and selection of a forecasting service provider.	See the AESO's response to Greengate Power Corporation's comments in section 2.2 with respect to industry participation in the RFP process. As noted previously, the AESO also intends to establish a Standing Wind Power Forecasting Work Group to provide ongoing input and advice to the AESO on several aspects related to wind power forecasting.
2.6	TransAlta Supports	<p>While the current level of wind penetration is not an issue the AESO must operationalize forecasts to be prepared when more wind energy is added to the system. This means the operators must be comfortable with the system and gain experience from its use prior to when significant wind is on the system.</p> <p>This will also give the AESO and the forecaster the time needed to fine tune their applications and processes.</p>	The AESO acknowledges TransAlta's comments regarding the need to operationalize and gain experience tuning the wind forecast prior to integrating large scale wind generation.
2.7	TransCanada Energy Supports	The AESO should consider including wind industry participants/stakeholders with background or technical knowledge in forecasting to assist the AESO in developing the RFP and potentially evaluating and selecting the provider. In the Wind Forecasting Pilot the industry workgroup participants were of considerable assistance to the AESO in this regard. The timing of this may be impacted by number 3 below.	Please see AESO's response to EPCOR's comments in section 1.1.
2.8	B(9) Power Opposes	Oppose. Neither the MOF nor its proposed rules have yet been approved. The cart cannot be before the donkey. Any forecasting mandate must be conducted FOR and BY industry and housed outside of AESO which can too readily impose economic penalties on wind generation as stated in its proposed plans. A firm "NO" to handing over these sensitive WPF-control-room-keys. Conversely, perhaps industry should take over the AESO control room with a view to inequitably curtail whomever it pleases.	<p>The Market and Operational Framework (MOF) was issued in March 2007 for stakeholder review and comment. Following extensive stakeholder consultation, the Final MOF Paper and removal of the 900 MW temporary reliability threshold for wind integration was announced by the Minister of Energy, the AESO and CanWEA in September 2007.</p> <p>The AESO is now consulting on implementation of the MOF and will consult on proposed ISO rules, procedures and standards through standard industry consultation and approval processes.</p> <p>With respect to the wind forecasting functions, please</p>

	Stakeholder	Comment	AESO Response
			also see the AESO's response to EPCOR's comments in section 1.1.
2.9	ENMAX Opposes	<p>ENMAX opposes an immediate RFP for two reasons. First, as a large wind generator, ENMAX expects that it will be asked to fund a substantial portion of the RFP cost if the AESO's proposed funding arrangements are approved. The cost of the forecasting system is not yet well-defined, and ENMAX is concerned about being required to make an open-ended funding commitment. Also, the funding request is being made outside a budget cycle. (This issue would be mitigated to some extent if the RFP funding were to come from a broader range of market participants, which seems appropriate since all will benefit if the project is successful.)</p> <p>Second, and more importantly, ENMAX believes there are more critical issues to address than forecasting how much wind generation there will be in the next two hours. Of particular importance is that the integration of large amounts of wind generation under the existing market structure could result in a significant number of zero (or negative) price hours and intense debates about which generators—based-load coal units that are expensive to stop and start, cogen facilities that are must-run for industrial heat, wind units that only generate revenue when the wind blows, etc.—will be forced off the system when the wind blows. The implications of zero (or negative) prices over the long term on wind investment, investment in other generation, and system reliability are potentially drastic, and there is little point spending a lot of time and effort to forecast wind if the market structure and/or rules suppress its development.</p>	<p>The AESO will include this cost in the 2010 budget which will be subject to the budget review process with stakeholders. With respect to the recovery of wind forecasting costs, please also see the AESO's response to the comments of EPCOR in section 1.1 and Greengate Power Corporation in section 1.2.</p> <p>To facilitate the equivalent of Must Offer Must Comply for wind generators, the forecasting component is important. Please see AESO's response to B(9) Power comments in section 1.7.</p> <p>The AESO is committed to integrating wind generation into the AIES in a reliable, fair, efficient and openly competitive manner and developing the market and operational rules to advance this objective.</p>

Recommendation:

3. WIND POWER FORECASTING

The AESO will commence consultation on rules, procedures, standards and technical requirements regarding submission of wind generator forecast data/information including; data requirement such as turbine availability and on-site meteorological data, communication protocols, and data quality required from wind generation facilities (or individual forecasters) to deliver forecasts to the AESO.

	Stakeholder	Comment	
3.1	EPCOR Supports	EPCOR supports the AESO's recommendation to begin consulting with stakeholders as soon as possible in an effort to ensure that all existing and future wind facilities in Alberta are capable of meeting the minimum requirements necessary to ensure a useful and reliable centralized forecast. The success of a forecasting system will depend on the quality and accuracy of the data provided to the forecaster.	The AESO acknowledges EPCOR's support for the AESO to consult as soon as possible on the requirements for wind power facilities to submit forecast data/information.
3.2	Load Coalition Supports (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	<p>Capturing comprehensive wind data is more urgent than retaining forecasting services. Every day that data is lost is another day of lost knowledge. It is recommended that data recording protocols be given the highest priority, particularly data such as on-site meteorological information which once lost cannot be recovered.</p> <p>Additionally wind generators should be required to provide access to at least three years of historic wind data for their sites (if available) as a condition for connection to the grid to provide inputs to the forecasting models.</p>	The AESO considers that comprehensive wind data, particularly facility-specific wind and turbine data, is critical to enabling the large scale integration of wind generation and ensuring the reliable system and market operation of the AIES. Hence the AESO considers it appropriate that wind power facilities be required to submit wind generation forecast data/information. This requirement will be included in defining participant obligations. The AESO also considers that it is important to proceed to procure a forecasting service provider to become familiar with the forecasting techniques/tools and to refine these techniques prior to the large scale integration of wind on the AIES. By issuing an RFP early and working with a forecaster, the AESO and industry will learn more about the need, type and use of historical data for forecasting purposes, which will assist with identifying and developing future rules, procedures and requirements for data and information.
3.3	Mainstream Renewable	Support the immediate consultation on providing the WFP data for forecasting purposes as an initial	Based on experience with the wind forecasting pilot, the data requirements are expected to be

	Stakeholder	Comment	
	Power Supports (MRP)	<p>preliminary undertaking. However, conclusion of any rules respecting the availability and delivery of data should await the selection of the central forecaster and a determination as to the data and information feed that compliments the forecaster's method.</p> <ul style="list-style-type: none"> • Avoid making rules that serve no useful purpose Please state the implications of being outside forecast. 	<p>independent of the chosen forecaster. The AESO intends to consult on the rules respecting the necessary data and information requirements.</p>
3.4	TransAlta Supports	<p>Same answer as in 3 above. This is needed to put the wind forecasting in place. As well it serves to advise new entrants of the requirements so that there are no surprises.</p>	<p>Acknowledged.</p>
3.5	TransCanada Energy Supports	<p>Many of these technical requirements may need to be specified in the wind forecasting RFP and thus this may need to be defined before the RFP can be issued. Also, wind industry experts with technical knowledge could assist the AESO in developing these requirements and specifications before releasing them to the general industry. Utilizing these technical resources would lead to a faster and cleaner consultation process.</p>	<p>The AESO acknowledges TransCanada's support for the development of the technical requirements for wind forecast data/information submission.</p> <p>As noted in the AESO's response to the comments of Greengate Power Corporation in section 2.2, the AESO has had discussions with wind power facility operators, CanWEA, and other ISO's with respect to what should be included in the RFP and took that input into account when it proceeded to draft the Forecasting Services RFP.</p>
3.6	ENMAX is Indifferent	<p>As stated above, ENMAX believes there are more critical issues to deal with right now than forecasting. Having said that, there is value in not losing data. ENMAX notes that further discussions are required around which data should become publicly available, and around the alignment of costs and benefits (i.e., one subset of industry stakeholders should not be required to fund data collection that benefits other subsets).</p> <p>Providing facility-specific wind and turbine data to the AESO, beyond the data specified in the Wind Power Facility Technical Requirements, may require infrastructure modifications. Costs associated with modifications required to provide shared data should not solely fall on the wind power facility owners.</p>	<p>The AESO considers that wind power facility forecast data/information, such as facility-specific wind and turbine data, is critical to enabling the large scale integration of wind generation and ensuring the reliable system and market operation of the AIES. Other generators are also required to provide data relevant to their generators to the AESO, as stated in the ISO Rules. The AESO considers that all generators are responsible for their costs related to the provision of facility-specific data as part of the requirements for interconnection to the AIES.</p>

	Stakeholder	Comment	
3.7	Greengate Power Corporation Cautious	It is of paramount importance for the AESO to regard the rules, procedures and standards somewhat flexible throughout their implementation as the affect that some rules may have on project viability. Consideration needs to be given for rules that are detailed and prescriptive enough to ensure proper compatibility of the systems implemented, but not so stringent that particular manufacturers may gain an advantage over others.	<p>Rules, procedures and standards are based on system and market requirements; they are intended neither to preclude nor promote a particular manufacturer.</p> <p>Full industry consultation will be undertaken before specific rules, procedures and standards are implemented.</p>
3.8	B(9) Power Opposes	Oppose. AESO MOF isn't approved and so this dog won't hunt before Alberta Department of Energy and Industry approved. AESO obviously doesn't know the true meaning of the industry term "turbine availability" which is the responsibility of the WPF O&M plant and procedures. Also, AESO will NOT "commence consultation on rules" before this MOF is approved. Cart before the donkey, again.	<p>Please refer to the AESO's response to B(9) Power's comments in section 2.8 regarding approval and release of the MOF.</p> <p>AESO rules, procedures and standards will go through standard industry consultation and approval processes.</p>

Recommendation:

4. WIND POWER FORECASTING – Data Management

As part of its forecasting research and development work, the AESO will continue work to determine the capability, resources, systems and time required to perform the data management function. In parallel, the AESO will include data management as an optional requirement in the wind forecasting RFP.

	Stakeholder	Comment	AESO Response
4.1	EPCOR Supports	<p>EPCOR agrees that a third party provider responsible for data management is the least desirable option. EPCOR sees value in having a centralized forecaster also manage the data provided that they possess the skills and expertise required to carry out this function. It is essential that whoever is responsible for data management is capable of verifying the quality and accuracy of the data used in the forecast in order to ensure its reliability.</p> <p>Regardless of who provides data management services with respect to this initiative, the AESO must address the capability of their IT infrastructure. IT limitations are not acceptable reasons for not implementing preferred market solutions. Currently the performance of the AESO's IT system is below acceptable standards and the AESO needs to invest significant resources to address this issue in a timely fashion.</p>	<p>The AESO considers that forecasting data should reside with and be managed by the AESO to ensure that quality, accuracy and confidentiality requirements are met. The AESO has had and continues to have ongoing discussions with other ISO's who also perform data management and quality control functions and we intend to continue to leverage their experience and knowledge. Industry experience (other ISO's) indicates need to retain data for compliance, and flexibility if a new or additional forecaster is chosen in the future. See also the AESO's response to the comments of Mainstream Renewable Power in section 4.7.</p> <p>However, so as not to preclude any future flexibility, data management has been included as an option in the wind forecasting RFP.</p> <p>The AESO agrees that IT limitations should not interfere with implementing market solutions; however the severity of current IT limitations directly impacts the cost and time to implement a solution. The AESO is currently working with industry to better understand the performance standards and requirements of market participants.</p>
4.2	Load Coalition Supports (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers)	<p>Wind forecasting is clearly a competitive industry, and it would be unwise to place data collection and retention services in the hands of a forecaster whose incentives would be to set the data repository up in a proprietary, closed fashion.</p> <p>It would be preferable to retain an IT-focused entity not engaged in the forecasting business to establish an 'open' data repository which can be made</p>	<p>See AESO's response to EPCOR's comments in section 4.1.</p>

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	Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	available to any forecaster the AESO chooses. This would also ensure that the AESO maintains strong control over source data dissemination, which is essential to maintaining the level of confidentiality required in respect of this commercially sensitive data. It is understood that a strong competitive market for wind data repository services already exists, and outsourcing this activity at this point would relieve pressure on the AESO's systems resources.	
4.3	TransCanada Energy Supports	As per comments in 3 above, this may need to be specified in the wind forecasting RFP and thus may need to be defined before the RFP can be issued.	Data requirements including the optional data management requirement have been defined and specified in the RFP. Also see the AESO's response to the comments of Greengate Power Corporation in section 2.2 with respect to discussions with wind power facility operators, CanWEA, and other ISO's while drafting the RFP.
4.4	ENMAX is Indifferent	While data management is clearly an important task if data is to be collected, it may be that the forecaster(s) should be responsible for it.	See AESO's response to EPCOR's comments in section 4.1.
4.5	Greengate Power Corporation Indifferent	This appears to segregate the forecasting tool into (a) telemetry, (b) forecasting tool and (c) data warehouse. If this is so, then an inherent fourth step is added (d) coordination and integration of the various components. It appears reasonable that AESO consider a one stop shop and draws benefit of simply "using" a tool, and not get involved in the minutia of data management—in short AESO should stick to managing the safe and reliable operation of the power system.	See AESO's response to EPCOR's comments in section 4.1.
4.6	B(9) Power Opposes	Oppose. This must never be AESO-controlled. No other generator types are required to do this. AESO does not get the keys to the windfarm. Maybe industry, or MSA, or AUC, but not AESO. A third party paid and monitored by industry and reporting to industry MAYBE. The AESO "will" not do anything until MOF approved. Data Management is a no-go-zone for AESO. This is like an Oil & Gas company giving up its most sensitive hottest play seismic data to the	Please refer to the AESO's response to B (9) Power's comments in section 2.8 regarding approval and release of the MOF. Also see AESO's response to EPCOR's comments in section 4.1.

