March 17, 2011

Dear Market Participants and Other Interested Parties

Re: **Phase Two Operating Reserve Market Redesign**

The AESO made several changes to the Operating Reserve (OR) market in July 2010 as part of the ongoing OR market redesign project. The key change moved all operating reserve procurement to the D – 1 timeframe, as opposed to previous design which allowed procurement from D – 5 through D – 1. This change was intended to simplify the market by reducing the number of trading periods, create a single price index for each delivery day, and reduce the AESO's influence in the market. The change has had the intended effect and the AESO has not observed any adverse impacts.

The Phase Two changes outlined in this document are designed to further reduce the AESO's influence in the market, simplify the design and improve transparency. The planned changes can be implemented within the framework of the current market. The three changes planned for implementation in the coming months are as follows:

1. Increase the volume of on and off peak active spinning and supplemental reserves on Watt-Ex to eliminate the need for 'shaped' over the counter (OTC) purchases. As a result, all active spinning and supplemental reserves will be purchased via block procurement at a single, transparent price.

2. The AESO will submit $0, volume-only bids for standby reserves on Watt-Ex and clear volume requirements based on on-screen supplier offers. This will eliminate the AESO's price influence in the standby market for regulating, spinning and supplemental reserves and allow the development of an offer curve for standby reserves.

3. Require market participants to make initial offers of 5 MW or greater on Watt-Ex to reduce the daily volume of cancelled trades resulting from aggregate offer volumes of less than 5 MW.

Increasing the volume of on and off peak block volumes of spinning and supplemental reserves will increase total active product volumes for these products. However, based on the AESO's evaluations, summarized in the Appendix to this letter, it is anticipated that total costs for ancillary services will not be impacted by this proposal for the following reasons:

- Standby activations will be decreased as the increased margin of active reserves will cover the expected forecast hour in most hours.

- Decreased standby volume activation rates allow the AESO to reduce the volume of standby reserves because these reserves will no longer be covering forecast error plus other contingencies.
- The AESO will no longer be paying premium prices for shaped OTC reserves in a secondary market. OTC prices are usually much higher than on and off peak active prices on Watt-Ex.
- Moving all contingency reserve volumes to Watt-Ex will materially increase liquidity and transparency because all active volumes will be traded at a single point, with a single price on a transparent platform.
- Peaking volumes for regulating reserves will continue to be purchased OTC, but the AESO will purchase blocks rather than an hourly shape. In effect, the AESO will develop a super-peak product for regulating reserves that will trade OTC.

In the standby market, the AESO will no longer submit a priced bid. The AESO will submit a volume bid with a $0/MW premium and $0/MW activation. The standby markets will then be manually cleared by the AESO based on the principle of minimizing expected costs. By not stating a price, the AESO will not influence offer prices and suppliers will be free to determine the fair market value for each product on each trading day. In the current market, the AESO significantly influences prices by stating a price preference via its bid and, since suppliers are able to select the AESO's bid at any time, the lowest priced suppliers may not be selected due to the 2-way pick mechanism. This dynamic does not support a fair, efficient openly competitive market and the proposed changes are intended address this issue.

Requiring participants to submit initial offers of at least 5 MW for the lowest priced block of any asset will ensure selected providers meet the 5 MW minimum volume requirement, and thereby reduce the number of cancelled trades. This will improve the function of the market by improving the fidelity of the price setting mechanism and increasing the volume of operating reserve that is ultimately traded over Watt-Ex. Given that sellers must meet a 5 MW minimum volume for each asset, there is no benefit allowing offers of less than 5 MW in the lowest priced block.

In addition to these three changes, the AESO will be soliciting participant feedback through a stakeholder meeting on the following concepts for future changes:

1. Modifying the definition of off peak products to represent 8 continuous hours from HE 24 on D-1 to HE 7 on D. The current definition of off peak results in a supplier providing reserves for 7 hours from HE 1 through HE 7, and then a single hour at HE 24.

