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# MSA REPORT

## Quarterly Report

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January – March 2008

30 April, 2008

**MARKET SURVEILLANCE**  
ADMINISTRATOR

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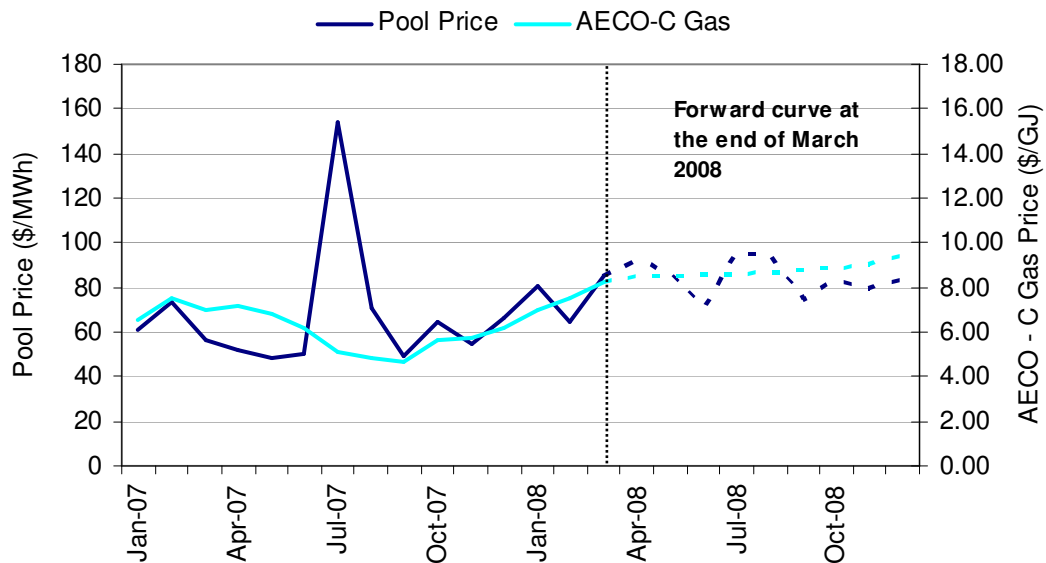
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# 1 FEATURED MARKET DEVELOPMENTS DURING Q1/08

## 1.1 Wholesale Market Fundamentals

Wholesale electricity prices averaged \$76.95/MWh in Q1/08, higher than Q1/07 (\$63.29) and Q1/06 (\$56.84). Average Alberta natural gas prices were higher in Q1/08, at \$7.56/GJ, than in the prior two years when Quarterly gas prices were approximately \$7/GJ. Adjusted for higher gas prices in Q1/08, electricity prices were similar to Q4/07 (a 10.2 and 10.6 heat rate respectively). Further, natural gas prices have trended up since September 2007 and higher rates are expected to continue throughout 2008, as shown in Figure i.

**Figure i: Monthly Average Natural Gas Price at AECO-C**



Notwithstanding the higher natural gas prices, the front end of the forward electricity curve was also pushed up by the expectation that the KEG Conversion Project would cause derates at certain generating units and would limit import ATC on the BC Intertie. On January 17, 2008, the AESO updated the KEG Conversion Project status and stated that the Project was “tentatively scheduled to proceed in early 2008”. Subsequently both the prices and the heat rates of the March, April and May contracts rose significantly, accompanied with high transaction volumes. The KEG Conversion Project commenced in March.

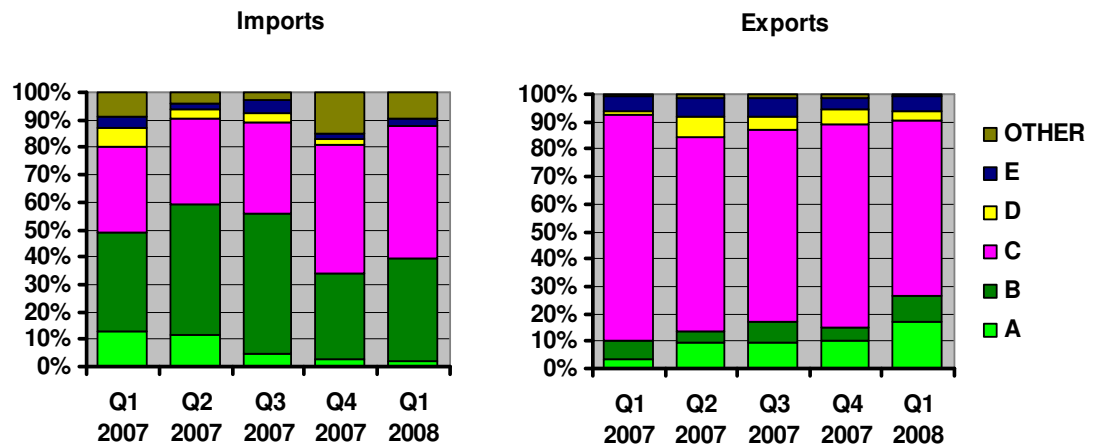
During Q1/08 there have been interesting changes in import and export volumes. Compared to the same quarter last year imports

were far higher (and exports far lower) in January and February, with the reverse being true in March (see Figure 11 and 12 in Appendix B). Over the quarter Alberta was a significant net importer of energy as opposed to a net exporter in Q1/07. The market shares of importers and exporters also exhibit significant differences between the quarters (see Figure ii below).

The MSA continues to watch the changing dynamics on the interties closely. In particular, we continue to watch for changes related to the ‘Quick Hits’ rules that require importers and exporters to offer at t-2. While the rules changes have no doubt been an influence on intertie behaviour, we noted in our 2007 Year in Review that overall intertie efficiency was within the range seen over the last two years.

Other factors, unrelated to ‘Quick Hits’, also explain some of the differences observed. For example, the low import volumes in March on the BC intertie may be influenced by the late melting of the snow pack in the Pacific Northwest which has resulted in somewhat elevated prices at Mid-C.