	Stakeholder	Comment	AESO Response
		<p>government. A no go for industry FOR SURE. This must hold off pending review by DOE, AUC, MSA, and industry.</p>	
<p>4.7</p>	<p>Mainstream Renewable Power Opposes (MRP)</p>	<p>We would request that the AESO determine and convey what it seeks to accomplish by warehousing data. One would expect that a capable forecaster will have the ability to warehouse the data feeding into the forecast as well as the realized “actual” results. (if they cannot do so, then the quality of the forecast should be questioned.)</p> <ul style="list-style-type: none"> • Hence, a first question is what amount of data can be warehoused by the forecaster and can the AESO retrieve data on request? • The second relevant question is, for what purposes does the AESO need to retrieve warehoused data? <p>The discussion implies that the AESO may need such data for compliance monitoring and penalties. This is questionable. For example on page 33 the AESO says, “[any inaccuracies along the process will contribute to forecast accuracy and errors and in the future may be the basis for monitoring compliance and penalties.] Such a statement is a gross generalization and in most cases false. The central forecast is superior because it does not depend strictly on WPF specific data, so inaccuracies from one site should typically have little effect on the overall performance. The exception to this would be the failure to report turbine outages; however this type of activity can be directly monitored from metered volumes data or other production data.</p> <p>If compliance monitoring is the AESO’s objective, then identification and clarification of these issues as a first step is required.</p>	<p>See AESO’s response to EPCOR’s comments in section 4.1.</p> <p>There are many practical business reasons for the AESO to warehouse the data such as;</p> <ul style="list-style-type: none"> • The amount of data is estimated at about 1 gigabyte per year. • In the event that multiple forecasters are required in the future as suggested by some stakeholders, the AESO could issue and receive forecast data to and from multiple forecasters • In the unlikely event that a forecasting service terminates early, the AESO would be in a position to quickly restart procurement of a new service provider • The AESO could conduct any necessary performance analysis on the historical data • Quality control and assurance is conducted by the AESO <p>Compliance requirements will be defined through the ISO rules development process.</p>
<p>4.8</p>	<p>TransAlta Opposes</p>	<p>Data management should be handled by the AESO as this flows with the contractual relationship between market participants and the AESO. Third party data management raises confidentiality issues.</p>	<p>See AESO’s response to EPCOR’s comments in section 4.1.</p>

Recommendation:

5. FORECASTING ACCURACY

The AESO will monitor forecasting, market and operational results and develop measures of forecasting accuracy. The AESO intends to leverage available data and forecasting resources toward this end.

5.1	Stakeholder	Comment	AESO Response
	EPCOR Supports	As indicated above it is essential that an accurate forecast is developed if any operational or market benefits are to be realized. EPCOR agrees that the establishment of accuracy standards is necessary to ensure the successful integration of intermittent resources into the electric system. Minimum accuracy requirements should be developed prior to selection of the forecaster as well as potential measures of accuracy. The AESO should make use of all data that is available to them in order to monitor the accuracy of the forecast and its impact on operations. All findings with respect to forecast accuracy and impacts of said forecast should be transparent to ensure that Albertans are benefiting from this initiative.	See AESO's response to EPCOR's comments in section 1.1.
	Greengate Power Corporation Supports	It is important that the AESO adjust its approach to forecasting in order to improve accuracy with the overarching aim of minimizing wind facility curtailment.	See the AESO's response to the comments of EPCOR in section 1.1 for discussion of a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on various aspects related to the wind power forecasts, including improvements to increase forecast accuracy. See also the AESO's response to Greengate Power Corporation's comments in section 2.2.
	IPPSA Supports	IPPSA would support benchmarking the accuracy of the forecast data and the market and operational results, as well as the AESO's role as data manager, should this materialize.	The AESO acknowledges IPPSA's support for benchmarking the accuracy of wind power forecast data and operational results, as well as the AESO's role as data manager.
	Load Coalition Opposes (Alberta Direct Connect Consumers Association (ADC); Industrial Power)	Different forecasting approaches will likely yield different types of forecast accuracy; some may be strong in the longer term, others in near real-time. An understanding of the types of accuracy yielded by various approaches will develop as experience is gained. This is an important long term objective, but does not appear to be immediately critical. At this	See the AESO's response to the comments of EPCOR in section 1.1 for discussion of a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on various aspects related to wind power forecasts, including, improvements to increase forecast accuracy.

	Stakeholder	Comment	AESO Response
	Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	stage in the process, the AESO might be well served by contracting with an external expert to provide these assessments.	
5.5	Shell Supports	In the case of a poor forecast that leads to additional cost and/or decreased system reliability, who bears responsibility?	<p>The AESO believes that just like any other forecast, a forecast of wind power generation will not be perfect.</p> <p>The AESO considers that an accurate wind power forecast is important for the reliable system and market operation of the AIES. At this time, more work is required to understand, develop, implement, and measure forecasting accuracy. As noted in the AESO's response to the comments of EPCOR in section 2.1, accuracy requirements and incentives for improving forecast accuracy have been addressed in the forecast services RFP and will be further addressed by the proposed Standing Wind Power Forecasting Work Group.</p> <p>With respect to wind generator cost responsibility, the MOF states "Consistent with the policy and legislative framework in Alberta, the MOF also established that wind generators will assume responsibility and costs for wind power forecasting and wind power management equipment and lost opportunity costs (i.e. Lost production due to curtailment)."</p> <p>With respect to load cost responsibility the MOF states "As per current policy and regulation, load assumes the costs associated with increased ancillary services and transmission upgrades and the AESO will continue to ensure that these costs are allocated consistent with policy and legislation, are reasonable and are prudently incurred."</p>
5.6	TransAlta Supports	There will be multiple forecast over multiple time horizons with the forecasts being used for various	The AESO acknowledges TransAlta's support for the AESO to monitor and improve forecasting accuracy.

	Stakeholder	Comment	AESO Response
		<p>purposes. The ultimate use of the forecasts determines the accuracy requirements and the assessment of the consequences, if any, of inaccuracy.</p> <p>We are unsure if the AESO means accuracy or an assessment of the uncertainty of any forecast. Forecasts by their nature have uncertainty and any measure of performance should be if the result is within the uncertainty bounds of the forecast estimate and not assessed against a single value forecast estimate.</p> <p>The AESO needs to develop performance measures including accuracy however defined.</p>	<p>Wind forecast accuracy and uncertainty information is valuable for system operations. As noted in the AESO's response to the comments of EPCOR in section 1.1, the forecasting service provider will be required to provide a wind forecast including accuracy and uncertainty information.</p> <p>See the AESO's response to the comments of EPCOR in section 1.1 for discussion of a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on aspects of the wind power forecasts, including, improvements to increase forecast accuracy.</p>
5.7	TransCanada Energy Supports	<p>As per comments in 3 above, additional work is required to be completed prior to the issuance of the RFP. Forecasters will need to understand what information the AESO is trying to forecast (wind speed, direction, power, ramping, etc) in order to prepare an appropriate proposal. It may be important to determine the level of granularity of the data that would be required.</p>	<p>The AESO acknowledges TransCanada Energy's support for the AESO to monitor and improve forecasting accuracy.</p> <p>The AESO does not see the need to have non-megawatt related forecasts such as wind speed, direction as suggested. A MW forecast is one of a number of forecasts that the AESO will require from the forecast service provider. One of the forecasts will be tuned for ramping as recommended by the pilot project work group.</p>
5.8	B(9) Power Opposes	<p>Oppose. AESO "will" not do any of the above until MOF is approved. Arrogance at best. Monitoring of forecasting results is responsibility of industry. AESO is not to interfere in the market. Better run by industry for supposed \$0.20 per MWH. AESO tariff power-point is the thin edge of the wedge to unending cost increases without performance & cost justification or monitoring. A firm "NO".</p>	<p>Please refer to the AESO's response to B(9) Power's comments in section 2.8 regarding approval and release of the MOF.</p> <p>See also the AESO's response to the comments of EPCOR in section 1.1 for discussion of a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on aspects of the wind power forecasts, including, improvements to increase forecast accuracy.</p>
5.9	ENMAX Opposes	<p>To the extent the AESO uses forecasts to manage operations, it should monitor forecast accuracy for its own purposes. However, monitoring accuracy for the purpose of improving forecasts is a task best undertaken by the forecasters, while monitoring</p>	<p>The RFP requires that the forecasters provide a performance report, which will allow the AESO to monitor forecast accuracy. The AESO will contract with the forecaster, but see the AESO's response to the comments of EPCOR in section 1.1 for</p>

	Stakeholder	Comment	AESO Response
		<p>accuracy for the purpose of managing one's commercial operations is a task best undertaken by participants. There is no need for the AESO to develop measures of forecasting accuracy on behalf of participants.</p>	<p>discussion of a Standing Wind Power Forecasting Work Group. This work group will provide input and advice to the AESO on various aspects related to wind power forecasts, including, improvements to increase forecast accuracy. It is also expected that some aspects of the forecasts will need different accuracy metrics and the AESO will solicit input on those aspects.</p>
<p>5.10</p>	<p>Mainstream Renewable Power Opposes (MRP)</p>	<p>Realistically speaking; development of an Alberta-wide wind power forecasting system will require years of experience. This will be prime example of "learning by doing". Accordingly, the AESO needs to avoid the "trap of perfection" by focusing on a sole objective of "accuracy".</p> <p>Forecasting is a tool to be used in concert with other tools, such as operating reserves. There will be times when the forecast can be usefully certain (accurate) and the level of reserves can be adjusted to accommodate the situation; alternatively there will be times when the forecast can only indicate a high level of uncertainty and in this case the operating reserves should be adjusted up. Forecasting, reserves and other tools should not be used as substitutes but should be used in a complimentary fashion, working together to maintain system reliability.</p>	<p>The AESO agrees that the development of an Alberta-wide wind power forecasting system will require years of experience. Hence, the AESO considers it important to implement a centralized forecasting model as quickly as possible to become familiar with the forecasting techniques/tools and to refine these techniques prior to the large scale integration of wind in the AIES.</p> <p>The AESO recognizes that information regarding the accuracy and uncertainty of the forecast can be provided and would assist the AESO in making risk assessments, operational decisions and ensuring reliable operation of the grid. A key theme in the Wind Power Forecasting Pilot Project – Industry Work Group Report is to start the forecasting process and continue to learn as forecasting is a foundational tool used in concert with other tools. In this respect, the AESO recognizes the need for an early starting point and ongoing improvement. As noted in the AESO Recommendation Paper: Implementation of Market & Operational Framework for Wind Integration in Alberta, March 2009, continuous improvement of these practices is required.</p> <p>See the AESO's response to the comments of EPCOR in section 1.1 for discussion of a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on aspects of the wind power forecasts, including, improvements to increase forecast accuracy.</p>

	Stakeholder	Comment	AESO Response
			<p>With respect to Mainstream Renewable Power’s comment on forecasting as a tool used in concert with other tools, the basic premise of the MOF is; <i>If</i> the System Operator receives a reasonable forecast of wind power generation, <i>then</i> the System Operator can establish operating plans to accommodate the forecast wind energy by using the following measures or tools:</p> <ul style="list-style-type: none"> • The Energy Market Merit Order (EMMO) • Regulating Reserves • Load / Supply Following Services • Wind Power Management (WPM) <p>Using the example of uncertainty (high or low) in the wind power forecasts, the order and use of measures or tools would be as described above.</p>

Recommendation:

6. FORECASTING – TRANSPARENCY

The AESO considers that system or aggregate wind forecasts should be transparent and made available to all market participants, particularly near term to real time.

	Stakeholder	Comment	AESO Response
6.1	ENMAX Supports	ENMAX supports aggregate wind megawatt forecasts being made available to market participants, and notes that those who benefit from such forecasts should pay for them.	AESO acknowledges ENMAX's support in making aggregate wind power forecasts available to market participant. With respect to cost recovery for wind power forecasting, please see AESO's responses to EPCOR's comments in section 1.1.
6.2	Load Coalition Supports (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	Transparency should always be the default option, and the burden of proof as to confidentiality properly belongs with the party making that contention. The benefits of transparency are well captured in the AESO's document. This is a requirement analogous to the publication of scheduled unit outages, and creates a level information playing field for all generators. It would be of greatest value if the AESO was to make the end results of these forecasts public, so that their outputs could be compared and assessed. Some components of the input data may be of value to analysts, but since this data has proprietary dimensions its general release appears neither necessary nor desirable.	The AESO acknowledges Load Coalition's support in having the aggregate wind forecasts transparent and made available to all market participants and the comment that this is analogous to the publication of scheduled generator outages information. The AESO will consider the suggestion regarding posting the results of the forecast, and will further consult with stakeholders.
6.3	IPPSA Supports	So long as the forecast data is provided as aggregate information, this appears consistent with how other facility information is provided, e.g. outages.	The AESO acknowledges IPPSA's support in making the aggregate wind power forecast data available to market participants and the comment that this appears consistent with how other facility information is provided, e.g. outages.
6.4	Mainstream Renewable Power Supports (MRP)	Information transparency makes for a more efficient market. The AESO should publish all relevant aspects of the forecast including the point estimate of WPF production but also the forecast uncertainty/	The AESO acknowledges Mainstream Renewable Power's support in making the aggregate wind power forecast data transparent to facilitate a more efficient market. The AESO will consider further consultation on making

	Stakeholder	Comment	AESO Response
		confidence interval.	available other data that may be beneficial to the reliable system and market operation of the AIES.
6.5	TransAlta Supports	<p>The aggregate wind power forecasts used by the AESO should be made available near term or real time.</p> <p>The AESO must decide the extent of the forecasts disclosed, e.g. for how many hours ahead, the granularity of the information, and whether uncertainty for the forecasts is provided. The AESO may wish to consult with market participants as to what information may be useful.</p> <p>The AESO should caution market participants that the information received is a forecast and that provision of the forecasts is for information purposes only.</p>	<p>The AESO acknowledges TransAlta's support in making available aggregate wind power forecasts, in near term or real time.</p> <p>The AESO will consider further consultation on the disclosure of the forecast data that may be beneficial to the reliable system and market operation of the AIES.</p> <p>A disclaimer will be provided with the wind data release.</p>
6.6	TransCanada Energy Supports	TransCanada supports transparency in all AESO processes, especially where it is available in a timely manner.	The AESO acknowledges TransCanada Energy's support in making transparent the aggregate wind power forecast data in a timely manner.
6.7	B(9) Power Opposes	Oppose. No other form of generation is forced to reveal sensitive data so NO for wind as well. This information is subject to gaming. Why would wind industry expose data to the world when coal, cogen, hydro, gas, biomass, etc are NEVER asked to even consider the same deal. Why is wind singled out? It has never been conclusively demonstrated to the satisfaction of industry that wind is responsible for 100% of any perceived system instability. This leap of logic from "variable" to "stable" has not been properly explored or challenged.	The AESO considers that publishing the aggregate wind power forecast data will be beneficial for the reliable system and market operation of the AIES, and as noted by Load Coalition and IPPSA in sections 6.2 and 6.3 respectively, is consistent with the publishing of other generator data (i.e. outages).
6.8	EPCOR Opposes	EPCOR strongly disagrees with the recommendation that aggregate wind forecasts should be transparent and available to all participants. Aggregate wind forecasting is required for the reliable operation of the electric system; it is not required for the efficient operation of the market. There is absolutely no precedent for publishing offer data (or a forecast of offer data) prior to real time. Participants who have invested in wind farm technology or have developed in house forecasting or analytics should not see the	As more wind is integrated under the current market design, it will become increasingly important to manage wind information carefully such that useful and proper information is available to participants. The AESO believes that it is important to provide the aggregate wind power forecasts for transparency. Availability of this wind power forecast, which is an indication of input to aggregate system variability, may enable participant actions that further improve reliable system and market operation of the AIES.