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2. The development of a “super peak” product for regulating reserves. This would facilitate the elimination of the OTC market for shaped regulating reserve and allow the AESO to procure all regulating reserve volumes on NGX.

Modifying the definition of the off peak product is an improvement to the product design that more closely aligns the product to the physical requirements of supplying the product. Suppliers would commit to 8 consecutive hours rather than 7 hours and then a single hour at the end of the day. The product would extend over two calendar days but would reduce the number of dispatches associated with a given contract. The AESO seeks feedback on the feasibility of this change and potential conflicts with energy market trading activities and IT systems.

The AESO is also considering the development of ‘super peak’ products for regulating reserve on the Watt-Ex platform. Regulating reserve hourly volume requirements are much higher in the morning and evening ramp periods than for the remainder of the on and off peak periods. Currently, these requirements are purchased OTC, but as noted the AESO is moving to the development of super-peak blocks for OTC purchases. In order to eliminate the OTC market, the AESO is considering the development of two new products, morning super peak and evening super peak, to meet the volume requirements for these hours via the Watt-Ex platform. The AESO seeks feedback on this concept from participants.

The AESO is seeking participant feedback on the feasibility of the proposed changes. A workshop will be held April 1, 2011 at 1pm in the AESO offices to facilitate feedback. Pending the results of the workshop and implementation efforts, the AESO plans to have changes #1 through #3 in place for June 2011. The remaining changes will be discussed and potentially implemented in Q3, 2011. Please contact Kris Aksomitis at 403-539-2646 or Kris.Aksomitis@aeso.ca with any questions or concerns.

Yours truly,

Original signed by

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Appendix

Operating Reserve Market Design

The current OR market design has been in place since 2001, with relatively few changes over that time. The key changes that have been made over the last 10 years include:

- The majority of purchases are now made via Watt Ex by explicit practice, as compared to the previous practice of splitting volumes more equally and arbitraging between the two procurement platforms.
- The range of terms traded has gradually been reduced. Previously, OR was procured at terms that ranged up to several months, but all OR products are now daily on or off peak contracts.
- The range of products has been reduced. OR previously traded flat 24 X 7 products, as well as super peak products. Currently, only on and off peak products trade, although 'shaped' on and off peak products trade OTC.
- D – 5 through D – 2 trading was eliminated in 2010.

The flexibility in the original design reflects a much different design intention for operating reserves than that of the energy market. The Transmission Administrator (TA) had flexibility and a mandate to build a portfolio of reserve purchases. By design, the TA was an active participant in the market and the multiple platforms and products were an attempt to facilitate competition between sellers given that the TA had volume requirements that were well known to sellers.

Over time, the AESO has migrated towards a role as market facilitator as opposed to market participant, as is the case in the energy market. The AESO is promoting a competitive market through the development of a transparent price signal and reducing the administrative burden of market participation. This reflects the position that a fair, efficient and openly competitive (FEOC) market is best served through increasing the number of market participants responding to a transparent price mechanism, as opposed to attempting to create competition across a variety of products and trading mechanisms.

This appendix provides the rationale for increasing on and off peak 'block' active spinning and supplemental volumes on the NGX trading platform and eliminating OTC purchases for these two products. The analysis indicates that the existing market design can be simplified and all active contingency reserve purchases can be made via the NGX platform without increasing the total cost of contingency reserves. The key factors underlying this result are:

- The AESO currently procures its hourly shaped reserve requirements via an OTC market. OTC prices are usually much higher than corresponding on and off peak active prices on Watt-Ex.

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- The AESO's current procurement approach is to purchase hourly reserve requirements to a granularity of 1 MW. However, due to the inherent uncertainty in day-ahead load forecasts and intertie schedule, accurate procurement of reserve volumes to this level of granularity is not possible.
- The AESO frequently activates small volumes of standby reserves to manage real time balancing requirements arising from the volume uncertainty in the previous bullet. Standby reserves are more expensive than on or off peak active reserves on average.
- Increasing active reserve volumes reduces the number of standby reserve activations to manage real time balancing requirements. Standby volumes can also be reduced because more active reserve has been purchased.