**Figure ii: Market Share of Importers and Exporters Q1/07 to Q1/08**



## 1.2 Volatility and Stability since Quick Hits

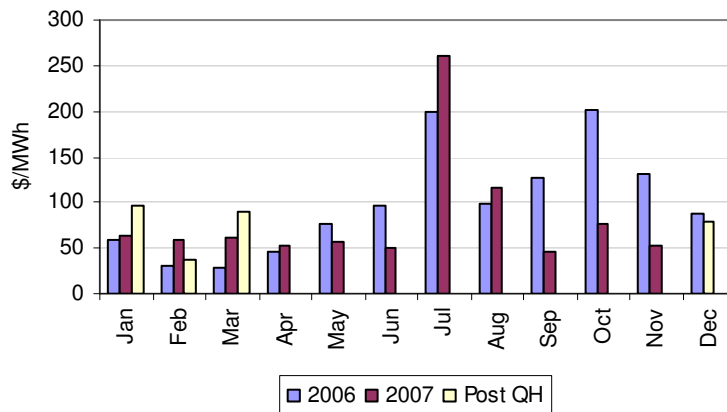
In its series of regular quarterly reports the MSA has examined a number of measures of price volatility. In this quarterly report we revisit the issue with a view to assessing whether volatility and price dynamics have been impacted by the rules associated with 'Quick Hits' on December 3, 2007. We consider:

- Hourly pool price volatility – the standard deviation, coefficient of variation and the inter-quartile range of the hourly pool price in a month
- Standard Deviation of the Percentage Change in Hourly Price
- Intra hour measures of SMP volatility; and
- Merit order offer volatility

### Hourly Pool Price Volatility

A simple measure of volatility is represented by the standard deviation of pool price which measures the dispersion of the pool price from the mean. Figure iii shows the standard deviation of the hourly prices in each month. Based on four months of data since the introduction of 'Quick Hits' the hourly prices were similarly dispersed to those in the previous years.

**Figure iii: Standard Deviation of the Hourly Price**

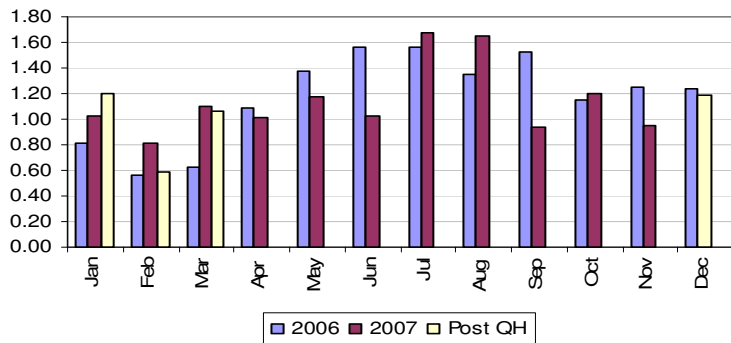


The limitation of standard deviation is that it doesn't consider the absolute value of the mean (i.e. \$10 standard deviation is more significant with a mean of \$10 than with a mean of \$100) and that it is prone to the impact of the extreme values. In recognition of these limitations, two other measurements of sample dispersion

were also calculated: the coefficient of variation and inter-quartile range.

The coefficient of variation is calculated by dividing standard deviation of price by its mean. Measured by coefficient of variation, only January 2008 was higher than the previous two years (Figure iv).

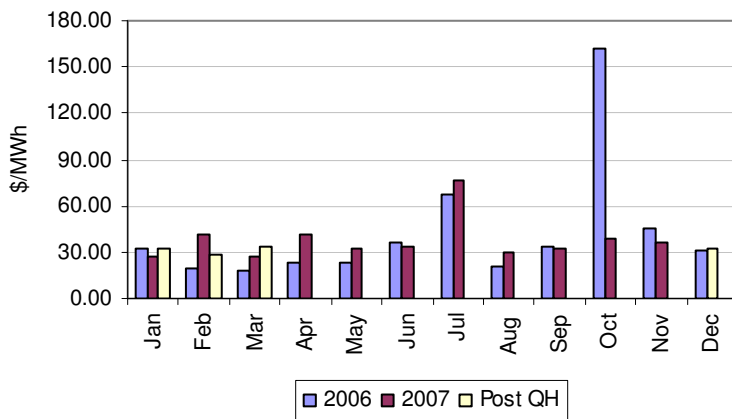
**Figure iv: Coefficient of Variation of the Hourly Price**



The inter-quartile range of price is calculated by taking the difference between the price at the 75th percentile and that at the 25th percentile. Since inter-quartile range doesn't include values in the top and bottom 25th percentiles, this measurement is less susceptible to extreme values. Inter-quartile range shows that without the influence of extreme values, only March 2008 hourly prices were slightly more volatile than the previous years (Figure v).

Overall, we see little evidence that hourly pool price volatility has changed significantly since the introduction of 'Quick Hits'.

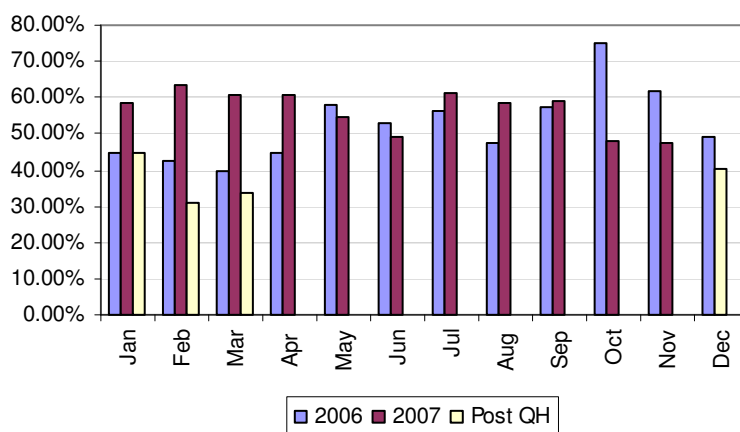
**Figure v: Inter-Quartile Range of the Hourly Price**



## Standard Deviation of the Percentage Change in Hourly Price

The measures considered in the previous section examine pool price dispersion within a month but do not consider the size of hour over hour change. In this section we address this by considering the dispersion of percentage change in the hourly prices. Figure vi shows that all post 'Quick Hits' months exhibited less dispersed percentage change than the previous years. This is an interesting observation. While the 'Quick Hits' rules limit price restatements to two hours from real time (whereas a locking restatement for economic reasons was limited to 30 minutes before real time) participants are able to use an unlimited number of price restatements (as opposed to one per day in the case of locking restatements).