	Stakeholder	Comment	AESO Response
		<p>value of their investment eroded away by the publishing of forecast wind generation by the AESO.</p> <p>Transparency of offer behaviour prior to real time is not conducive to a competitive outcome. To the extent that the AESO wishes to publish after the fact aggregate data EPCOR recommends that it should be published 60 days after the settlement date.</p>	<p>Currently the offer data of other fuel types, such as coal and natural gas is posted on the AESO website in the historical trading report, and the AESO may consider modeling the provision of aggregate wind forecasting data after this report in order to verify consistency. The historical trading report consists of information on energy offers (after the trading hour), and is not asset specific.</p> <p>In addition, the supply adequacy report, which is published in near term and in real time, uses offer information on a forecast basis in aggregate form. Wind forecasting would be a valuable input into this report. Another report that is published in near term and in real time, and uses aggregate information, is the generator outage report.</p> <p>In addition, transparency of market information is critical to an orderly market. As the AESO is the facilitator of the wholesale market, information on wholesale market data should be provided to industry to facilitate ease of market access and aid in market response. Wind forecast information from a market perspective is equivalent to market offer information and as such has market value in an aggregated form.</p>
6.9	<p>Greengate Power Corporation Strongly Opposes</p>	<p>The AESO must not forget that the purpose of an accurate wind forecast is to develop a tool or a means for system operators to gain an upper hand on the perceive uncertainty of wind generated power. It is not appropriate for wind proponents to fund forecasting for the benefit of other generation stakeholders even if it is shared in aggregate. The forecasting should be strictly for the AESO's use for the management of wind power variability and ramping within the system.</p> <p>Sharing wind forecasting details with industry participants could too easily be manipulated to "game the system", resulting in an overall higher SMP.</p>	<p>Please see the AESO's response to the comments of EPCOR in section 6.8.</p>

	Stakeholder	Comment	AESO Response
		<p>Providing information on forecast accuracy is appropriate as it enables stakeholders to assess the benefits of forecasting. It appears prudent that only real time information is made available on the Current Supply and Demand, i.e. provide (a) accepted forecast for the current interval, (b) actual MW for the current interval, (c) the interval error.</p>	

Recommendation:

7. WIND POWER MANAGEMENT – Curtailment Protocol

The AESO seeks stakeholder feedback on the work group recommendations to use a Potential MW Protocol and specifically would like input from stakeholders regarding practicality and risks associated with this option.

	Stakeholder	Comment	AESO Response
7.1	Greengate Power Corporation Supports	<p>There appears to be one category missing, i.e., geographical (area specific) curtailment for localized extreme and violent weather events. In short, it is unreasonable to penalize wind farms that have no participation in a weather pattern causing an adverse effect on the power system.</p> <p>For system wide weather events, a pro rata approach to curtailment helps to ensure that all assets are held equal from the standpoint of investment. No one project may gain a specific advantage through curtailment if it is applied pro rata. It should be intended that curtailment not affect investment decisions beyond the aggregate effect it has on the potential revenue achieved by an asset class.</p> <p>With regard to protocols intended to minimize curtailment or distribute the burden most fairly, we support these measures.</p> <p>A significant concern exists with regard to environmental attributes derived by renewable projects. If wind projects are curtailed when they could otherwise be producing green tags or environmental offsets are foregone. This is an issue only with renewable and could present significant contractual issues or detract significantly from the value of wind assets. Even though the SMP may be approaching \$0, wind may still achieve significant revenue from the proceeds of environmental attributes. The value of foregone environmental attributes needs to be taken into consideration when developing curtailment protocols. This issue is obviously more severe as</p>	<p>The AESO is committed to integrating wind generation into the AIES in a reliable, fair, efficient and openly competitive manner and developing the market and operational rules to facilitate.</p> <p>The noted concerns regarding localized and system conditions were discussed in the Wind Power Management Protocol Work Group. This work group discussed examples such as the south west ramping up first with this ramp being accommodated by the EMMO and available ancillary services. With additional ramping in the south central and south east regions it is possible that there would be insufficient EMMO and AS to accommodate these additional MW. This approach could result in the use of WPM on wind power facilities that are more often the last to ramp up.</p> <p>The re-allocation of WPM limits at 20 min intervals as proposed by the WPM protocol should address any regional differences that could occur in an equitable and reasonable manner.</p> <p>The EUA requires the AESO to “carry out its duties, responsibilities and functions in a timely manner that is fair and responsible to provide for the safe, reliable and economic operation of the interconnected electric system and to promote a fair, efficient and openly competitive market for electricity.” The MOF proposes the use of pro-rata allocation, which provides generators a fair and efficient mechanism to compete for system access in conditions where curtailment is required in order to maintain supply demand balance or to maintain or restore system reliability.</p>

	Stakeholder	Comment	AESO Response
		<p>the frequency of curtailment increases.</p> <p>With reference to the refresh rate and the threshold of the curtailment order that AESO proposes, it could be considered a starting point. It should be understood that this is only a starting point and that is subject to joint wind industry and AESO review to ensure that punitive consequences on the wind farms economics are eliminated.</p>	<p>In addition, AUC decision 2009-042, Transmission Constraints Management, states that “Access to the AIES, for all generators, is a reasonable opportunity and not a right.” It is the AESO’s view that the rules and protocols are intended to treat all generators fairly, and not intended to exempt specific generators.</p> <p>Also, as noted by the Department of Energy in the Alberta’s Electricity Policy Framework: Competitive Reliable – Sustainable (June 6, 2005) paper, “The Department does not support one type of generation over another but rather allows competitive market forces to determine the appropriate generation mix (e.g. no fuel use policy).”</p> <p>As with any rule change, the AESO will evaluate market impacts following the rules and will continue to consult to improve practices and procedures.</p>
7.2	Mainstream Renewable Power Qualified Support (MRP)	<p>A pro rata approach is notionally the fairest approach to capping individual WPF production when a SWPL is in effect. If other methods are to be considered they need to consider the loss of fairness inherent in the pro rata approach.</p> <p>The AESO has stated “the impacts of implementing and operating the proposed protocol have not been fully evaluated and further work will be required to determine what extent this functionality and capability can be implemented and in what timeframe.”</p> <ul style="list-style-type: none"> • What progress has the AESO made in this regard since the Working Group recommendation was put forward last spring? • Can we expect some publication of the metrics that have been addressed in the last 6 months? • Can the AESO define what work needs to be accomplished and set out a work plan with specific dates for concluding the work? 	<p>The AESO acknowledges Mainstream Renewable Power’s support for the pro rata approach and the comment that it is notionally the fairest approach to capping individual WPF production when a SWPL is in effect.</p> <p>The AESO IT group is working on design considerations for system operators and participants to implement wind power management. As well, the AESO market and operations personnel are assessing detailed criteria regarding when to invoke WPM, and change or release the SWPL.</p> <p>Wind power management will not be in effect until approved by the AUC thus there are no metrics available at this time.</p> <p>It is expected the result of these assessments will be reflected in the proposed rules, procedures and standards that will be issued for stakeholder</p>

	Stakeholder	Comment	AESO Response
			consultation in accordance with the process pursuant to AUC Rule 017.
7.3	Shell Supports	Will the quality of the power generated by the turbine factor into the Curtailment Protocol?	The AESO has interconnection requirements to ensure all power generated to the system, regardless of supply type, meets minimum requirements.
7.4	TransAlta Supports	<p>The protocol is premised on the AESO having made the decision that wind power management should be triggered. An important part of the discussion which has not taken place is the decision process in deciding to trigger WPM.</p> <p>WPM management is focused on limiting wind when system resources are inadequate to handle the change in wind output over time. There are many other changes in generation output, imports/exports and loads on the system at any time and there is a danger that WPM will be used to solve/mitigate non-wind issues. The decision process to clearly identify and associate cause with mitigative action needs to be fully described and prescribed.</p> <p>Wind generation will be dispersed over wide geographies in Alberta. There will be many occasions when the local generation is providing system benefits including voltage support and loss reductions. In these circumstances prorata system wide curtailment may not make sense.</p> <p>With these caveats we support the protocol.</p>	<p>With respect to the ongoing process for identifying triggering criteria for WPM, please see the AESO's response to Mainstream Renewable Power's comments in section 7.2.</p> <p>The AESO considers that there is still much to be learned about wind power diversity and the AESO remains committed to monitoring this aspect and working with industry to better understand its impact on the reliable operation of the system and market in the AIES.</p>
7.5	TransCanada Energy Supports	<p>In principle, TransCanada opposes pro-rata allocation of generation curtailment. This is consistent with our congestion management position and our position that the AESO should find market based solutions to system problems.</p> <p>TransCanada does not believe that Wind Generators should be solely responsible for the variability of generation output. This is a responsibility of the system that should be met by</p>	<p>The use of pro-rata allocation for generation curtailment is consistent with AUC decision 2009-042, Transmission Constraints Management.</p> <p>Pursuant to the EUA the AESO has a duty "to provide safe, reliable and economic operation" of the system and "promote a fair, efficient and openly competitive market for electricity". The use of pro-rata allocation as part of a congestion management protocol provides generators a fair and efficient</p>

	Stakeholder	Comment	AESO Response
		<p>Ancillary Services.</p> <p>TransCanada encourages the AESO to explore market based solutions to the variability introduced by adding more wind capacity. This could include procuring fast ramp down service so that fast ramping generators and storages facilities and wind dumping can together determine the most efficient curtailment service through competition.</p> <p>This is also true in the situation where wind production is already high and the risk is that it will diminish quickly. During such times other generators will have unloaded capacity available that the system is relying upon. This reliance on the unloaded capacity is a service and should be compensated. The need for this service is a consequence of the addition of wind generators which comes with numerous benefits. Competition to provide this service while the system is surplus in capacity will moderate the cost of the service.</p>	<p>mechanism to compete for system access in conditions where curtailment is required.</p> <p>The AESO appreciates TransCanada Energy's comments on exploring market based solutions to deal with the variability introduced by adding more wind capacity. The AESO supports exploring market based solutions as a complement to the wind power management curtailment protocol, and these will be advanced in concert with other market design initiatives over the medium to long term period. The AESO recognizes that on-going refinement of ISO Rules, operating procedures, standards and operating tools will be necessary to facilitate the integration of additional wind generation in Alberta including consideration of more comprehensive market based and innovative solutions (e.g. demand side participation, dynamic scheduling, negative pool pricing, AS procurement).</p> <p>Should the AESO anticipate that the longer term solutions will not be available when larger scale wind generation is integrated to the AIES (note that by Q3 2010, wind generation in Alberta is expected to be approximately 1000 MW), the AESO will initiate development of a contingency plan through consultation with stakeholders in accordance with AUC Rule 017.</p>
7.6	EPCOR is Indifferent	<p>To the extent that the WPM curtailment protocol is intended for use by the system controller to effect system wide reductions to wind power on the AIES to maintain or restore reliability it is EPCOR's view that WPM curtailment and the use of Potential MW capability is reasonable.</p> <p>EPCOR supports the use of pro-rata allocation of system curtailments when curtailments are deemed necessary as the process is fair; however, EPCOR does recognize that pro-rata curtailment may not always be efficient and the cost benefits need to be considered.</p>	<p>The AESO acknowledges EPCOR's comment that "To the extent that the WPM curtailment protocol is intended for use by the system controller to effect system wide reductions to wind power on the AIES to maintain or restore reliability it is EPCOR's view that WPM curtailment and the use of Potential MW capability is reasonable", and that "Therefore twenty minute intervals for reassessment and re-allocation of curtailments seems reasonable provided the costs do not outweigh the potential benefits, as does the threshold of 5 MW. Anything less than 5 MW is considered non substantive by other AESO rules".</p>

	Stakeholder	Comment	AESO Response
		<p>The use of Potential MW Capability to allocate for each WPF appears to be superior as it takes into consideration actual production at individual wind facilities. This approach is consistent with the allocation of curtailments currently applied to non-WPF. However, EPCOR has concerns regarding the complexity of implementation and the potential high error in the data (10-15%). EPCOR supports this approach to the extent that it can be efficiently implemented and the time frame and proposed costs are reasonable.</p> <p>EPCOR agrees that regardless of the curtailment and allocation protocol implemented the need for accurate operating conditions and curtailments must be balanced by implementation complexity and costs. Therefore twenty minute intervals for reassessment and re-allocation of curtailments seems reasonable provided the costs do not outweigh the potential benefits, as does the threshold of 5 MW. Anything less than 5 MW is considered non substantive by other AESO rules.</p>	<p>The AESO recognises the concern respecting errors in the potential MW capability. However, the AESO understands from its discussion with manufacturers, that this method is achievable. As indicated in the Wind Power Management Work Group paper, Wind Power Management Protocol for Alberta: Work Group Recommendations to the Alberta Electric System Operator , “the Potential MW Capability is still representative of changing wind conditions and would lead to a more equitable allocation of the System Wind Power Limit (SWPL).”</p>
7.7	B(9) Power Opposes	<p>Oppose. Each of the above items should be individually considered. Each represents a massive cost to industry. First, some smart industry folks tried to help but main MOF author is all the time talking and at no time listening so industry folks could not get a word in edge wise. Industry participation decreased, leaving the author to do as they please anyway. So in response to the above 3 points: (1) No one knows what it really means. How about a system wide curtailment for all other forms of generation? If that is not possible to do safely then perhaps a pro-rata sharing of the opportunity cost of lost generation. How about the AESO quantifies what that might look like. (2) as above, no one knows what this really means, therefore unacceptable.. Cost implication of this is not understood by industry. What is the proposed size (GWH and when) of this proposal? (3) again, no one knows what this means so unacceptable.</p>	<p>The AESO considers that WPM is required to ensure large scale wind power generation can be integrated in the AIES in a reliable, fair, efficient and openly competitive manner,</p> <p>With respect to comments regarding the need to apply WPM, please see the AESO’s response to Greengate Power Corporation’s comments in section 7.1.</p> <p>With respect to the how the WPM may work, including the identification of the invoking or triggering criteria for WPM, please see the AESO’s response to Mainstream Renewable Power’s comments in section 7.2.</p> <p>The AESO also confirms that in the current market structure in Alberta, there are no constrained down generation payments.</p>