The main result of increasing block procurement of contingency reserve is that the AESO will be purchasing volume uncertainty via the active block market instead of through the combination of the OTC and standby markets. This results in more total active volume being procured, but all active volume would be procured via Watt Ex. Standby reserve volume procured is reduced, as is the frequency of standby reserve activation. The total volume of operating reserves procured is unchanged, but the ratio of active reserves to standby reserves is increased. The analysis shows that the overall impact of this portfolio rebalancing is approximately cost neutral and provides incremental benefits such as increased transparency and market simplicity.

Background

Spinning and supplemental reserves [collectively known as contingency reserves] are available output from a generator that can be dispatched, or load that can be reduced, to maintain system reliability in the event of an imbalance between supply and demand on the electricity system. The demand for contingency reserve is determined as 7% of load served by thermal generation plus 5% of load served by wind or hydro generation, where at least 50% of total contingency reserves are spinning. Load served by imports does not require contingency reserve to be carried in Alberta, but Alberta must carry contingency reserve for exports on the same basis that it does for internal load.

The AESO purchases contingency reserves on a day ahead basis based on a forecast for total hourly requirements. This forecast has significant uncertainty due to load levels, relative market share for different generation types and the intertie schedule.

Current Practice

The AESO currently uses two distinct products to meet its hourly contingency reserve requirements. The majority of the volume requirement is met with 'active' contingency reserves. Active contingency reserves are always dispatched to be in position and are the first line of contingency reserves. Standby reserve provides additional reserve for use when the active reserve portfolio is insufficient to meet the real time requirements. Standby reserve is dispatched into active status if the active volume forecast requirement

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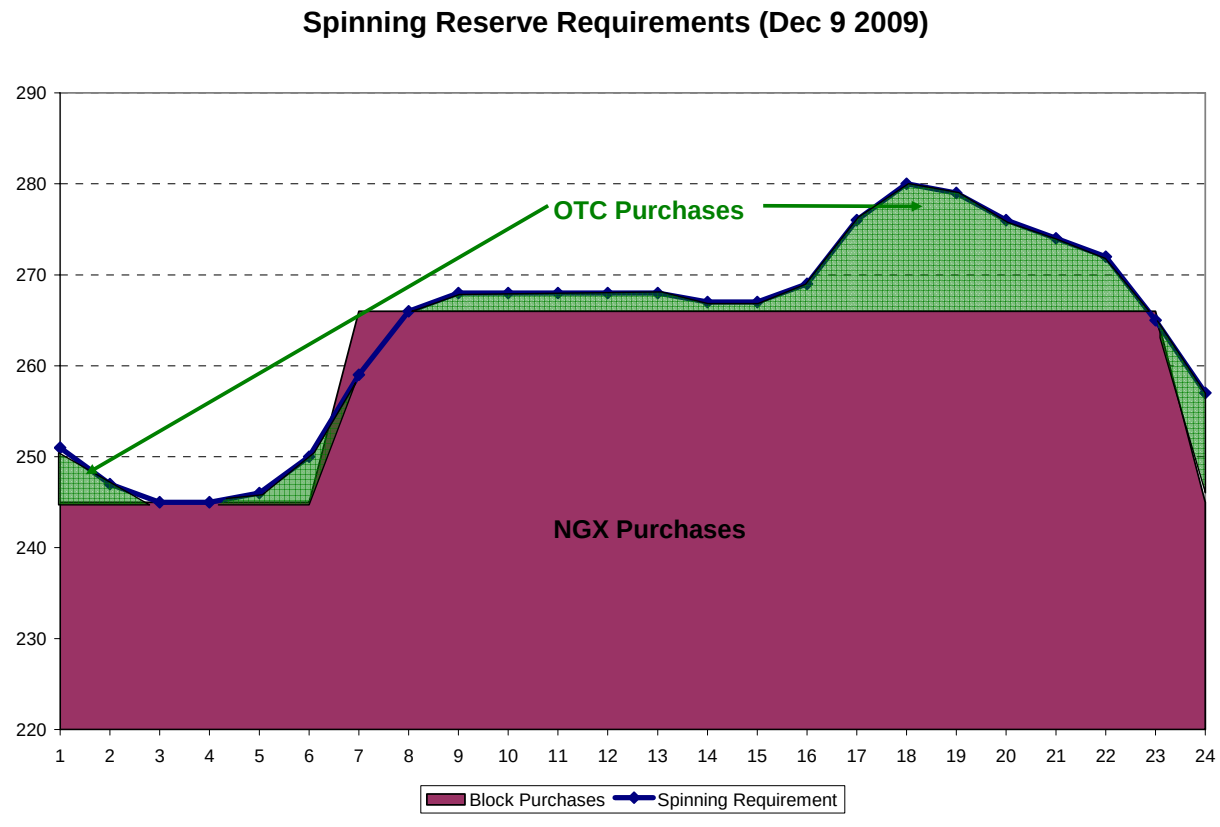
is below the actual real-time requirement, or when providers of active operating reserve are unable to provide the dispatched volume.