**Figure vi: Standard Deviation of the Percentage Change in Hourly Price**



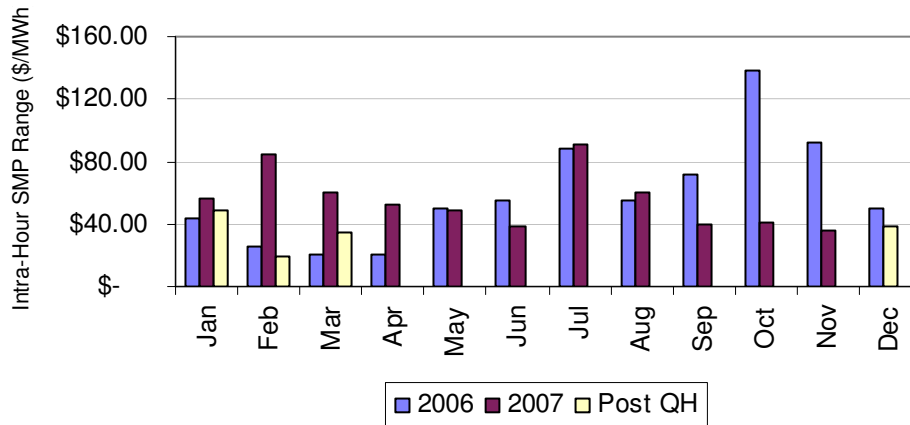
## Intra hour measures of SMP volatility

The 'Quick Hits' measures might be expected to reduce within hour volatility since the rule change removed the ability of participants to issue energy restatements for economic reasons during the hour. Alternatively, it could be argued that prior to 'Quick Hits' within hour energy restatements from participants 'chasing price' may have acted to dampen volatility.

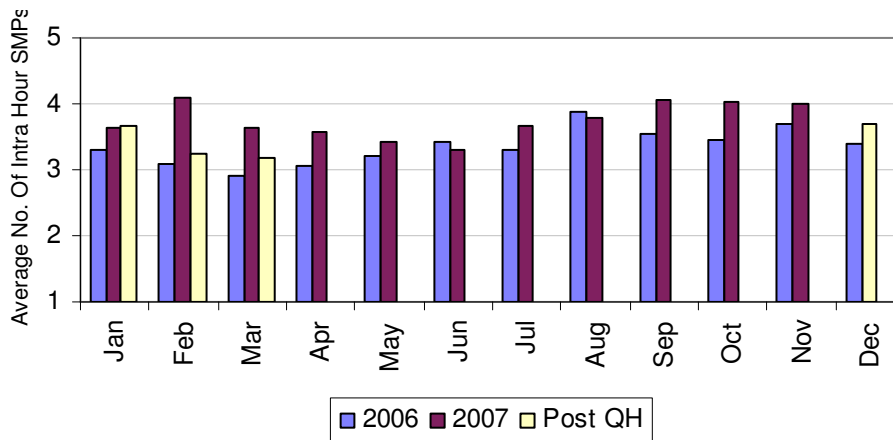
We consider two very simple intra-hour measures: the intra-hour SMP range and the average number of intra-hour SMP values. Figures vii and viii show inconclusive results.



**Figure vii: Intra-Hour SMP Range**



**Figure viii: Average Number of Intra-Hour SMP**



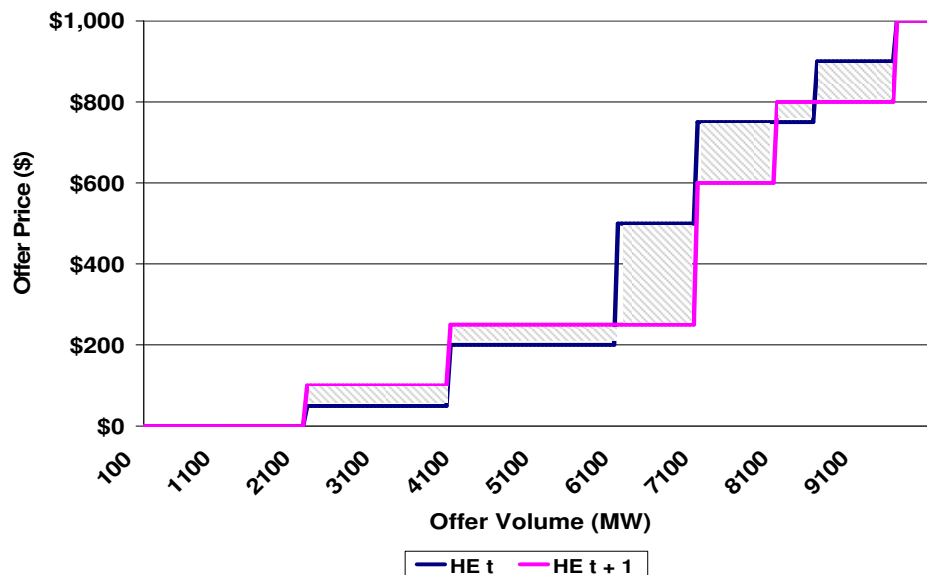
### Merit Order Offer Volatility

The 'Quick Hits' have significantly changed the rules around participants' ability to restate offers. To summarize:

- Participants enjoy less freedom with the removal of energy restatements (volume only) within t-2 for economic reasons and the removal of a once a day locking restatement (price and volumes) that could be used for economic reasons up to t-30 minutes.
- Participants enjoy more freedom in that they are able to change offers through the unlimited use of price restatements prior up until t-2.