	Stakeholder	Comment	AESO Response
		The economic impact to wind has not been estimated or explained. This is not understood by industry, so NO.	
7.8	ENMAX Opposes	ENMAX strongly opposes non-market-based solutions unless there is no other option. Much more consultation is required on this point from both an operational perspective and an effect-on-the-market perspective.	<p>The AESO supports exploring market based solutions for the wind power management curtailment protocol, subject to alignment with the congestion management protocol. Further consultation is required on determining these market based solutions.</p> <p>Please also see the AESO's response to TransCanada Energy's comments in section 7.5.</p>
7.9	IPPSA Opposes	<p>IPPSA has three broad recommendations:</p> <p>1) As a general approach, IPPSA would prefer it if the AESO were to examine market solutions to market problems, rather than rely on directives and involuntary curtailments. As an example, could a voluntary constrained down mechanism be considered, rather than pro-rata curtailment?</p> <p>2) Perhaps a Wind-Following AS product can be developed to seek fast-acting loads and supplies to respond, as an early step to resolve any ramping issue. Again, this would be a more market-based solution, rather than relying on directives.</p> <p>3) The AESO should clearly define the conditions for invoking Wind Power Management (WPM). As a high-level principle, WPM should be limited to system operations issues clearly attributed to wind. There is a concern from IPPSA's wind members that WPM may be used to manage other system issues, not necessarily those caused by wind producers.</p>	<p>With respect to comments regarding market based solution, please refer to the AESO's response to the comments of TransCanada Energy in section 7.5.</p> <p>With respect to comments regarding the specifying the criteria to invoke WPM, please refer to the AESO's response to Mainstream Renewable Power's comments in section 7.2.</p>
7.10	Load Coalition Opposes (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers)	It is suggested that this is fundamentally a question of market structure, from which an operating protocol should then be derived. In general, market-based, bilateral solutions are preferable to an imposed formula.	Dispatch Down Service is designed as a price reconstitution mechanism to mitigate the impact of a Transmission Must Run dispatch on the Pool Price. Further consultation is required to explore DDS as a "dispatch down" protocol for other applications.

	Stakeholder	Comment	AESO Response
	Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	<p>A “DDS-like” approach would be more consistent with the current market design, since this is essentially a ‘constrained down’ requirement that flows from the generation system itself, just as DDS flows from the transmission system itself.</p> <p>A ‘bilateral’ approach to this problem is also worthy of consideration. Loads could be held responsible for providing operating instructions consistent with the system’s requirements, in a form that can be efficiently used by system operators.</p> <p>It may be practical to set a date by which an alternative mechanism must be agreed to by industry. If agreement is not reached by that date, then it would be helpful if the AESO’s operations group identified an expedient default protocol (which, ideally, would be distasteful enough to all parties to force agreement on a better approach).</p> <p>It would also be expedient to consider implementation of negative pricing as the means to allocate curtailment among the zero-offer community provided this was in concert with introduction of an energy-ahead and imbalance market design. Note that negative pricing is not a new concept - the Ontario average hourly price on April 10th was - \$6.50/MWh, as generation assets attempted to manage their activities.</p>	<p>The AESO supports exploring the suggestions provided by the Load Coalition as well as other market based solutions for the wind power management curtailment protocol, subject to alignment with the congestion management protocol. Further consultation is required on determining these market based solutions.</p> <p>Please refer to the AESO’s response to the comments of TransCanada Energy in section 7.5.</p>
7.11	Nexen Opposes	<p>Generally Nexen would like to see the AESO examine market solutions to manage any market issues rather than rely on directives and involuntary curtailments. For instance the AESO may introduce new products or ancillary services which could manage the ramping of wind generation.</p>	<p>Please refer to AESO’s response to TransCanada Energy’s comments in section 7.5.</p>

Recommendation:

8. WIND POWER MANAGEMENT - Supply Surplus

The AESO solicits input from all stakeholders on the proposed supply surplus protocol and proposed modifications to OPP 103 provided below.

- (1) Include wind power facilities and co-generation facilities in OPP 103 procedures with co-generation to be subject to Minimum Operating Level (MOL) requirements
- (2) Establish a Minimum Operating Level (MOL) for each asset and, where possible, assets should not be dispatched below their MOL.
- (3) Refine MOL definition to include new constraints not included in Minimum Stable Generation¹ (MSG) but that affect the asset's ability to operate at or below a threshold. MOL is a physical operating limit (not an economic limit) for an asset constrained by legal/regulatory, environmental, health and safety, equipment reliability, operating level required to serve dispatched ancillary services, or operating level required to prevent damages to third party equipment. Examples of physical operating constraints for types of generation and import/export are included in the WG paper (Appendix A).
- (4) Develop a mechanism for pool participants to declare and submit the MOL. It is expected that the need for, approach and frequency of declaration may vary among generators and will need to be defined.
- (5) Revise the current "inflexible block" definition. The definition of "inflexible block" will need to be amended as follows:

"inflexible block" means a block of energy that may be dispatched on or dispatched off, but not partially dispatched on, except for a \$0 offer block it may be dispatched to the asset's MOL.

Definition of "flexible block" does not require any changes since it accommodates the proposed \$0 SMP management protocol.

- (6) Provide market indication of supply surplus conditions (similar to supply adequacy situations) to provide market participants an opportunity to take voluntary actions in the face of potential \$0 SMP conditions and also become aware that an out-of-market dispatch to clear the energy imbalance could be forthcoming.

	Stakeholder	Comment	AESO Response
8.1	Greengate Power Corporation Supports	The procedure set out seems appropriate since it aims to curtail on a fair basis while giving consideration to specific physical limitations. As discussed previously, it is important that the AESO share either definitive information on when this situation is likely, similar to the aggregate wind forecast, or more generic information on the conditions that are likely to lead to oversupply, such as spring run-off/freshette. In providing information to participants, it is possible that some oversupply situations may be avoided. The information on when oversupply is more likely to occur can assist developers in educating	<p>The AESO acknowledges Greengate Power Corporation's comments that "The procedure set out seems appropriate since it aims to curtail on a fair basis while giving consideration to specific physical limitations".</p> <p>The AESO Recommendation Paper for the Implementation of Market & Operational Framework for Wind Integration in Alberta, March 2009, states that the Supply Surplus working group recommends the following: "Provide market indication of supply surplus conditions (similar to supply adequacy situations) to provide</p>

¹ ISO Rule definition for MSG is "minimum stable generation" which means the minimum generation level that an asset can be continuously operated at without becoming unstable.

	Stakeholder	Comment	AESO Response
		<p>prospective investors on the range of possible and probable revenue outcomes.</p>	<p>market participants an opportunity to take voluntary actions in the face of potential \$0 SMP conditions and also become aware that an out-of-market dispatch to clear the energy imbalance could be forthcoming.”</p> <p>The AESO supports providing participants with a market signal, similar to supply adequacy situations, to provide participants an opportunity to take voluntary actions.</p>
<p>8.2</p>	<p>Mainstream Renewable Power Supports (MRP)</p>	<p>While the AESO has included the Supply Surplus discussion as part of the MOF implementation, it is not a wind specific issue. The AESO recognises the wide range of interests that will be affected by changes to OPP 103.</p> <ul style="list-style-type: none"> • Will all market participants review the MOF implementation paper? <p>It is likely better to advance changes to OPP 103 through the established rules consultation process so that details of each the rule can be debated including the calculation of the MOL for each generator. Is this the proposed plan of action?</p>	<p>Supply surplus rules and protocols are intended to treat all generators in a fair, efficient, and openly competitive manner and are not intended to exempt specific generators unless there is an acceptable operating reason or other considerations.</p> <p>Resolving supply surplus issues is necessary for the fair, efficient, openly competitive and reliable integration of significant additional wind generation on the AIES. As such, the discussions to date within the MOF have been useful and necessary. However, consultation within the MOF, including considering the Supply Surplus (\$0 SMP) Protocol Work Group Recommendation for modifications to OPP 103 (including the new concept of the Minimum Operating Level (MOL) for each facility and the reporting of the MOL to the AUC), was not intended to be conclusive. It was anticipated that the proposed supply surplus protocol, including the revisions to OPP 103, would be conducted through the established ISO Rules development and consultation process, which is in accordance with the AUC Rule 017.</p> <p>A number of stakeholders have commented that the AESO should consider conducting further consultation on the supply surplus initiative.</p> <p>The AESO is committed to further consultation with industry on supply surplus or dispatching equal priced offers, including the appropriateness of the MOL and inclusion of the co-gen/ISD facilities in the protocol and exploring other market based solutions. The</p>

	Stakeholder	Comment	AESO Response
			<p>AESO will use the Supply Surplus Protocol Work Group's recommendations as input to that process. The objective continues to be identification and refinement of longer-term and possible interim solutions to address supply surplus matters while ensuring that the AESO is able to manage pending issues as they arise.</p> <p>The AESO expects that any subsequent ISO Rules and OPPs will address supply surplus issues in a way that is fair, efficient, openly competitive, technically sound and in the public interest.</p> <p>In the meantime, any occurrence of an Alberta supply surplus situation will be managed in accordance with the existing OPP 103. Should the AESO anticipate that the longer term solutions will not be available, when larger scale wind generation is integrated to the AIES (note that by Q3 2010 Alberta wind generation capacity is expected to be approximately 1000 MW), the AESO will initiate the development of a contingency plan through consultation with stakeholders in accordance with AUC Rule 017.</p>
8.3	TransCanada Energy Supports	<p>TransCanada supports the inclusion of wind power facilities in OPP 103. TransCanada also, in principle, supports the inclusion of co-generation facilities in OPP 103, as long as the contractual steam requirements that the generation facility has with its host facility can be maintained. In many instances the power output of a cogeneration facility is driven by the host steam requirements.</p> <p>TransCanada requests removing the revision of OPP 103 and Supply Surplus consultation from the MOF and addressing this change through the rule making process. Within the MOF this issue may not receive the same attention from the rest of the industry who may dismiss it as purely a wind issue.</p>	<p>The AESO acknowledges TransCanada's support in the inclusion of wind power facilities in OPP 103.</p> <p>With respect to TransCanada's comments on co-gen facilities and broader stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>
8.4	Suncor is indifferent	Suncor takes the position that the recommendation paper submitted for stakeholder	With respect to Suncor's comments on co-gen facilities and broader stakeholder consultation, please

	Stakeholder	Comment	AESO Response
		<p>consultation is being processed without appropriate notice to market participants with Cogeneration facilities in an industrial system designation arrangement. This is mostly due to the changes being rolled out under wind integration, which did not clearly articulate the proposed changes to OPP103, and the proposed MOL being imposed on cogeneration facilities.</p> <p>Suncor suggests that the AESO initiate a more detailed review of the proposed changes with respect to OPP 103 with ISD cogeneration based stakeholders to gain a thorough understanding of the definition of MOL, and the impact on the cogeneration facilities.</p> <p>ISD's are established to provide self generation and steam facilities for reliability and overall systems integrity. The facilities are completely integrated, and normally produce excess MW in order to meet the steam and load demands of the site.</p> <p>We would like to better understand how the AESO interprets MOL with respect to Cogen facilities where excess MW are produced in order to meet the steam and load demands of the facility, how the MOL is aligned with legislation on the ISD's, and what flexibility is envisioned to support the diverse day to day operational changes required to keep an ISD facility whole.</p>	<p>refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>
8.5	ATCO Power	<p>ATCO does not support the inclusion of co-generation facilities into OPP 103 as set out above. Even with the addition of MOL, there are still potential consequences to the co-generation facilities and the site host. Unit characteristics are not properly addressed, and need to be considered further.</p>	<p>With respect to ATCO Power's comments on co-gen facilities and broader stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>
8.6	B(9) Power Opposes	<p>Oppose. This comment box is TOO LONG. A whole new AESO undertaking. Most industry participants know NOTHING about it. Never</p>	<p>Supply surplus rules and protocols are intended to treat all generators in a fair, efficient, and openly competitive manner and are not intended to exempt</p>

	Stakeholder	Comment	AESO Response
		<p>clearly explained. In response to the above points: (1) include wind in OPP103? Why would industry agree to this? (2) Min MOL: doesn't make sense for wind. Why does wind eat the cost of other generation types being unable to ramp in accordance with power demand? Wind is <1% of generation. Why does it bear cost of 100% of the problem? All generation must be treated FAIRLY in accordance with AESO mandate. This is not fair. If wind is most logical generation type to SOLVE the problem, then why does wind bear 100% of the cost? (4) the "MSG" is not applicable for wind. The definition is inadequate as it does not address wind characteristics. The AESO comment "will need to be defined" is unacceptable. This represents an unknown not explained.</p> <p>Wind is not coal nor is it cogen nor is it gas. The definition does not recognize generation diversity in Alberta.</p>	<p>specific generators unless there is an acceptable operating reason or other considerations.</p> <p>The overall objective of the supply surplus initiative is to develop a protocol that is fair and efficient, while considering technical and operating issues. The AESO has considered the operating characteristics of wind generators in the proposed Minimum Operating Limit (MOL) definition.</p> <p>Please also refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>
8.7	Canadian Natural Resources Opposes	<p>Making a statement that "Cogen" should be subject to this curtailment plan is too broad a statement. Not all Cogen is alike. At oilsands sites, Cogen is installed primarily to produce heat in the form of steam. This steam is used to produce oil and any curtailment of Cogen is a reduction of oil output. There is no alternate source of heat/steam that can be switched on to replace lost output when Cogen is curtailed. Also the processes used to produce oil depend on the reliable supply of heat/steam from the Cogen. Unpredictable and unscheduled reductions in heat/steam from the Cogen can cause reservoir and facility damage. As heat/steam production is part of a continuous process, the interruption of the supply of heat/steam interrupts the entire production process. Recovery from such an interruption is not immediate when full heat/steam production is restored. In some cases it can take a week or more to restore full oil production. Therefore reducing heat output in order to reduce</p>	<p>With respect to Canadian Natural Resources' comments on co-gen facilities, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>