Active reserves are currently procured in two different ways. The majority of the active volume is purchased on NGX as an on or off peak block product. The on peak product is a 16 hour product from HE 7 to HE 23, and the off peak product is the 8 remaining hours of the day. The block volume purchases are set at the minimum forecast requirement for any 1 hour in that block period. OTC purchases are used to fill in any remaining requirements and amount to the 'shaped' portion of the overall procurement strategy. Figure 1 illustrates both NGX purchases and OTC purchases.

Figure 1 – Current Active Contingency Reserve Procurement (Spinning)



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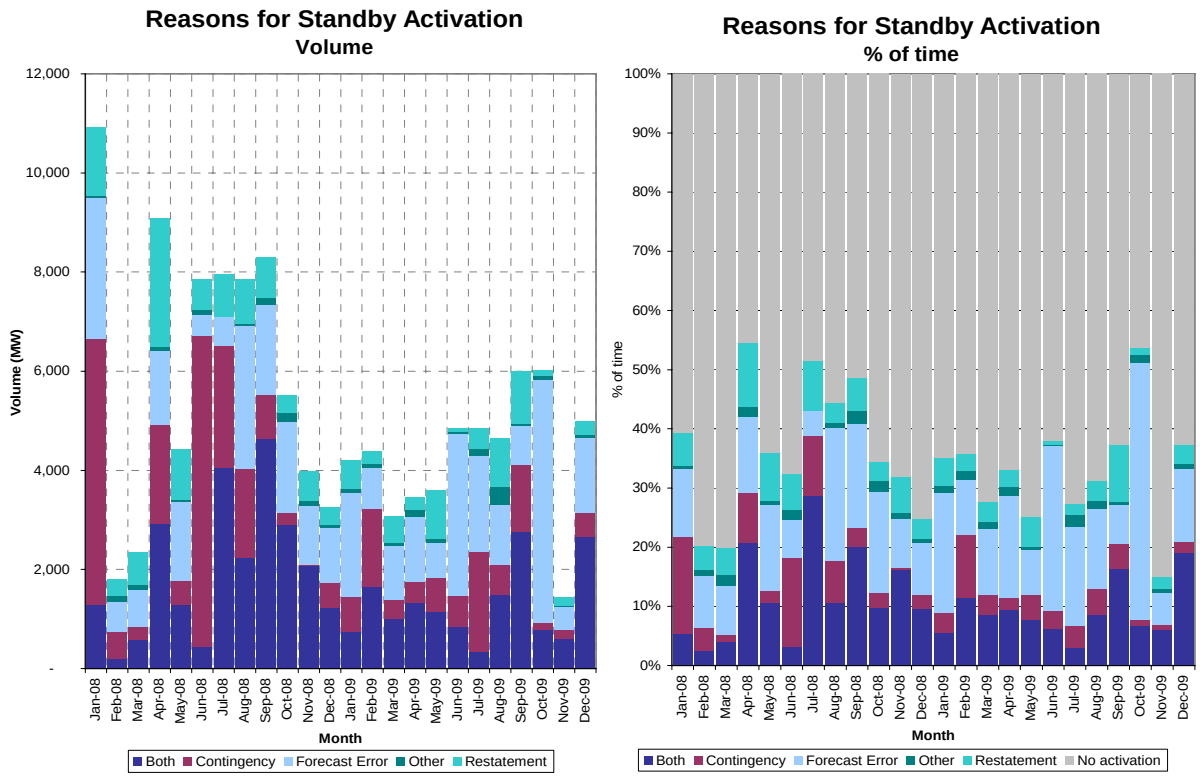
In addition to active reserves, the AESO purchases about 140 MW to 150 MW of standby contingency reserves in the day-ahead market. About 100 to 110 MW of this standby capacity is spinning reserve, and 30 MW to 50 MW is supplemental. The process of dispatching a standby reserve provider into position to provide reserves is known as 'activating' the standby reserve and is done in the real-time market.