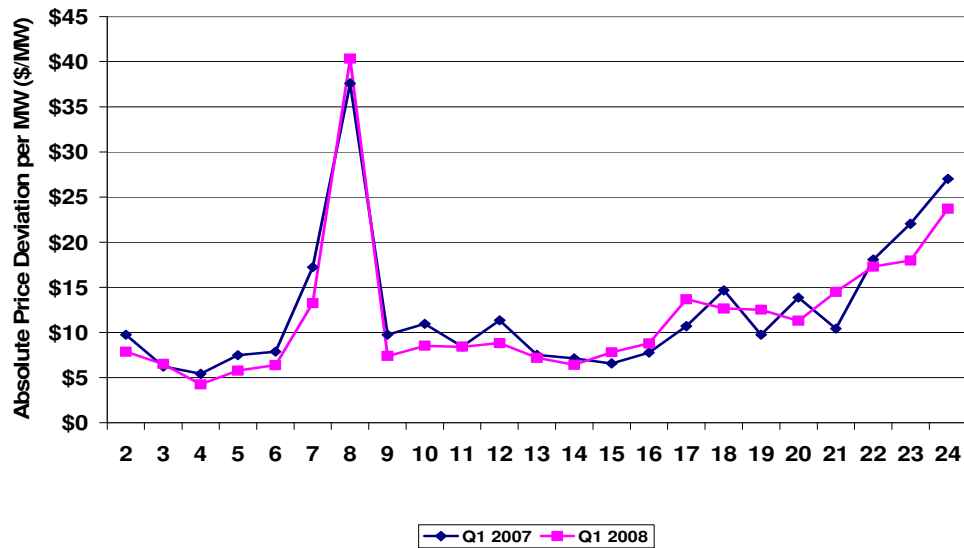
The price volatility comparisons considered in the previous sections are all susceptible to error if in one period compared to another there was a difference in volatility in fundamentals. A different way to consider volatility is to look not at changes in prices but at the changes in the offers in a merit order. There are a number of ways to do this. Consider Figure ix that shows a hypothetical merit order a time  $t$  and  $t+1$ . The 'difference' between the two merit orders can be measured by the shaded area. Dividing this area by the number of total number of MW's in the merit order we obtain a dollar measure for the merit order deviation from one hour to the next. A lower value indicating the merit order in one hour is similar to the next and a higher value less similar. By considering values over a significant time period we are able to assess whether the hour to hour change in the merit order has on average declined since Quick Hits in comparison to the same time period the previous year.

**Figure ix: Hypothetical Merit order at time  $t$  and time  $t+1$**



In Figure x the average hourly absolute price deviation per MW is plotted for a period in Q1/08 and the same period in the previous year. In both years there is a large difference between merit orders during the morning ramp (as we move from off-peak to on-peak). We also see relative stability in the early morning and late afternoon hours. Overall the differences between 2007 and 2008 are not large indicating that this measure of merit order volatility has changed little since Quick Hits.

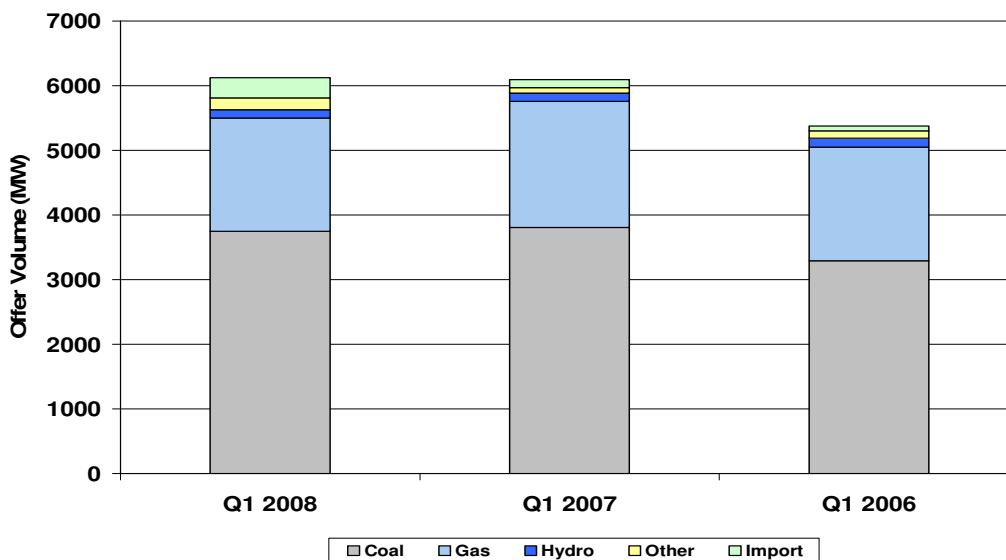
**Figure x: Hour to Hour Change in the Merit Order**



### **Zero Dollar Offers**

The volume of MW offered at zero dollars in the merit order can give some insight into whether the new 'Quick Hits' rules have impacted the incentives on participants to offer at zero. Figure xi displays the average quarterly level of zero dollar offers by fuel type in Q1/08 and those in previous years. Coal MW's make up more than half of the total MW's offered at zero dollars and this value appears to be relatively constant throughout the three quarters. Once again we are unable to draw any clear conclusion that the new market rules have had any significant impact on the volume of MW offered at \$0.

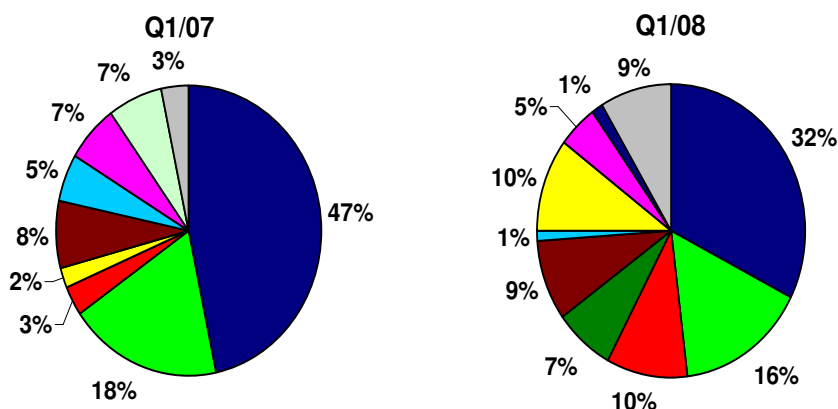
**Figure xi: Zero Dollar Offers**



**Price Setting Share**

As noted at our Spring Stakeholder Meeting, the ‘Quick Hits’ changes have coincided with changes in weekly price setting share of participants. Figure xii shows the average weekly price setting share by participant in Q1/07 and Q1/08. The number of price setters appears to have increased since Q1/07. Furthermore the price setting shares appear to be more evenly distributed among the participants.