	Stakeholder	Comment	AESO Response
		<p>power output is simply not an option. A main component of the proposed protocol is that “inflexible \$0 offer blocks, flexible \$0 offer blocks and wind power facilities would share the burden of curtailments in a fair and effective manner”. This element of the proposed protocol represents a major policy shift from the existing protocol contained in OPP 103, in that OPP 103 currently exempts “generating units primarily serving load or steam process, including those supplying to industrial systems with industrial system designation” (the “Exemption”) from being directed to minimum stable generation in the event of a surplus of supply. The unique characteristics and economics of non-dispatchable cogeneration facilities, being those whose bids into the system are not price sensitive, dictate that such an exemption should be preserved. Our minimum stable “heat” generation is base load.</p> <p>At our Primrose site, the primary purposes of our cogeneration facility is to produce steam which is then injected into the ground in order to extract bitumen (InSitu oilsands; as is acknowledged in paragraph 3 of Appendix B to the Supply Surplus (\$0 SMP) Protocol Work Group Recommendation) The efficient design of our cogeneration facilities results in the creation of significant quantities of power as a by-product of the steam generation. It also results in a significant CO2 reduction compared to alternatives. Because the primary purpose of our facilities is the creation of steam for bitumen extraction and synthetic oil production, steam reliability is of essential to our operations. Any curtailment in steam production for a cogeneration facility would place a disproportionate burden, both in financial and operational terms, on the primary business that the cogeneration facility was built to support, as compared to a facility whose primary purpose is electricity generation. As the injection of steam into the bitumen reservoir must occur on a</p>	

	Stakeholder	Comment	AESO Response
		<p>continuous basis, any unscheduled interruption in the supply of steam from the Cogen, can result in permanent damage to the reservoir, resulting in the permanent loss of production capacity from the reservoir. The financial burden would manifest in a significant loss of revenue from a reduction in bitumen and oil sales. The value of the heat can be up to 10 times the value of electricity. As such, our cogeneration facilities must run at full capacity continuously and steam production should not be compromised due to power market conditions, including conditions of oversupply.</p> <p>At our Horizon Project site, the cogeneration facility supplies heat to the bitumen refining and extraction process. Unscheduled interruption in the supply of this heat will immediately impair the production of bitumen and synthetic crude oil from this project. This will manifest itself in financial terms as reduced revenue from the sale of synthetic crude and additional operating costs incurred to restart the process when full steam production returns.</p> <p>The integrated nature of a cogeneration facility is such that steam and power cannot be made separately which further supports an argument in favour of a continued exemption for cogeneration facilities from any curtailment protocol and was, presumably, a critical factor in the initial decision to include the Exemption in OPP 103. The Supply Surplus (\$0 SMP) Protocol Work Group Recommendation, in paragraph 3 of Appendix B, makes the following statement:</p> <p>“Co-gens are usually sized for the steam requirement and there may not be a lot of flexibility in generation output and (sic) would not cause negative impact to host process. There may be some alternative means to reduce the need for generation output to produce steam such as duct firing.”</p>	

	Stakeholder	Comment	AESO Response
		<p>Unfortunately, the opinion in the last sentence is incorrect. Non-dispatchable cogeneration steam generation is entirely dependant on maintaining the power output. The suggestion that duct firing could be used to provide dispatchability misses the fact that duct firing has already been maximized to support the steam load. Duct firing is always needed for oilsands steam production in order to get the efficiency of the cogen process to an economically viable level. Duct firing is necessary in order to supplement the available heat provided by the Cogen turbine when the turbine operating at base load. Duct firing is not designed to replace heat which the turbine cannot provide when the turbine is operating at a reduced load. Our Cogen plants and those of our competitors are not designed to produce sufficient heat/steam for the oil production process in the absence of base load operation of the turbine.</p> <p>A further important consideration that cannot be ignored is that the construction of a cogeneration facility requires substantial investment and a favorable and stable regulatory environment is an important consideration for any entity(ies) considering, or who have already committed to, such a project. The growth in cogeneration in Alberta over the last several years has been substantial, due in part to a favorable regulatory environment. Cogeneration is now an integral part of the infrastructure of Alberta's core industries, providing reliable, on-site steam generation to many sectors including forestry, petro-chemical and oilsands production and refining. In order to encourage the continued development of such projects, investors will require certainty as to the ability of such a facility to operate consistently and reliably. The following illustrates this point:</p> <p>"Regulatory barriers pertain to the regulatory environment governing the installation and</p>	

	Stakeholder	Comment	AESO Response
		<p>operation of cogeneration facilities. A key regulatory barrier is access to the electricity grid for the sale of excess electricity. Currently, only Alberta has open access to its electricity grid and has provided easier access to the market. As a result, since 2000, over 1.2 GWe of cogeneration capacity has been installed in the province, more than any other region. While there are many other conditions that affect the penetration of cogeneration (primarily higher electricity prices and reliability issues in Alberta), improved access to the grid and to the market in general are considered primary motivations for the growth of cogeneration in the province.”</p> <p>Although the paper this quote came from is somewhat dated, the principles that it sets forth remain valid under the existing OPP 103.</p> <p>In summary, access to the electricity grid for the sale of excess electricity is a key driver of cogeneration development in respect of integrated industrial processes, as this facilitates the ability of the Cogen operator to run the Cogen plant at the output required to facilitate the demand for heat by the industrial process. The proposed protocol represents a significant policy shift which would have a disproportionately negative impact on existing or developing cogeneration projects and would negatively influence the construction of new cogeneration projects in the province. Therefore, Canadian Natural Resources Ltd respectfully requests that the exemption contained in the existing OPP 103 excluding “generating units primarily serving on-site load or steam process, including those supplying to industrial systems with industrial system designation” from the curtailment process should be respected and maintained in any new protocol which may amend or supersede the existing OPP 103.</p> <p>“Cogeneration Potential in Canada, Phase 2”</p>	

	Stakeholder	Comment	AESO Response
		completed for Natural Resources Canada and prepared by Catherine Strickland and John Nyboer of MK Jaccard and Associated in April 2002.	
8.8	ENMAX Opposes	ENMAX strongly opposes non-market-based solutions unless there is no other option. Much more consultation is required on this point from both an operational perspective and an effect-on-the-market perspective.	With respect to ENMAX's comments on market based solutions and further stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.
8.9	EPCOR Opposes	<p>In EPCOR'S view it is inappropriate to include supply surplus management proposals within this stakeholder consultation on wind integration. The proposal has the potential to constitute a significant change to the market design and will impact all participants extensively regardless of their source of generation. Supply surplus is not by any means an issue that is unique to wind power integration. There are other circumstances that could result in a supply surplus (independent of volatile wind generation levels) and we must ensure that supply surplus management protocols are considered in all contexts, not just in the context of excess supply due to high wind generation.</p> <p>Before contemplating such significant and pervasive changes, the AESO should hold a separate stakeholder consultation process to deal with supply surplus management. The outcome has major and widespread consequences for market participants who may not be involved in or fully aware of the current consultation on wind integration. It is essential that all impacted parties are engaged in discussing potential supply surplus management protocols that are critical to the preservation of price fidelity and the operation of the market.</p> <p>That being said, EPCOR has major concerns with the supply surplus management protocol that is put forward in this recommendation paper. The proposed introduction of a minimum operating</p>	<p>With respect to EPCOR's comments on the appropriateness of MOL and requirement for broader stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p> <p>The AESO acknowledges EPCOR's support for the AESO's recommendation to provide the market with an indication of supply surplus events prior to real time in order to encourage participant actions and market responses.</p>

	Stakeholder	Comment	AESO Response
		<p>level (MOL) is particularly troubling. The recommendation paper indicates that MOL is intended to be a physical operating limit; however, contractual considerations (PPA or non-PPA) are not physical limits, they are economic limits that have no bearing on the level a unit is dispatched to in a supply surplus event. Furthermore, the recommendation paper suggests that run of river hydro facilities are analogous to wind generating facilities, that is, the fuel passing through and the generator must be used or wasted. No harm would come to the asset in either case if the unit was curtailed. Although there would be a financial impact, this does not constitute a physical operating limit. Economic incentives are not acceptable reasons for a unit to be precluded from being dispatched to Minimum Stable Generation (MSG) in a supply surplus event. The existing MSG satisfactorily and separately addresses real physical limitations and there is no physical reason for the MOL of a wind turbine to be set to any value greater than zero. For these reasons EPCOR is not in favour of the proposal to establish an MOL or to change the definition of inflexible block.</p> <p>EPCOR supports the AESO's recommendation to provide the market with an indication of supply surplus events prior to real time in order to encourage market responses to the fundamentals.</p>	
8.10	IPPSA Opposes	<p>We would prefer a market solution to this perceived market problem, rather than involuntary curtailments. One idea would be to create a modified DDS product, where must-run generators can pay a volunteer to curtail supply.</p>	<p>With respect to IPPSA's comment on market solution, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>
8.11	Load Coalition Opposes (Alberta Direct Connect Consumers Association)	<p>It is suggested that this is fundamentally a question of market structure, from which an operating protocol should then be derived. Alternatives include a 'DDS-type' model, negative pricing, and 'blind' pro-rating, each of which may have advantages and disadvantages for the zero-</p>	<p>With respect to Load Coalition's comment on market based solution, co-gen facilities and broader stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>

	Stakeholder	Comment	AESO Response
	<p>(ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)</p>	<p>offer generators; however, none of the alternatives should be implemented without an extensive review of the implications for the broader power market.</p> <p>In addition, consideration must be given to the economic consequences of curtailment as well as the reliability issues. Co-generation facilities that are supporting industrial processes with thermal outputs often cannot be curtailed without significant impact to the production processes supported by the steam. As such, all co-generation facilities that support industrial processes should have the ability to designate an MOL that is based on this industrial need as well as the other factors identified.</p> <p>In any instance where the co-generation facility is part of an ISD, the facility must be fully exempt from any OPP 103 provisions. It is unreasonable to have these units subject to any dispatch risks induced by a supply surplus, as by definition they are part of an industrial process.</p> <p>It is recommended that any changes to OPP 103 become part of a broader market dialogue such that the concerns of other zero-offer generators are adequately captured in the considerations.</p>	
<p>8.12</p>	<p>MEG Energy Corp Opposes</p>	<p>We understand that a main component of the proposed protocol is that “inflexible \$0 offer blocks, flexible \$0 offer blocks and wind power facilities would share the burden of curtailments in a fair and effective manner”. This element of the proposed protocol represents a major policy shift from the existing protocol contained in OPP 103, in that OPP 103 currently exempts “generating units primarily serving load or steam process, including those supplying to industrial systems with industrial system designation” (the “Exemption”) from being directed to minimum stable generation in the event of a surplus of supply. It is our strong</p>	<p>With respect to MEG Energy’s comment on co-gen facilities and broader stakeholder consultation, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.</p>

	Stakeholder	Comment	AESO Response
		<p>belief that the unique characteristics and economics of non-dispatchable cogeneration facilities, being those whose bids into the system are not price sensitive, dictate that such an exemption should be preserved.</p> <p>As is acknowledged in paragraph 3 of Appendix B to the Supply Surplus (\$0 SMP) Protocol Work Group Recommendation, the primary purpose of our cogeneration facility is to produce steam which is then injected into the ground in order to extract bitumen. The efficient design of our cogeneration facility results in the creation of significant quantities of power as a by-product of the steam generation. Because the primary purpose of our facility is the creation of steam for bitumen extraction, steam reliability is of paramount importance to our bitumen production operations. Any curtailment in steam production for a cogeneration facility would place a disproportionate burden, both in financial and operational terms, on the primary business that the cogeneration facility was built to support, as compared to a facility whose primary purpose is electricity generation. In particular, the financial burden would manifest in a significant loss of revenue from a reduction in bitumen sales. As such, our cogeneration facility must run at full capacity continuously and steam production should not be compromised due to power market conditions, including conditions of oversupply.</p> <p>The integrated nature of a cogeneration facility is such that steam and power cannot be made separately which further supports an argument in favour of a continued exemption for cogeneration facilities from any curtailment protocol and was, presumably, a critical factor in the initial decision to include the Exemption in OPP 103. The Supply Surplus (\$0 SMP) Protocol Work Group Recommendation, in paragraph 3 of Appendix B, makes the following statement:</p>	

	Stakeholder	Comment	AESO Response
		<p>“Co-gens are usually sized for the steam requirement and there may not be a lot of flexibility in generation output and (sic) would not cause negative impact to host process. There may be some alternative means to reduce the need for generation output to produce steam such as duct firing.”</p> <p>Unfortunately, the speculation expressed in the last sentence is incorrect. Non-dispatchable cogeneration steam generation is entirely dependant on maintaining the power output. The suggestion that duct firing could be used to provide dispatchability misses the fact that duct firing has already been maximized to support the steam load.</p> <p>A further important consideration that cannot be ignored is that the construction of a cogeneration facility requires substantial investment and a favourable and stable regulatory environment is an important consideration for any entity(ies) considering, or who have already committed to, such a project. The growth in cogeneration in Alberta over the last several years has been substantial, due in part to a favourable regulatory environment. Cogeneration is now an integral part of the infrastructure of Alberta’s core industries, providing reliable, on-site steam generation to many sectors including forestry, petro-chemical and oilsands production and refining. In order to encourage the continued development of such projects, investors will require certainty as to the ability of such a facility to operate consistently and reliably. The following illustrates this point :</p> <p>“Regulatory barriers pertain to the regulatory environment governing the installation and operation of cogeneration facilities. A key regulatory barrier is access to the electricity grid for the sale of excess electricity. Currently, only</p>	

	Stakeholder	Comment	AESO Response
		<p>Alberta has open access to its electricity grid and has provided easier access to the market. As a result, since 2000, over 1.2 GWe of cogeneration capacity has been installed in the province, more than any other region. While there are many other conditions that affect the penetration of cogeneration (primarily higher electricity prices and reliability issues in Alberta), improved access to the grid and to the market in general are considered primary motivations for the growth of cogeneration in the province.”</p> <p>Although the paper this quote came from is somewhat dated, the principles that it sets forth remain valid under the existing OPP 103.</p> <p>In summary, access to the electricity grid for the sale of excess electricity is a key driver of cogeneration development. The proposed protocol represents a significant policy shift which would have a disproportionately negative impact on existing or developing cogeneration projects and would negatively influence the construction of new cogeneration projects in the province. Therefore, MEG argues strongly that the exemption contained in the existing OPP 103 excluding “generating units primarily serving on-site load or steam process, including those supplying to industrial systems with industrial system designation” from the curtailment process should be respected and maintained in any new protocol which may amend or supersede the existing OPP 103.</p> <p>As a final note, we would like to express our concern with the lack of engagement of all stakeholders to date. The proposed changes to the curtailment protocol that have been embedded in the Implementation of Market & Operational Framework for Wind Integration have a significant impact on co-generators in the Province. We urge the AESO to extend the period for stakeholder</p>	<p>With respect to the engagement of stakeholders to date on the supply surplus and related issues, see the AESO’s response to the comments of Canadian Natural Resources in section 11.3</p>