In early 2010, the AESO conducted a study to determine the impact of forecast error and non-contingency Active restatements on the activation of contingency standby reserve. That study was conducted using historical data from January 1, 2008 to December 2009. The results, as shown in Figure 2, illustrate that standby contingency reserves are activated about 30% of the time.

Figure 2 - Standby Activations



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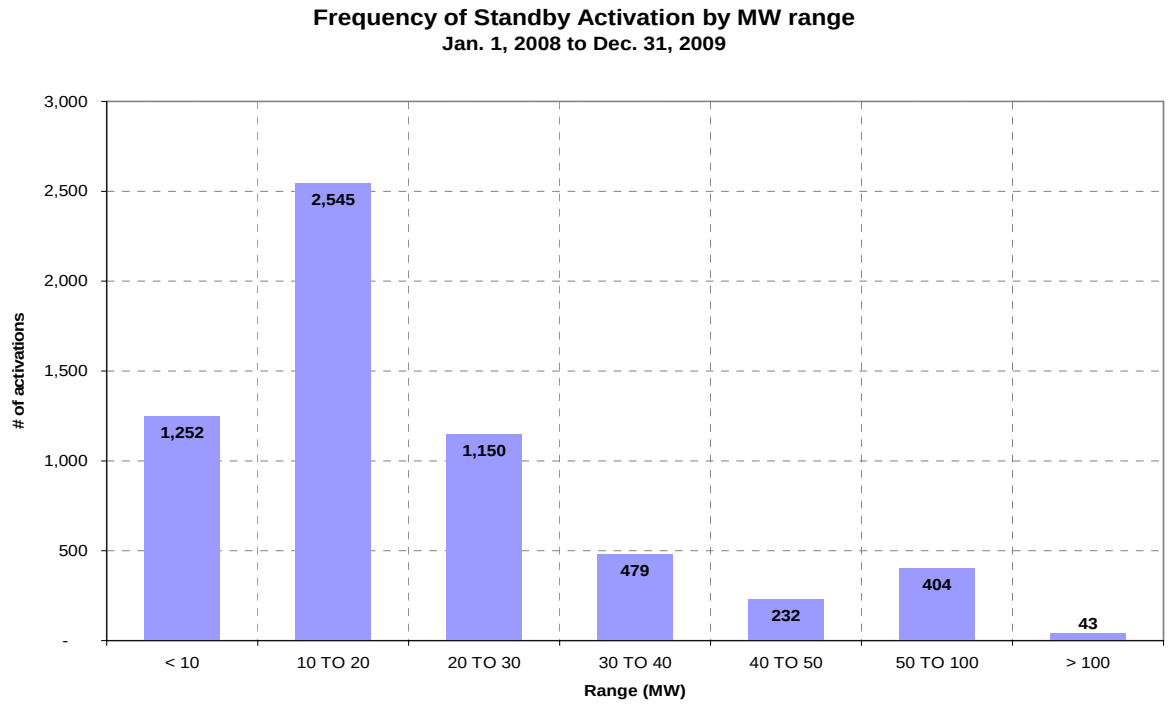
The standby reserves were activated to manage:

- Contingencies (24% of activations)
- Restatements by active reserve providers (13%)
- Forecast error (30%)
- Both forecast error and restatements (31%)
- Other reasons (2%)

Figure 3 - Standby Activation Volumes



This data demonstrates that standby reserves are currently being used for a variety of purposes, including use as a real-time balancing service. There is uncertainty associated with both the ability of actual providers to supply the service (contingencies and restatements) as well as with the actual

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requirement for the service (due to load and intertie schedule uncertainty). Standby reserves are used to manage this uncertainty because the AESO does not have the discretion on the minimum volume of contingency reserves required in real time.

Figure 3 illustrates that the majority of standby contingency reserve activations are for small volumes. 80% of activations are 30 MW or below, and over 99% of all activations are for less than 100 MW. This suggests that the frequency of standby activations can be reduced if the volume of active reserve was increased by a small amount.

Impact of Increasing Active Block Purchases of Contingency Reserves

The frequency of standby activations combined with the premium the AESO typically pays for OTC reserves suggests that the current contingency reserve procurement strategy is not optimal. The AESO tested this premise by examining the impact of procuring slightly more active contingency reserve.

Specifically, the study evaluated “Block Procurement” for all contingency reserve volumes. Blocked procurement uses the NGX on or off peak instrument to purchase reserves based on the maximum forecast volume for each on and off-peak “block” (versus the current shaped procurement strategy that seeks to procure the minimum forecast hour). As a result, the block procurement eliminates the need for OTC purchases. Figure 4 illustrates the Blocked Procurement strategy.

The block procurement strategy increases total active contingency reserve volumes by 8 MW on average, or under 2% in total. However, since this is netted against lower standby volumes, fewer standby activations, and the elimination of the OTC market, there are also cost savings that mitigate any cost impact associated with higher active volumes.

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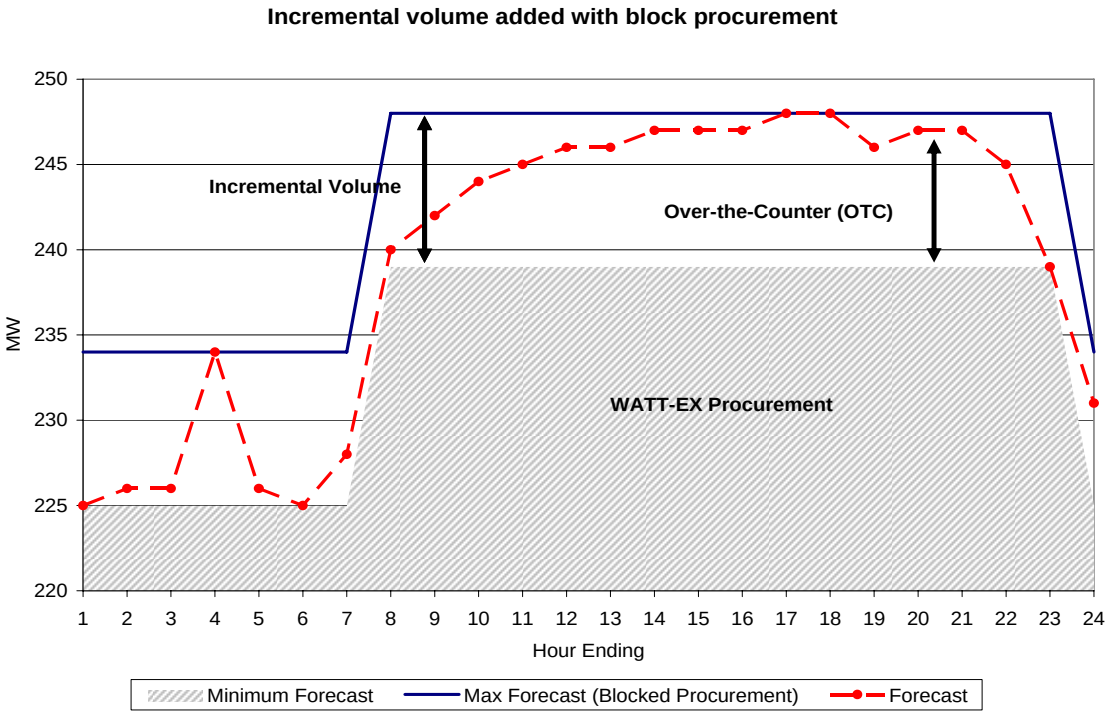
Figure 4 - Block Procurement Strategy (Spinning Reserve)