**Figure xii: Average Weekly Price Setting Share Q1/07 and Q1/08**

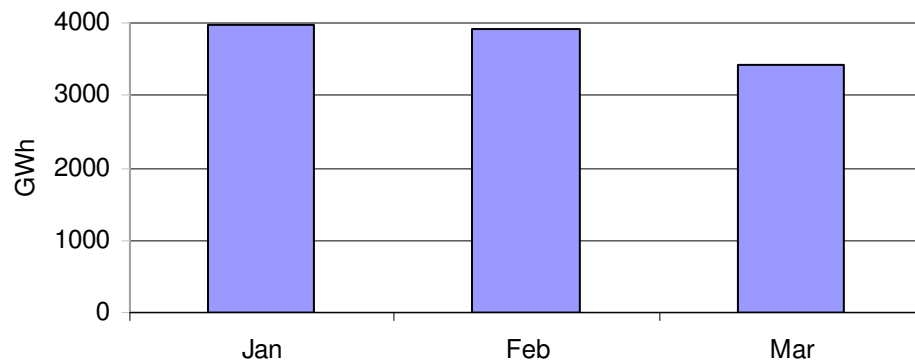


The conclusion from all these measurements of volatility and merit order stability is that it is too soon to discern any significant effects due to the implementation of the 'Quick Hits' but at the very least there do not seem to be any red flag issues either. The MSA will continue to monitor for the impacts of 'Quick Hits' in the upcoming months.

### 1.3 Forward Market Activity

The forward market saw increased activity in Q1/08 with as many as 16 participants involved in forward trading<sup>1</sup>. These participants included the energy marketing arms of generating companies, investment banks, hedge funds and other energy marketers. The forward trades encompassed a wide variety of terms and instruments. The total trade volume exceeded 11,200 GWh in Q1/08 (Figure xiii) which corresponds to about 60% of the size of the physical market. In the near future, the MSA will be collecting the corresponding data from the OTC brokers active in the Alberta market. This will enable the MSA to get a more complete view of the liquidity and general direction of the forward market.

**Figure xiii: Q1/08 Forward Market Trade Volume**



### 1.4 New Generation

Thus far in 2008, the Alberta market has seen the addition of 180 MW of co-generation capacity at the Nexen/OPTI Canada Long Lake Oil sands development south east of Fort McMurray and 45 MW of gas-fired capacity at Epcor's Clover Bar Energy Center in Edmonton although both are completing requirements for final certification.

<sup>1</sup> The forward market data include all transactions on NGX and those settled through NGX.

For the balance of 2008, a further 260 MW of gas-fired thermal generation is expected to enter commercial service. No substantial new wind generation is expected on line until 2009 while Alberta's next new coal unit expected to be commissioned in 2011 is Keephills 3, a joint venture between Epcor and TransAlta which is currently under construction.

## 1.5 MSA Activities

**Investigation Procedures** – In early February, the MSA commenced a stakeholder consultation process in relation to revised investigation procedures being contemplated by the MSA. During late February and early March, a written feedback process was open to market participants to provide the MSA with comments on the proposed procedures. Two rounds of comments were received from stakeholders and they can be reviewed on the MSA website at: <http://www.albertamsa.ca/752.html>. Early in Q2 the MSA published its amended Investigation Procedures which are also available on the website: <http://www.albertamsa.ca/778.html>.

**Spring Stakeholder Meetings** - The MSA held its annual spring Stakeholder meetings in Edmonton and Calgary on March 18<sup>th</sup> and 19<sup>th</sup> respectively. The intent of the Stakeholder meetings is to distribute and discuss topics raised in the MSA's annual report for the prior year and to provide electricity market stakeholders with view of the MSA's work priorities for the upcoming year.

**EISG** – The MSA was represented at the recent spring conference of the Energy Inter-Market Surveillance Group – an association of electricity market monitoring groups in other jurisdictions in North America and abroad. This group meets on a semi-annual basis to review and discuss matters of mutual interest regarding monitoring of competitive electricity markets.

**ISO Rules Compliance** – Further to new enactments coming into force on January 1, 2008, the MSA assumed responsibility for enforcement of ISO rules and the issuance of specified penalties in instances where the MSA is satisfied that an ISO rule has been contravened. The AESO maintains responsibility to conduct monitoring of its rules while the MSA has the power and authority to impose specified penalties. The AUC is the final adjudicator of any penalties imposed. The new approach to handling of non-compliance issues was discussed further at the MSA Spring

stakeholder meeting – the presentation from the meeting can be referenced at [www.albertamsa.ca](http://www.albertamsa.ca) under Presentations.