	Stakeholder	Comment	AESO Response
		<p>commentary and to actively notify all stakeholders that are affected by the policy such that they may become appropriately engaged in the discussion.</p> <hr/> <p>“Cogeneration Potential in Canada, Phase 2” completed for Natural Resources Canada and prepared by Catherine Strickland and John Nyboer of MK Jaccard and Associated in April 2002.</p>	
8.13	Nexen Opposes	<p>Nexen - This MOF paper suggests a major change to OPP 103, where the exemption for “generating units primarily serving load or steam process, including those supplying to industrial systems with industrial system designation” will be removed and replaced with a requirement to be directed to a Minimum Operating Level (MOL) in the event of a surplus of supply. Nexen submits that the unique characteristics and economics of non-dispatchable cogeneration facilities suggest that the original exemption should be preserved.</p> <p>The MOF paper suggests the objective of the proposed changes are intended to support fairness and efficiency between market participants while meeting the AESO’s technical and operating requirements. While Nexen appreciates the proposed changes may provide some benefits to the AESO in the management of the AIES, the inclusion of ISD co-generation units does not support the intended fairness between market participants.</p> <p>Nexen submits electric generating facilities and co-generation facilities are drastically different types of facilities which cannot be treated in the same manner. While similarities may exist in offer price, as some co-generation facilities that have surplus energy may offer that surplus into the market at \$0, but that is where the similarity ends.</p> <p>Generally the primary purpose of a cogeneration</p>	<p>With respect to Nexen’s comment on co-gen facilities and broader stakeholder consultation, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.</p>

	Stakeholder	Comment	AESO Response
		<p>facility is to produce steam which is then used to produce another product. In the case of Nexen's Long Lake facility the steam is injected into the ground in order to extract bitumen. Electricity production is a by-product of the operation rather than the primary output. As steam production is a primary input into bitumen production, any curtailment in that production would have a serious negative impact on the organization.</p> <p>The primary motivator of an electric generator is to generate the maximum amount of energy and corresponding revenues as sold through the power pool. Nexen acknowledges that curtailment of energy production for an electric generator may cause some economic harm. Curtailment of electricity and steam production for a co-generation facility on the other hand would be substantially greater and disproportionate to that of an electric generator. For instance:</p> <ul style="list-style-type: none"> - as noted above, the reduction or loss of the primary revenue generating output i.e. oil production, forestry products, petro-chemical production would be far greater than the loss of the energy sales to the AIES - sudden curtailment in generation may also cause catastrophic failure to integrated equipment processes (which may include incremental costs associated with the recovery from an outage, replacement of equipment etc.) <p>Nexen submits this lopsided outcome does not support the MOF's intended objectives of advocating equity and fairness among all participants. The integrated nature of a cogeneration facility is such that steam and power cannot be made separately which further supports an argument in favour of a continued exemption for cogeneration facilities from any curtailment protocol and was, presumably, a critical factor in the initial decision to include the exemption in the original OPP 103.</p>	

	Stakeholder	Comment	AESO Response
		<p>Nexen is also concerned that the proposed policy shift is also unduly harmful to those participants that have or are about to make significant investment in co-generation technology. As discussed above cogeneration and accompanying processes are exceedingly integrated, which rely heavily on an extremely reliable source of steam production. The principles and exemptions outlined in OPP103 provided direction to participant's which in turn was used in the economic analysis, facility design and eventual investment of capital. The fundamental policy change as proposed for OPP 103 can have a significant impact on the operational and financial viability of the facility along with future investment decisions. Nexen submits implementing a policy with such a negative impact on stakeholders is not reasonable and strongly recommends that the exemption as outlined in the current OPP 103 be upheld.</p> <p>Nexen appreciates that as a result of the anticipated increase in the amount of \$0 offer energy on the AIES, the AESO felt is necessary to develop and update its processes and procedures to ensure compliance with its mandate. The rationale to now remove the exemption for co-generation facilities is not fair and equitable and Nexen submits that the circumstances and rationale which supported the original exemption continue to be valid.</p> <p>Nexen appreciates the opportunity to comment on the AESO's MOF proposal and hopes that the AESO will continue to engage all stakeholders in developing a solution which satisfies the needs and concerns of all stakeholders.</p>	
8.14	Shell Opposes	OPP 103 should be addressed by a separate consultation process since it affects all market participants.	With respect to Shell's comment on broader stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable

	Stakeholder	Comment	AESO Response
8.15	Syncrude Opposes	<p>1. The inherent nature of cogeneration facilities is to maximize the use of available energy by combining the production of electricity with another process. In Syncrude’s case, cogeneration units are used to supply heat for steam production, and to supply heat for various processes. Generator turbines are used to ‘let-down’ steam from high to low pressure for various processes, to ‘let-down’ steam from high pressure into condensate for various processes, and to utilize excess heat energy from oil production process units. For any of the 10 cogeneration units at Syncrude, altering the production of electricity will impact the related process.</p> <p>Our facility offers to sell electricity at \$0.00 to protect ourselves from the likelihood of having to make sudden adjustments to curtail electrical production, preventing adverse effects and a disproportional burden on our related processes.</p> <p>2. Syncrude Utilities is operated to preserve the integrity of the steam distribution system (maintaining safe and operable pressures, and supplying critical steam-driven equipment) at the expense of electrical production. 8 out of 10 cogeneration units on Syncrude site can be classified as ‘bottoming-cycle’ cogeneration units, in which case, electrical production is secondary to its accompanying process. As such, these generators do not have the ability to ‘safe-park’ or revert to a safe ‘minimum operating level’ on short notice.</p> <p>3. The purpose of Syncrude’s electrical distribution system and cogeneration units is to support the process of oil production. Our connection to the AIES is used to maintain an energy balance on our site, by either importing or exporting electricity. Excess energy on our site, due to an unforeseen</p>	<p>Power in section 8.2.</p> <p>With respect to Syncrude’s comment on co-gen facilities, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.</p> <p>The potential tariff changes with respect to resulting impact to DTS for co-gen facilities will be included in the future consultation on supply surplus.</p>

	Stakeholder	Comment	AESO Response
		<p>change to process conditions, must be dispelled, and the export of electricity is often necessary to maintain this safe and reliable equilibrium.</p> <p>4. Based on the AESO Recommendation Paper, the proposal is to treat wind generation the same as 'generating units primarily serving load or steam process' with respect to supply surplus conditions. The resulting impact to these two categories of generating assets is very different.</p> <p>5. The AESO Recommendation Paper indicates that there may be an impact to the DTS tariff as a result of implementing these recommendations. Further details are required before existing ISDs can understand the financial impact of this change.</p> <p>6. Introducing the proposed changes to OPP 103 would constitute a major change for existing ISDs that operate non-dispatchable cogeneration units, and could have significant unfavourable impacts on the operation at Syncrude. Up to this point, there have been no significant regulatory obstacles in the operation of cogeneration units, or significant restrictions on market participants that operate cogeneration. In this instance, there are many ISDs that were not consulted prior to publishing these proposed changes, and perhaps the impact of the proposed changes is not fully understood.</p> <p>Syncrude Canada Ltd. is not in favour of removing the existing clause in the current version OPP 103 exempting 'generating units primarily serving on-site load or steam process, including those supplying to industrial systems with industrial system designation'.</p>	
8.16	TransAlta Opposes	TransAlta believes the modifications to OPP 103 proposed by the AESO are premature in that changes are proposed which will impact cogeneration facilities without sufficient notice to	With respect to TransAlta's comment on broader stakeholder consultation, MOL and ISD, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.

	Stakeholder	Comment	AESO Response
		<p>those market participants.</p> <p>The changes suggested are set out in a process dealing with “wind integration”. Notices sent out by the AESO concerning the process do not highlight that changes are suggested for cogeneration operations under OPP 103 and therefore the affected parties may not have reviewed the changes. Further, MOL would be established for all types of generation and a wider consultation is thus needed.</p> <p>OPP 103 is similar in some ways to congestion management and this process is uncertain at this time. The introduction of a new concept such as MOL has wider implications than just OPP 103 and should be taken through the broadest possible stakeholder consultation process.</p> <p>We would like to understand how issues related to Industrial System Designations and how the proposed supply surplus rules respect legislation regarding ISD’s.</p> <p>Further, how does the proposed definition for MOL fit with an ISD designation and its right to service its own site load?</p> <p>Specifically, if generation at levels beyond serving on site electrical requirements is required to produce the necessary steam on site, how will this be interpreted under the MOL?</p> <p>Declaration of a MOL, as a physical quantity, must be flexible to allow hourly submission to reflect site operational conditions.</p>	

Recommendation:

9. SUPPLY SURPLUS – protocol

The Supply Surplus work group also developed the following protocol respecting OPP 103:

Step 1: Curtail opportunity services including import transactions.

Step 2: Take the following actions, taking into account the transmission system operating and reliability constraints and an objective of rotating the curtailments amongst market participants where possible:

- a. Curtail flexible \$0 blocks, by pro-rata assignment,
- b. Where wind generation is required to be curtailed pursuant to (a), assign the curtailment amongst each individual wind power facility using the wind power management protocol,
- c. Curtail inflexible \$0 blocks to the asset’s MOL.

Step 3: Curtail an asset to 0 MW (go off line), considering the asset’s minimum off time.

	Stakeholder	Comment	AESO Response
9.1	Greengate Power Corporation Supports	The order of operations set out seems appropriate. However, AESO needs to keep in mind that while wind power facility could be a \$0 block, it still attracts revenue through its green attributes.	The AESO acknowledges Greengate Power Corporation’s support for the supply surplus protocol and the comment that “while wind power facility could be a \$0 block, it still attracts revenue through its green attributes”.
9.2	Mainstream Renewable Power Supports (MRP)	While the AESO has included the Supply Surplus discussion as part of the MOF implementation, it is not a wind specific issue. The AESO recognises the wide range of interests that will be affected by changes to OPP 103. Will all market participants review the MOF implementation paper? It is probably better to advance changes to OPP103 through the rules so that details of each the rule can be debated including the calculation of the MOL for each generator. Will this be done?	With respect to Mainstream Renewable Power’s comment on broad stakeholder consultation, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.
9.3	TransCanada Energy Supports	See response to 8.3 above.	Please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.
9.4	Canadian Natural Resources	See comments under Section 8.7.	Please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.

	Stakeholder	Comment	AESO Response
	Opposes		
9.5	ATCO Power	OPP 103 is a very important OPP that has wide ranging impacts on the market beyond wind energy. ATCO Power would encourage the AESO to consult on this OPP outside of the wind integration initiative with a wider group of stakeholders.	Please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.
9.6	B(9) Opposes	<p>Oppose. "Curtailment" x6! Few if any stakeholders know anything about this area. Not well understood. Cost is not understood. Sharing of this cost is not considered in MOF. Opposed because no one understands the implications. A new brainchild of AESO authors for a make work project. "Curtail... Curtail... Curtail... Curtail... Curtail..." How about getting the system ready to accommodate renewable energy. How about building some transmission.. How about a can-do attitude. This is a wind industry "NO."</p> <p>Quantitative impact of curtailment is unknown. This massive uncertainty makes debt financing of wind projects infeasible due to unquantifiable uncertainty. All other aspects of wind farm operations are now well understood thanks to investment by industry and historical risk taking. Now AESO is injecting massive unknown into wind economics. This is not acceptable.</p>	<p>Please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p> <p>The AESO has created a long-term plan for reinforcement of the southern Alberta transmission system to accommodate expected wind generation additions. This plan was filed with the AUC in December 2008, in addition to the plans on the southwest transmission reinforcement filed in 2004 and southeast transmission reinforcement filed in 2007.</p> <p>While the AESO is working to develop transmission expansion, there is an immediate requirement for wind power management and other possible solutions to ensure large scale wind generation can be integrated reliably in the AIES.</p>
9.7	ENMAX Opposes	ENMAX strongly opposes non-market-based solutions unless there is no other option. Much more consultation is required on this point from both an operational perspective and an effect-on-the-market perspective. ENMAX notes that the implications of OPP 103 extend to all market participants, not just wind generators, so a much broader discussion process is necessary.	With respect to ENMAX's comment on market based solutions and broader stakeholder consultation, please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.
9.8	EPCOR Opposes	EPCOR opposes the inclusion of Supply Surplus management in the stakeholder consultation on wind integration. See comments above.	With respect to EPCOR's comment on broader stakeholder consultation Please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.
9.9	IPPSA Opposes	We believe that OPP 103 should be the subject of a separate consultation process.	Please refer to the AESO's response to the comments of Mainstream Renewable Power in

	Stakeholder	Comment	AESO Response
		We would also support a market solution to this market problem, rather than involuntary curtailments.	section 8.2.
9.10	Load Coalition Opposes (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	<p>It is suggested that this is fundamentally a question of market structure, from which an operating protocol should then be derived.</p> <p>The initial step of curtailing imports appears manifestly unfair, particularly since importers may have to make significant financial commitments in order to obtain transmission services to the Alberta border, and Load Shed Requirement (LSR) support for these transactions may already be committed.</p> <p>The concept of decision-making based on physical requirements of assets is fundamentally in conflict with decision-making based on the economic preferences of market participants. Such ‘mixing of models’ inevitably leads to complex ‘seams issues’, which could be avoided by selecting one model and rigorously adhering to its requirements.</p> <p>Please refer to comments on Issue #7 as well.</p>	As noted in the AESO’s response to the comments of Mainstream Renewable Power in section 8.2, further stakeholder consultation will be held on supply surplus. The order of curtailment will be reviewed and, will be included in the stakeholder consultation.
9.11	MEG Energy Corp Opposes	See comments under Section 8 above	With respect to MEG Energy’s comment on co-gen facilities, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.
9.12	Nexen Opposes	Please see the comments provided in Section 8.13 above.	With respect to Nexen’s comment on co-gen facilities, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.
9.13	Shell Opposes	OPP 103 should be addressed by a separate consultation process since it affects all market participants.	With respect to Shell’s comment on broader stakeholder consultation, please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.
9.14	TransAlta Opposes	The same comments as were made in 8.16 apply to 9.	Please refer to the AESO’s response to the comments of Mainstream Renewable Power in section 8.2.