The study revealed that block procurement reduces stand-by activations by 43%, as shown in Figure 5.

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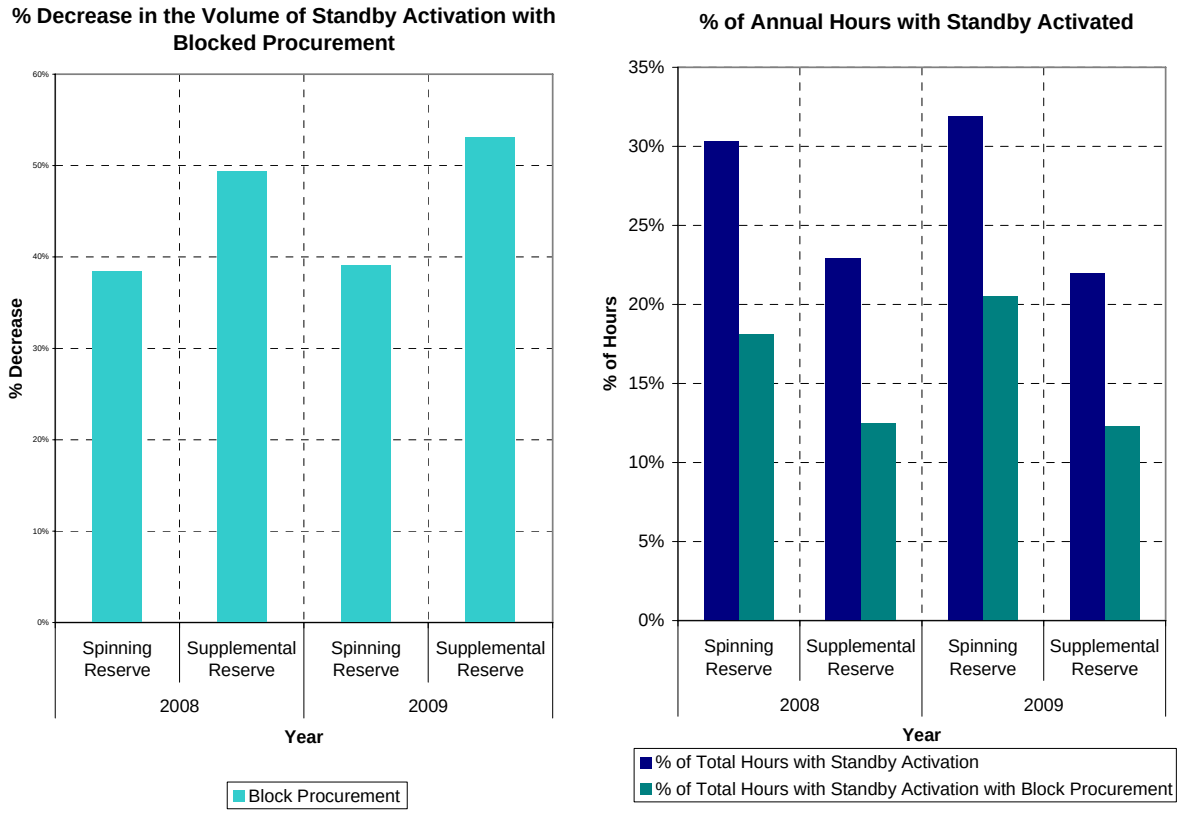
Figure 5 - Impact of Block Procurement Strategy on Standby Activations



Cost Impacts

The AESO did two bookend studies on the cost impact of the block procurement strategy. In both cases, incremental active reserves were purchased and the OTC purchases were eliminated. Table 1 illustrates cost savings under the assumption that the price of active reserve is unchanged with the incremental volume of the block procurement strategy.