## APPENDIX A – WHOLESALE ENERGY MARKET METRICS

**Table 1 - Pool Price Statistics**

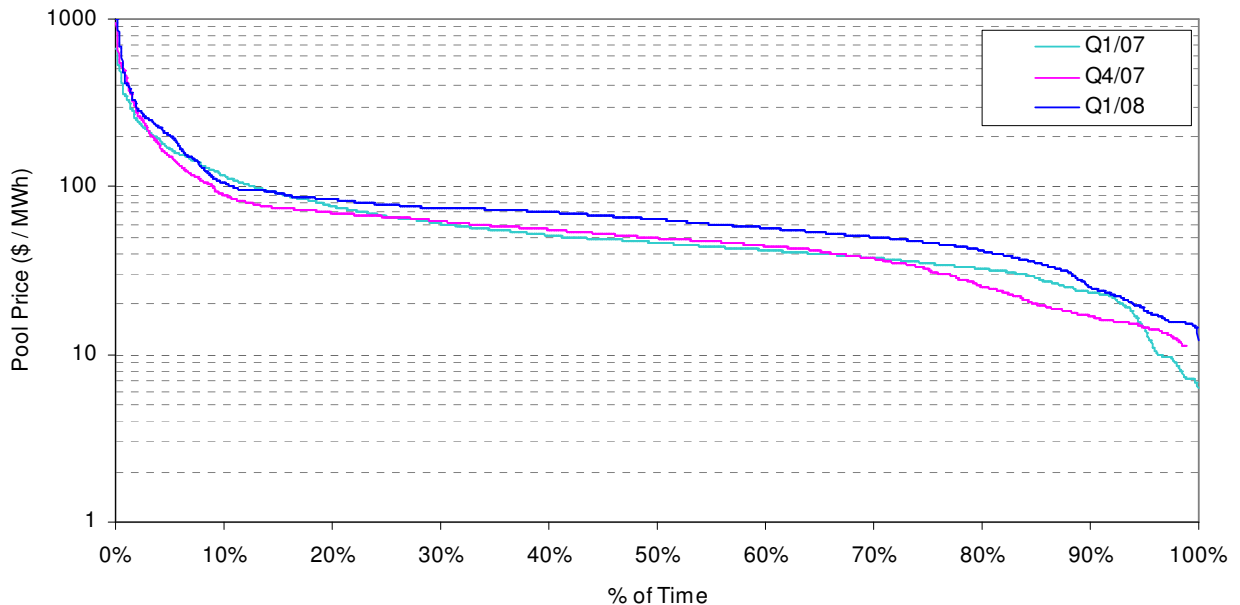
	Average Price <sup>1</sup>	On-Pk Price	Off-Pk Price	Std Dev <sup>2</sup>	Coeff. Variation <sup>3</sup>
Jan - 08	80.30	99.28	56.23	96.23	120%
Feb - 08	64.89	74.99	51.24	38.31	59%
Mar - 08	84.89	99.51	66.30	90.37	106%
<b>Q1 - 08</b>	<b>76.95</b>	<b>91.26</b>	<b>57.92</b>	<b>80.43</b>	<b>95%</b>
Oct - 07	64.74	83.35	38.97	77.60	120%
Nov - 07	54.24	70.09	34.48	51.72	95%
Dec - 07	66.28	84.67	44.89	79.03	119%
<b>Q4 - 07</b>	<b>61.83</b>	<b>79.37</b>	<b>39.45</b>	<b>70.91</b>	<b>111%</b>
Jan - 07	60.75	74.10	43.81	62.44	103%
Feb - 07	73.38	84.15	59.01	59.48	81%
Mar - 07	56.72	70.72	37.29	62.24	110%
<b>Q1 - 07</b>	<b>63.29</b>	<b>76.32</b>	<b>46.70</b>	<b>61.83</b>	<b>98%</b>

1 - \$/MWh

2 - Standard Deviation of hourly pool prices for the period

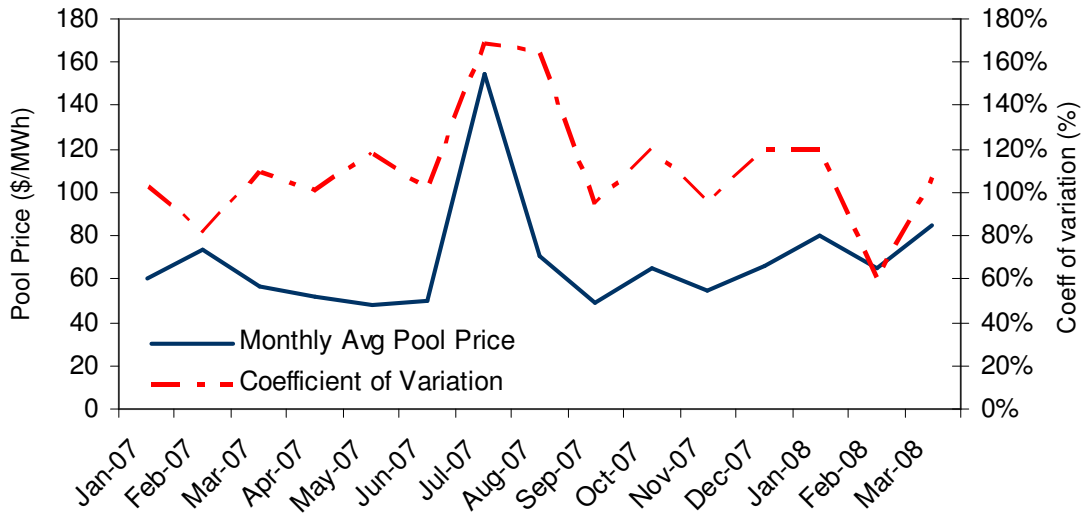
3 - Coefficient of Variation for the period (standard deviation/mean)