Recommendation:

10. Technical Requirements and Standards

Given the expected difficulty and expense in modifying and/or retrofitting some existing wind power facilities, the WPFTR (s 1.2 g) provided an exemption from the 2004 requirements for any facilities that interconnected under the technical requirements that were in effect prior to November 15, 2004 but specified that these facilities would be required to comply with the WPFTR if the facilities underwent a refurbishment or major upgrade.

The AESO considers that this approach is reasonable and prudent but expects that the issue of applicability should be discussed in the rules and standards development and consultation phase. This will include a discussion of the potential grandfathering of certain wind facilities based on the terms and conditions of interconnection agreements and other relevant information.

	Stakeholder	Comment	AESO Response
10.1	ENMAX Supports	It is appropriate that existing interconnection agreements be respected.	The AESO acknowledges ENMAX's comment that "It is appropriate that existing interconnection agreements be respected".
10.2	EPCOR Supports	EPCOR is generally supportive of the recommendation that onerous interconnection requirements and costs should not be retroactively imposed on existing generators of any fuel source. However, EPCOR would like more information regarding the percentage of facilities that will not be compliant with the most recent technical requirements. It is important the costs associated with more stringent technical requirements are not outweighed by the costs to system reliability.	The AESO monitors the operation and performance of facilities to verify that they comply with their interconnection obligations. The current Wind Power Facility Technical Requirements (November 15, 2004) state that "WPFs that were approved for interconnection to the ATS prior to November 15, 2004 are subject to the previous generator standard". Approximately 300 MW of transmission-connected WPFs were connected under the previous standard. The remaining facilities have connected under the Wind Power Facility Technical Requirements (November 15, 2004).
10.3	Greengate Power Corporation	It may be necessary to grandfather certain existing assets due to retrofit costs. In other words, granting an exemption from complying with the specifics of the WPFTR itself is not offensive, whereas exempting any existing facilities from curtailment requirements is not acceptable.	The grandfathered facilities will not be required to meet the new technical requirement which include; over frequency control, ramp rate limiting, power limiting, and wind forecasting. However, they will be required to comply with all dispatch and market requirements as established in the rules and procedures. The rules and procedures will be consulted with stakeholders. Notice for stakeholder consultation

	Stakeholder	Comment	AESO Response
			will be provided with the respective timelines.
10.4	Load Coalition Supports (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	This appears to be a balanced and practical solution.	The AESO acknowledges Load Coalition's support and comment that "This appears to be a balanced and practical solution".
10.5	Mainstream Renewable Power Supports (MRP)	This should be the case only for those wind farms not capable technologically supporting power management or those built before 2004 Integration standards	See AESO's response to the comments of Greengate Power Corporation in section 10.3.
10.6	Shell Supports	What is the timeline for developing the WPFTR? It is key that the performance parameters be defined, especially for "power limiting", "ramp limiting", and "sustained ramping".	See AESO's response to the comments of Greengate Power Corporation in section 10.3.
10.7	TransAlta Supports	<p>We support grandfathering of older wind farms which will not have the necessary communications in place and which also will not have equipment with the capabilities required to comply. As well, the older wind farms will decrease in significance as the amount of wind on the system increases.</p> <p>We would suggest that it would be timely to review the entire WPFTR at this time to ensure the requirements can be met by the wind turbine equipment suppliers. This standard is now almost five years old and a review would be timely.</p>	<p>The AESO acknowledges TransAlta's support and comments regarding the older wind power facilities.</p> <p>NERC / WECC are developing requirements applicable to WPFs such as updated VRT requirements. In addition, the AESO is in the midst of reviewing its authoritative documents and may rewrite this standard in a new format. These changes may trigger further review of the remainder of the WPFTR.</p>
10.8	B(9) Opposes	Oppose. No end of technical requirements and standards and rules which cost MILLIONS of DOLLARS. Cannot approve.	The AESO has a legislated mandate to develop criteria and standards for the reliability and adequacy of the transmission system. These technical requirements are essential to maintain the reliability of the power system with high levels of

	Stakeholder	Comment	AESO Response
			wind penetration.
10.9	TransCanada Energy Opposes	<p>TransCanada does not support grandfathering for forecasting data acquisition. All Wind Power Facilities should be held to the same standards and rules. Installing met towers is not a significant cost but has a significant benefit to the system. Grandfathering of existing facilities may be acceptable only for small wind projects, 10 MW or less. Larger projects should be able to accommodate any additional costs to install forecasting equipment. The issue of managing winds variability will not be resolved if the 497 MW already on the system are not required to forecast their wind resource.</p>	<p>Grandfathering will apply with respect to wind power management. The AESO concurs that forecasting is separate and as determined in the pilot project almost all facilities could participate.</p>

Recommendation:

11. Additional Comments

	Stakeholder	Comment	AESO Response
11.1	ATCO Power	ATCO Power would appreciate the AESO providing more information on what type(s) of ancillary service products could be used to help integrate wind onto the AIES.	The AESO is committed to exploring ancillary service products (e.g. demand side options supply/load following, storage options) to address system variability due to wind as part of the broader consultation on longer term market solutions.
11.2	B(9) Power	<p>MOF massively undermines the economic viability of wind projects:</p> <p>(1) Massive proposed curtailment costs to be unevenly borne entirely by wind industry to solve a system-wide problem caused by antiquated transmission infrastructure which AESO has not upgraded since inception in 2003.</p> <p>(2) Project financing requires certainty. MOF introduces massive operating uncertainty due to proposed curtailment with no proposal for opportunity cost loss sharing among power generators. Lenders will balk at uncertainty of unquantifiable costs associated with MOF curtailment proposals. Not acceptable.</p> <p>(3) Wind is <1% of generation. Wind may one day be 4% of generation Yet MOF proposal is that wind is burdened with 100% of the cost of supply/demand imbalance. Wind will share in this cost equitably with other generation types in fair proportion. MOF is discriminatory to wind.</p> <p>Wind helps reduce power cost in Alberta, benefiting power consumers.</p> <p>Constant dictatorial treatment by AESO forcing comments they want into a box rather than outside the box is an industry-wide unacceptable approach</p>	<p>See the AESO's response to the comments of B(9) Power in section 7.7.</p> <p>See the AESO's response to the comments of EPCOR in section 1.1 with respect to wind power forecasting.</p> <p>See the AESO's response to the comments of Greengate Power Corporation in section 2.2 with respect to curtailment.</p> <p>See the AESO's response to the comments of Mainstream Renewable Power in section 8.2 with respect to supply surplus.</p> <p>The AESO Recommendation Paper for the Implementation of Market & Operational Framework for Wind Integration in Alberta, March 2009, states that the Supply Surplus working group recommends the following: "Provide market indication of supply surplus conditions (similar to supply adequacy situations) to provide market participants an opportunity to take voluntary actions in the face of potential \$0 SMP conditions and also become aware that an out-of-market dispatch to clear the energy imbalance could be forthcoming." The AESO supports providing participants with a market signal, similar to supply adequacy situations, to provide participants an opportunity to take voluntary actions. Details respecting this matter will be</p>

	Stakeholder	Comment	AESO Response
		<p>that's gone on far too long.</p> <p>Rather than address out of the box information and suggestions, AESO wants to force industry into the AESO box. It is the reason we chose a broader outlook outside the AESO box and to ADOE, AUC and MSA. Moreover, AESO refuses to listen to anything other than what they want to hear. Thus the 900 MW cap on wind, NO TRANSMISSION built since AESO inception in 2003, too many bogus studies and more make work projects that don't get any transmission built.</p> <p>Comments are: letter pdf, attachments, appear to ADOE, AUC, MSA. Clearly MOF needs to go ON HOLD until a more proactive attitude can be taken.</p> <hr/> <p>Additional comments</p> <p>After two years of study, involving 3 forecasting vendors and millions of dollars spent on Wind Forecasting, the ability to forecast wind power has improved dramatically. The MOF must provide comfort to industry that curtailment would only be necessary in events where EMMO, Regulating Reserves, Load/Supply Following Services, and Forecasting all FAILED. Although this is outlined in the MOF working papers, reassurance is required that curtailment is not to be used until no other alternative is available. The wind industry has been supportive of the forecasting pilot and cost forecasts are minimal relative to their forecast benefit to grid stability.</p> <p>"In situations where the system cannot absorb all the forecasted or actual wind power generated, maintaining system security will call for wind power to be dispatched down, ramp rate limited or dispatched off" Such "situations" are not clearly understood by stakeholders.</p>	<p>defined in the future rule and/or OPP.</p> <p>As more wind is integrated into the AIES, it will become increasingly important to manage wind information carefully and ensure that useful and proper information is available to participants including; wind forecasting data, information on ramping events, and supply surplus conditions.</p> <p>The AESO has started these efforts through its posting of weekly wind reports and is committed to working with stakeholders to improve these mechanisms.</p>

	Stakeholder	Comment	AESO Response
		<p>New renewable generation cannot attract investment capital if the System Operator has the ability to “dispatch down, ramp rate limit or dispatch off” generation at will. If AESO is going to curtail wind output, it must provide an analysis of the scope of these anticipated curtailments. The AESO may use historical and any of its forecast generation/load scenarios as the basis. The analysis must clearly show, in respect of these curtailment events (see page 21 of MOF paper), the historical and anticipated:</p> <ul style="list-style-type: none"> a. DURATION (hours per event) b. MAGNITUDE (MW curtailed per event) c. FREQUENCY (events per year) d. TIMING (seasonality & time of day of events) <p>This information is critical for quantifying the economic impact of proposed curtailment. (power sales per MW installed per year). This data has not been provided in a clear, concise manner to stakeholders. AESO reports on MOF have, to date, merely included EXAMPLES of events, with little meaningful quantitative analysis to assist stakeholders in understanding the impact and severity of such events, either forecasted or historical. Eg. Page 23 of the March 24, 2009 MOF Presentation merely mentions 234 ramp events but offers no indication of the period over which these were observed, their duration, magnitude or timing. The CanWEA response letter of April 5, 2007 clearly articulates the need for the above information to be quantified, though it remains to be demonstrated by AESO. Other stakeholder comments asked similar questions.</p> <p>Supply Surplus conditions mean that power supply exceeds demand (load). If wind provides a service to other generators by shutting down voluntarily, then it is to be compensated for this service. Perhaps those units unable to dispatch down safely (coal) could compensate wind for this anticipated service. The condition illustrated on pg 12 of the March 2009 MOF</p>	

	Stakeholder	Comment	AESO Response
		<p>paper (a supply surplus event where supply exceeds demand) can indeed be handled by wind curtailment. In these scenarios, price should be at or near \$0 (reflecting supply exceeding demand) and curtailment is a service the wind industry can perform at relatively low cost to the system. As noted, AESO has not adequately demonstrated the duration, magnitude, frequency and timing of such events historically or on a forecast basis. Why would wind not be incentivized to provide this service to other generators unable to safely dispatch down (coal and cogeneration)? The MOF must address cost sharing in its “considerations for fairness”. It is encouraging that MOF states that “all supply facilities should participate in reducing MW generation during supply surplus conditions”.</p> <p>MOF statements such as “the current size and composition of generation resources in Alberta (predominantly thermal and a large amount of cogeneration) in combination with the limited interconnection capability affect the capability of the system to accommodate wind power variability in the near term” demonstrate a narrow and misguided mindset. The system reliability issue is not solely caused by the variability of wind power generation. System reliability is a problem inherent in a fragile, unresponsive generation system fueled by non-dispatchable and unreliable coal-fired generation with limited</p> <p>inertie capacity. The above statement says as much. The costs of mitigating this inherent instability must be borne by the sector as a whole in a proportional and fair manner. Wind generation (at 500 MW installed in a system with 5900 MW of coal) cannot reasonably be expected to bear 100% of the burden. This is UNFAIR and thus contrary to AESO mandate.</p> <p>The AESO comment on page 13 that “Historical monthly or seasonal capacity factors therefore could be useful information for AESO system and market operations, system planning and resource adequacy</p>	

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		<p>assessments. In addition, market participants may find capacity factors useful” demonstrates AESO’s punitive attitude toward wind generation.</p> <p>a. Perhaps market participants would be interested in similar data for thermal units and transmission lines, whose outages similarly cause grid instability. (see above)</p> <p>b. Perhaps the AESO could provide this information from its metered volumes database in a more accessible manner, similar to SYGRATION’s analysis available from Ontario’s IESO.</p> <p>a. Genesys, the computer model used for evaluation of power supply adequacy by the Northwest Power and Conservation Council identifies “forced (unplanned) outages of thermal and hydro generating units [as] a major source of uncertainty.”[1]</p>	
11.3	Canadian Natural Resources	<p>We are concerned with the lack of engagement of all stakeholders to date. The proposed changes to the curtailment protocol that have been embedded, almost by sleight-of-hand in the Implementation of Market & Operational Framework for Wind Integration, have a significant impact on cogenerators in the Province. We urge the AESO to extend the period for stakeholder commentary and to actively notify all stakeholders that are affected by the policy such that they may become appropriately engaged in the discussion.</p>	<p>The AESO is committed to full stakeholder engagement on its rules, procedures and practices. The Market and Operational Framework For Wind Integration in Alberta, March 7, 2007 and the AESO Recommendation Paper for the Implementation of Market & Operational Framework for Wind Integration in Alberta, March 2009, were issued to all stakeholders. During the lengthy consultation process since March 2007 many comments were received from all sectors of the industry Three working groups were established (“Supply Surplus”, “Wind Power Management Protocol” and “Wind Power Management – Technical Requirements”) Representation on the working groups was publicly solicited from all sectors. Notwithstanding, the AESO recognizes the concerns respecting treatment of cogenerators and the AESO is planning to initiate additional stakeholder consultation on supply surplus. The objective is to develop a protocol that is fair and efficient, while considering technical and operating issues for all generating facilities including those of the co-gens.</p>
11.4	CanWEA	Forecasting - CANWEA	See the AESO’s response to the comments of