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Table 1 - Cost Impact with No Price Changes

Overall change in Spinning and Supplemental Cost			
	Old Cost (million)	New Cost (million)	Increase (Decrease)%
Active Cost	$231	$227	(2)%
Standby Activation Cost	$ 13.9	$ 8.8	(37)%
Standby Premium	$ 11.9	$ 10.7	(10)%
Overall	$258	$246	(4)%

Study 1 assumes the following:

- The Active "clearing price" and thus the "settlement price" used to calculate the active cost was not changed. Only volume was increased. Active costs fell in total because higher priced OTC reserves were replaced with block product active reserves that trade at a lower price.
- Standby volumes were reduced by a volume equal to the additional active volume, and the premium costs were reduced accordingly.
- Activation costs were reduced due to the incremental active volumes in many hours, i.e. if 8 MW of extra active reserves were purchased, activations were reduced by up to 8 MW in that hour.
- All OTC associated costs were removed - blocked procurement eliminates the need for OTC.

Study 2 represents the other bookend where active market prices increase based on the current offer curve for these products. In other words, despite the elimination of the OTC market, no new volumes are offered in the NGX market. This represents an upper bound for the size of the price impact associated with increases to active volumes in the NGX market.

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Table 2 – Cost Impact with Price Increase

Overall change in Spinning and Supplemental Cost			
	Old cost (million)	**New cost (million)**	**Increase (Decrease) %**
Active Cost	$17.8	$20.3	
OTC Cost	$1.2	$0.00	
Total Active Cost	$19	$20.3	7%
Standby Activation Cost	$1.3	$0.85	-34%
Standby Premium	$0.7	$0.65	-7%
Overall	**$21**	**$21.8**	**4%**

Study 2 assumes the following:

- Study 2 analyzed the impact on the clearing price over a two month period only - September and October 2009. These months were selected as they captured both a period with a high number of contingencies (September) as well as stable period (October).
- The historical clearing price was adjusted to where it would have settled had the incremental active volume cleared in the NGX market given an identical offer curve to the actual offer curve, i.e. there were no new offers in the market and no changes to existing offers.
- All OTC associated costs were removed - blocked procurement eliminates the need for OTC.
- Standby volumes were reduced by a volume equal to the additional active volume, and the premium cost were reduced accordingly.
- Activation costs were reduced due to the incremental active volumes in many hours, i.e. if 8 MW of extra active reserves were purchased, activations were reduced by up to 8 MW in that hour.

Table 2 illustrates that as an upper bookend, contingency reserve costs could increase by 4%.

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Conclusions

The study results support using a block procurement strategy to reduce market complexity and improve transparency without increasing expected costs. The key conclusions and expected market benefits are:

- Total contingency reserve costs are not expected to change materially. The two bookend studies suggest a range of plus or minus 4% of total current cost. However, the upper bookend result should be unlikely to materialize because the suppliers currently selling volume OTC would be expected to increase volumes offered in the Watt Ex market.
- All active contingency reserves will be transacted via a single transparent mechanism. This is expected to promote a more FEOC market for contingency reserves.
- Standby activations will be expected to decrease, which has the potential to result in lower activation prices. This is based on the assumption that providers view activation as a risk associated with selling the service.

There is no evidence to suggest that the current procurement practice of shaping purchases to a 1 MW granularity results in cost savings relative to a much simpler block procurement practice. The uncertainty in volume requirements on a day ahead basis and the higher prices associated with OTC purchases and standby activations negate the savings associated with shaping active volumes. As a result, the AESO plans to rebalance its OR portfolio and use a block procurement strategy for active contingency reserves and reduce standby purchases by a corresponding amount. Total reserves purchased will be unchanged and the OTC market will be eliminated for spinning and supplemental reserve.

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