**Figure 1 – Pool Price Duration Curves**

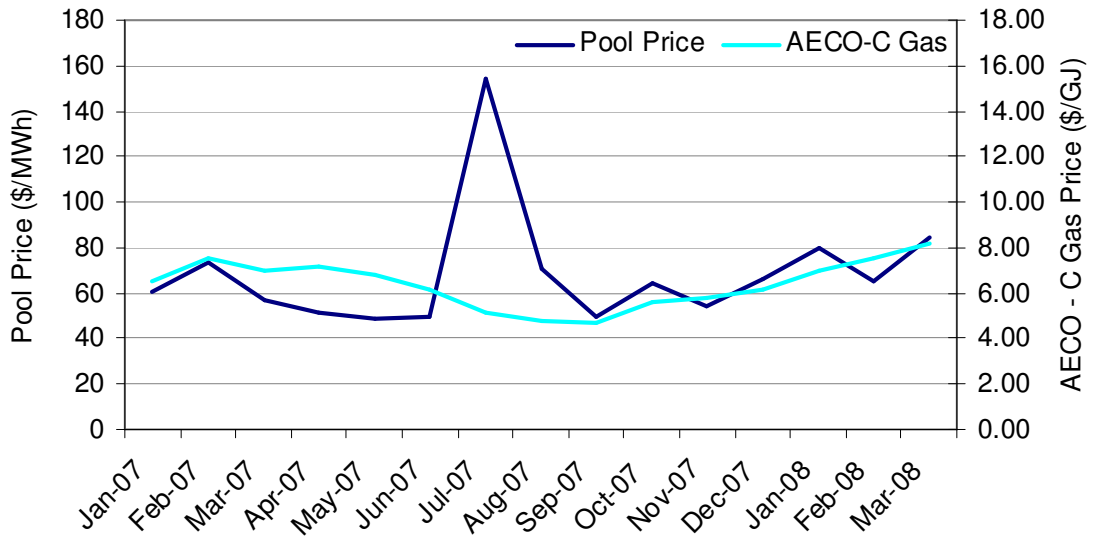




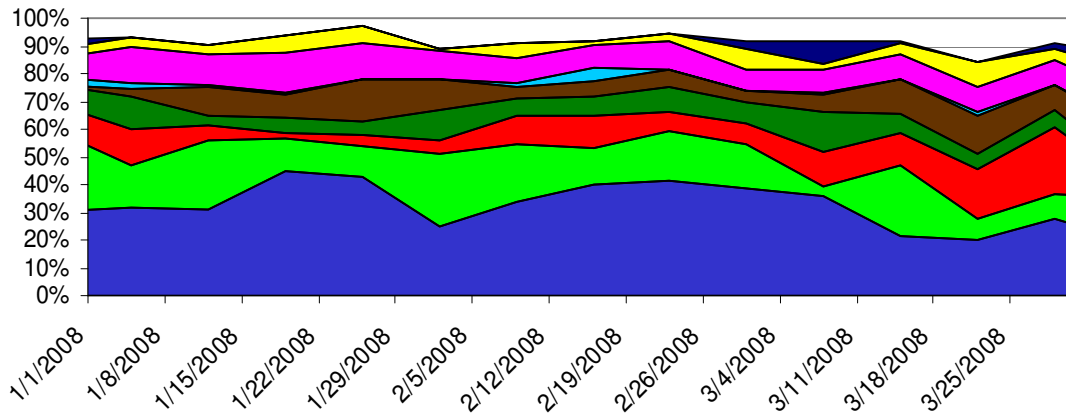
**Figure 2 – Pool Price with Pool Price Volatility**



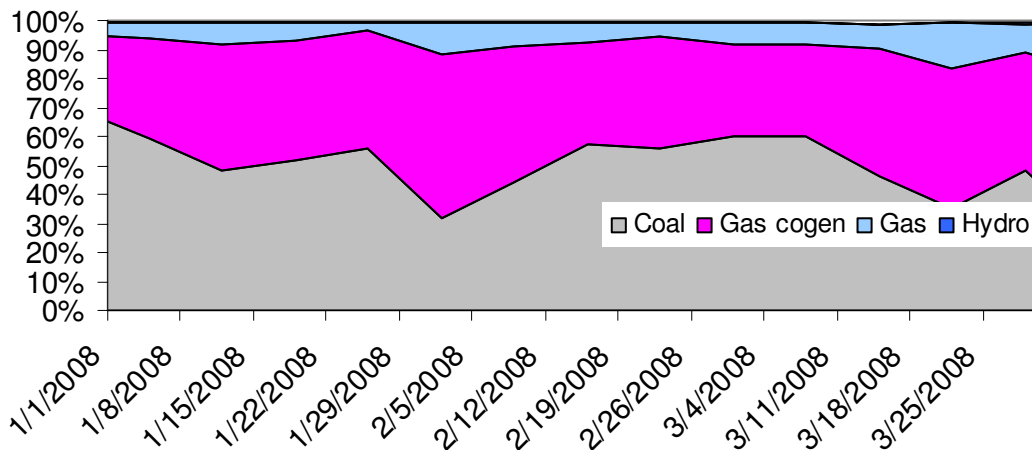
**Figure 3 – Pool Price with AECO Gas Price**



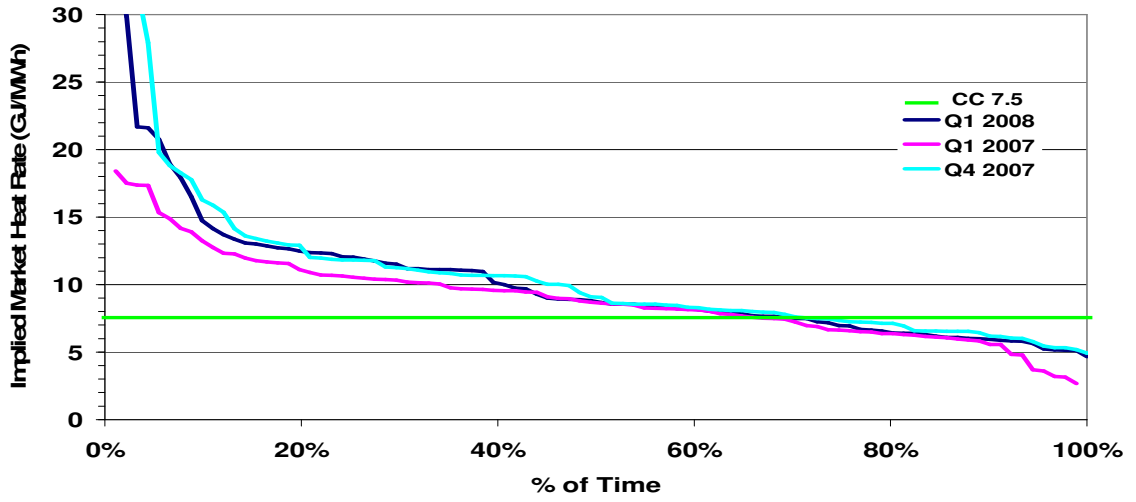
**Figure 4 – Weekly Price Setting Share by Submitting Customer (All Hours)**