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	<p>Forecasting is properly identified as a foundational element throughout the MOF Recommendation Paper. CanWEA agrees that:</p> <ol style="list-style-type: none"> 1. Solicitation, evaluation and selection of a centralized forecasting service provider should proceed as soon as possible, 2. Consultation on rules, procedures, standards and technical requirements with respect to wind generator data should also proceed as soon as possible, and 3. Data management must remain a critical issue within the forecasting services consultations. Given AESO's operational experience with data management and the fact that the procurement of a forecasting service will present new challenges, it would seem appropriate for AESO to maintain the data management function, assuming it is logistically and economically feasible. <p>CanWEA supports the reconvening and involvement of the Wind Power Forecasting Group in the various aspects of obtaining reasonable and particle forecasting services within the Alberta market. The importance of advancing forecasting given its interrelationship with other critically important issues associated with curtailment, supply surplus protocols, ancillary services as examples, cannot be overstated.</p> <p>Wind Power Management - CANWEA Wind Power Management (WPM) remains a foundational component of the MOF for CanWEA members. Our membership has stated on a number of occasions that WPM, as it is contemplated in MOF documentation, should only be utilized after all other operational measures have been executed. In other words, WPM should be a measure of last resort rather than a default option for addressing operational matters. CanWEA believes that the determination and establishment of a clear protocol around WPM has to be a priority for AESO. Part of that</p>	<p>EPCOR in section 1.1 with respect to forecasting and workgroups.</p> <p>The AESO acknowledges CanWEA's support for the AESO maintaining the wind power forecast data management function.</p> <p>See the AESO's response the comments of EPCOR in section 4.1 with respect to data management.</p> <p>See the AESO's response to the comments of TransAlta in section 7.4 with respect to wind power management.</p> <p>See the AESO's response to the comments of Mainstream Renewable Power in section 8.2 with respect to supply surplus.</p>

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		<p>discussion must look at how wind may be impacted by WPM measures initiated in response to events that are not attributable to wind.</p> <p>The process and decisions made to trigger WPM and the ensuing mitigation measures need to be fully transparent. As an example, frequency and duration protocols for curtailment, should it be necessary, have to be developed and applied in a fair and transparent manner.</p> <p>Supply Surplus - CANWEA Revision to Operating Policy and Procedure (OPP) 103 and managing supply surplus operating conditions will require the same diligent effort. However, since all market participants are affected by alterations to this procedure and since meaningful contributions from the wind sector will be reliant and informed by operational experience of the above items, a separate and distinct consultative process may be more advantageous.</p> <p>Recognizing limited resources by all parties and a desire to bring more certainty to the market, CanWEA recommends focusing on forecasting and further development of WPM protocols in advance of a thorough review of OPP 103.</p>	
11.5	ENMAX	<p>The AESO's wind forecasting pilot project demonstrated that individual forecasts could differ from one another, and from actuals, by hundreds of megawatts (i.e., by a substantial fraction of the total installed wind capacity). The pilot project also demonstrated that the timing of significant ramps could be missed by many hours, and that persistence forecasts were essentially as good as model forecasts over short time horizons. To ENMAX's knowledge, there has been no assessment of what accuracy level would be needed to successfully incorporate wind forecasts into grid operations, whether that accuracy level is achievable (after all, even after a great many years, forecasting the weather in Alberta continues to be a significant</p>	<p>See the AESO's response to EPCOR's comments in section 1.1.</p>

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		challenge), or whether spending additional money will yield forecasts much better than persistence forecasts over operational time horizons. Therefore, while it may be appropriate to continue with pilot studies to attempt to improve the accuracy of the forecasting models, it is premature to attempt to incorporate those models into an operational framework. This is particularly so given that the existing energy-only market design is unlikely to support the AESO's frequently-mentioned 11,500 MW of wind generation in the interconnection queue.	
11.6	EPCOR	Finally, EPCOR opposes the inclusion of the supply surplus management proposal (OPP 103) within the consultation on wind integration. This proposal has the potential to significantly impact the market design. The AESO should hold a separate stakeholder consultation process to deal with supply surplus management as there are major and widespread consequences for all market participants regardless of their source generation. There are a number of circumstances under which supply surplus could occur aside from high levels of wind generation. Supply surplus management protocols need to be developed independently to ensure that they are considered in all contexts and not just in the case of excess supply due to high levels of wind generation.	See the AESO's response to the comments of Mainstream Renewable Power in section 8.2
11.7	Load Coalition (Alberta Direct Connect Consumers Association (ADC); Industrial Power Consumers Association of Alberta (IPCAA); and Office of the Utilities Consumer Advocate (UCA) – submitted on a joint basis)	Although the solutions to issues as set out in the MOF appear to have the consensus support of wind-developers, they do not take into consideration the implications of significant increases in wind generation on the operation of the hourly market nor on implications for system reliability. These broader issues demand a more comprehensive consultative approach.	Please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.
11.8	Mainstream Renewable	At page 42 (first full paragraph) the AESO seems to imply that it is monitoring the "complex relationship"	The EUA requires the AESO to "carry out its duties, responsibilities and functions in a timely

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<p>Power (MRP)</p>	<p>between wind market integration and the cost of ancillary services as though there were a trade-off to be made between the two. In other words, the AESO is attempting to find the optimal balance between increased cost of reliability and increased wind integration.</p> <p>In actual fact, the AESO has a duty to achieve both goals and there should not be an attempt to trade one off against the other. The AESO has a duty to promote and fair, efficient and openly competitive market, period. Unequivocally the AESO also has a duty to provide for a reliable system. The trajectory of the past 50 years is relatively simple; the cost of reliability increases as the market develops. This is not to say that the AESO should not attempt to minimize or slow the rising cost of reliability; by all means look for alternatives, however it would be inappropriate to slow or halt the development of the energy market because the cost of reliability would increase.</p> <p>At page 45 the AESO raises the notion of compliance monitoring. Such discussion is premature until the rules have been determined. That said, the objective of compliance monitoring also needs to be clarified and stated. Additionally, the consequence of failure needs to be addressed as well as appropriate penalties. This is a broad discussion regarding the principles of compliance and penalties this is not wind integration specific. The AESO should address these principles on a stand-alone basis.</p> <p>At page 45 the AESO discusses the possibility of contingency plans but concludes with the statement that today's rules will be used if the new rules are not yet in effect. This is somewhat puzzling as many of the MOF implementation rules are new. It is recommended that the AESO be more explicit as to how issues will be addressed using the current rules if the new rules are not in effect. For example, how will the AESO determine a SWPL; what method will</p>	<p>manner that is fair and responsible to provide for the safe, reliable and economic operation of the interconnected electric system and to promote a fair, efficient and openly competitive market for electricity.” The AESO will not limit wind integration to save costs. However, AESO reliability solutions must be compatible with the energy market and be cost effective.</p> <p>As for compliance, the AESO’s role pursuant to 21.1 of the EUA is to monitor and refer suspected contraventions of ISO rules to the MSA.</p> <p>Regarding Contingency Plans, the AESO recognizes the implementation plan for the MOF is ambitious. In the event that any delays in implementation occur, operation of the grid and markets would proceed under the current or slightly modified rules and procedures. The AESO would consult on any modifications to the current rules and procedures in accordance with the ISO Rules process and AUC Rule 017.</p> <p>See AESO’s response to the comments of Mainstream Renewable Power in section 8.2 on supply surplus.</p> <p>The AESO believes that stakeholders benefit from the outcomes resulting from their active participation and does not intend to fund any cost of stakeholder participation.</p>

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		<p>be used to cap WPFs if a SWPL is invoked; what forecasting method will be used; how will OPP103 apply to WPFs today; etc.?</p> <p>At page 46 and 47 the AESO outlines its' next steps. We observe that these next steps will involve converting the high-level concepts presented in the MOF paper to specific rules and that this process will require a considerable amount of in-depth work. The AESO encourages stakeholders to participate (and we would agree that stakeholder participation leads to better results) however the amount of time and resources needed to fully participate can be taxing on stakeholders. From this perspective the AESO is encouraged to consider funding a portion of stakeholder costs in order to allow for a greater degree of participation by stakeholders.</p>	
11.9	IPPCA/Petro-Canada	<p>Petro-Canada requests that AESO continue to exempt co-generation facilities from participating in curtailments associated with dispatching during events of multiple \$0 offers. Petro-Canada would be pleased to participate in a broadly represented working group to explore alternate solutions.</p>	<p>Please refer to the AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>
11.10	RHO*V**CUBED ENERGY LTD.	<p>Wind Power Management needs to be clearly defined as a "last resort" response. The need for such is inversely proportionate to forecast accuracy and to the efficiency of alternative processes. In the real world it will be almost impossible to convince renewable resource investors to invest in Alberta wind when due diligence obliges developers to advise investors: "Oh, by the way, the AESO reserves the right, at any time, to reach over and turn us off." The methodologies of WPM allocation discussed in the Recommendation Paper appear to have the effect of rewarding mediocrity and penalizing excellence in wind farm efficiency factor.</p>	<p>The AESO Recommendation Paper for the Implementation of Market & Operational Framework for Wind Integration in Alberta states "The basic premise of the MOF is that if the System Operator has access to a reasonable forecast of wind power, they can establish operating plans using the following measures; (1) Energy Market Merit order (EMMO), (2) Regulating Reserves, (3) Load/Supply Following Services, and (4) Wind Power Management (WPM)."</p> <p>The specific details regarding the procedures for wind power management will be consulted with industry.</p>
11.11	Shell	<p>More clarity is required concerning cost allocation (forecasting service, Regulating Reserves, Load/Supply following, Ancillary Services).</p>	<p>As noted in the MOF, load pays for all costs of ancillary services (including regulating reserves) in accordance with subsection 47(a) of the</p>

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		<p>Managing the integration of wind power provides an opportunity to develop demand side management tools and other innovative solutions.</p>	<p>Transmission Regulation. Please refer to responses above regarding wind powered generation forecasting service cost allocation.</p> <p>The AESO acknowledges that there is an opportunity to develop other innovative solutions for integrating additional wind power. The AESO will consult industry stakeholders on possible options and opportunities and will monitor developments in other jurisdictions. Please also refer to the AESO's response to the comments of TransCanada Energy's in section 7.5 and ATCO Power ins section 11.1.</p>
11.12	Syncrude	<p>As a result, the amount of available power generation at Syncrude is dependent on the site steam balance and process conditions. Adjustments to power generation is impossible without affecting the integrity and reliability of the steam system, and many critical 'must run' process units and equipment. Maintaining the ability to import and export electricity from the AIES, with minimal restriction, is critical to maintaining the site energy balance. As such, our operations personnel are instructed to maintain a standing offer for the sale of electricity at \$0.00 at all times, so that, in a supply surplus situation, we can retain some ability to export power. Our generators do not have the ability to 'safe park' or revert to a safe 'minimum operating level'. Keeping this balance is critical to maintaining safe operating limits on all of Syncrude's equipment and process units.</p> <p>It is Syncrude's position that wind generation and cogeneration should not be treated the same in this regards. Where it may be possible and relatively easy to take a wind turbine offline in a supply surplus situation, the same cannot be said for the cogeneration unit that is coupled with a process unit or steam distribution system. A sudden and significant reduction in generation cannot be accomplished without compromising the integrity of our related commodity and process systems and posing a</p>	<p>See AESO's response to the comments of Mainstream Renewable Power in section 8.2.</p>

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		concern for the safety of our staff.	
11.13	TransAlta	<p>Given the plans to implement the Forecasting System in 2009 and that the costs of the forecasting are to be paid by the wind farms producing energy, the AESO needs to consider the following:</p> <ul style="list-style-type: none"> - The current level of wind energy on the system of approximately 500 MW is not a concern but that the AESO has indicated a concern exists when approximately 900 MW is reached. - The costs of the forecasting will be borne initially by wind farms which are not a level of concern. We would recommend the cost chargeout on the system be based on 1000 MW and that until such time as 1000 MW is achieved that the AESO absorb the costs related to the difference between the installed capacity and 1000 MW. - The AESO needs to devise a chargeout process and consult with the wind industry on the process. We assume that this will become part of the tariff process. 	<p>The AESO considers that all wind powered generation benefits from forecasting. The AESO cannot “absorb” costs due to its not-for-profit nature; all costs must be paid by some party. The AESO also considers it unreasonable to suggest chargeout be based on 1000 MW regardless of whether less than 1000 MW is actually installed. The AESO expects to base the cost recovery on wind power forecast existing at the time and does not plan any differential treatment based on in service date.</p> <p>The AESO will engage stakeholders in the 2010 General Tariff Application process regarding cost recovery for wind power forecasting.</p>
11.14	TransCanada Energy	<p>Missing from these recommendations is any reference to what level of Regulating Reserves the AESO will contract for and dispatch, and especially how this will be traded off against Wind Power Management.</p> <p>The industry would also benefit from an analysis on historical statistics regarding ramping behaviour of wind generation in Alberta. How often do they ramp? How much do they ramp? How quickly do they ramp? This might best be illustrated with “duration curves” rather than hard numbers or percentages.</p> <p>Currently the Alberta market does not have adequate ramping response for future wind generation levels. If the market is to succeed in growing ramp capability the AESO must move away from curtailment and commit to procuring for its future needs. To allow creative solutions, the AESO should define the problem to be solved, not the solution. (This definition could be something like XX MW/minute ramp up capability to be used when wind generation is high, and YY MW/minute ramp down capability to be used</p>	<p>See AESO’s response to the comments of Mainstream Renewable Power in section 11.8.</p> <p>As noted in the AESO’s response to the comments of Mainstream Renewable Power in section 5.10, the AESO considers that the energy market merit order (EMMO) and ancillary services (AS) will be used prior to the implementation of the WPM protocol. The quantity and type of AS requirement will be determined by the wind forecast information and the AESO operational experiences.</p> <p>The AESO agrees that further analysis of the ramping behaviour of wind generation would be beneficial to market participants. In this respect, the AESO has been posting weekly wind power operational and market reports on its website for over a year and has committed to working with stakeholders to improve the value of these reports and historical statistics.</p>

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		<p>when wind generation is low.) The AESO needs to commit to a long enough initial term for the service that will entice suppliers to develop appropriate solutions. To protect the market, these quantities must only be used for the purpose procured (to accommodate new wind generation capacity) and after that initial term there should be a return to full competition to provide the service.</p>	<p>The AESO agrees that the challenges facing industry require clear definition. While curtailments are a necessary consideration in managing wind we agree that it is not the only solution.</p>