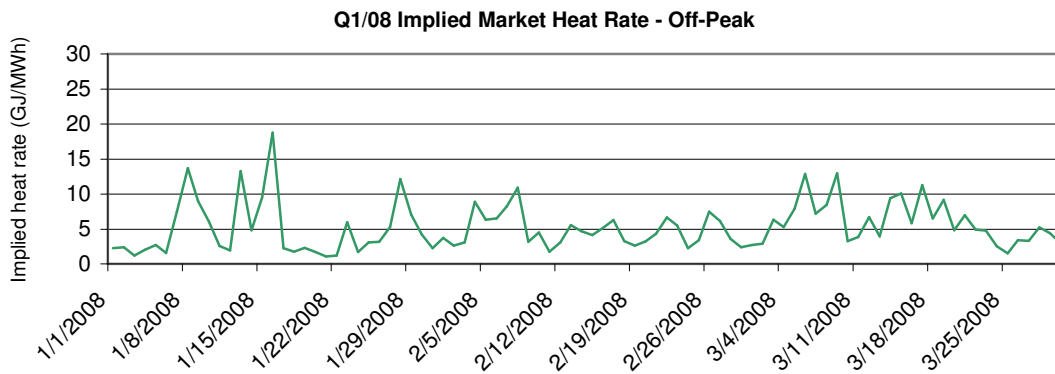
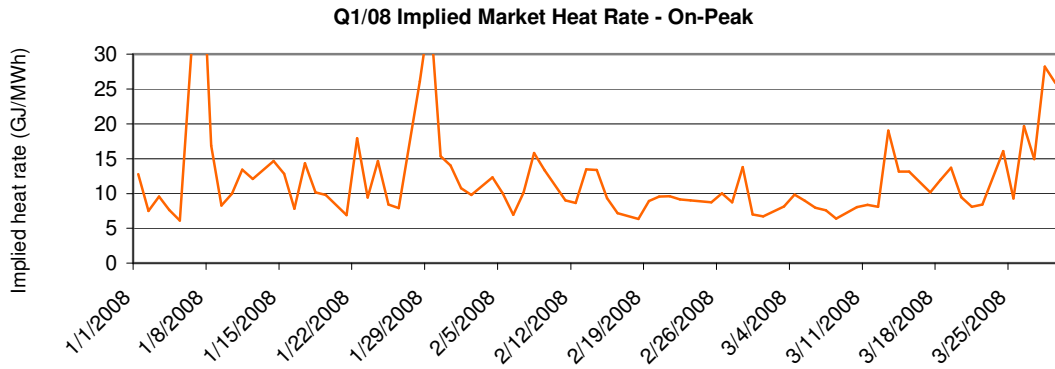
**Figure 5 – Weekly Price Setting Share by Fuel Type (All Hours)**



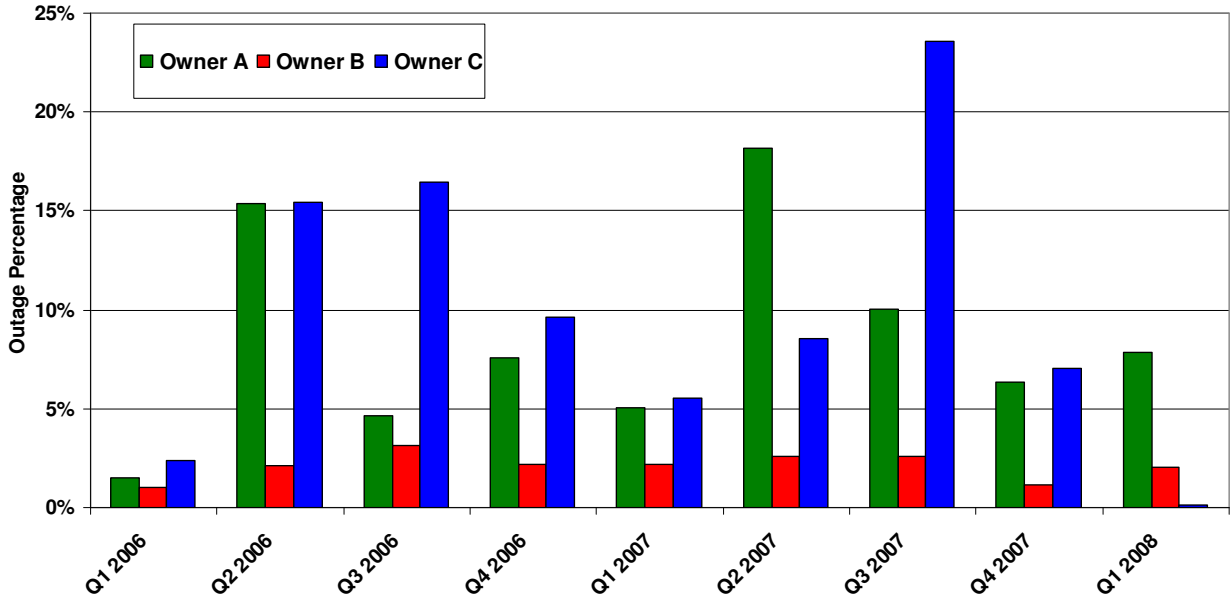
**Figure 6 – Heat Rate Duration Curves (All Hours)**



**Figure 7 - Implied Market Heat Rates (Q1/08)**



**Figure 8 – PPA Outages by Quarter**



**Table 2 - Percentage of Unplanned Outages for PPA Units**

	Q1 2008	2007	2006	2005	2004
Owner-A	7.9%	6.0%	5.2%	5.0%	6.1%
Owner-B	1.9%	1.8%	1.8%	5.4%	1.5%
Owner-C	0.1%	7.1%	5.3%	6.5%	6.3%
PPA weighted average	0.8%	6.0%	4.8%	5.9%	5.5%

Note:

- 1) PPA units include: Genesee 1 & 2, Battle River 3, 4, 5, Sheerness 1 & 2, Sundance 1 - 6, Keephills 1 & 2.
- 2) Outages rates are based on maximum continuous rating (MCR), not gross unit capacity.

**Table 3 - MW Weighted Portfolio Target Availability (%) vs Actual Availability (%) - Coal Fired PPA Units**

	Target Availability 2006	Actual Availability 2006	Target Availability 2007	Actual Availability 2007	Target Availability 2008	Actual Availability Q1 2008
Owner-A	87%	93%	87%	90%	87%	92%
Owner-B	89%	98%	89%	98%	89%	98%
Owner-C	87%	89%	86%	89%	86%	92%
PPA weighted Average	87%	91%	87%	94%	87%	93%

PFEC and PFAM, are mechanisms by which corrections and adjustments can be made to settlement calculations pursuant to the retail Settlement System Code ("Code"), which is part of the AUC rules. PFEC ("pre-final error correction"), serves to correct errors prior to a subsequent run of settlement and thus improves settlement results prior to final settlement. PFAM ("Post-final adjustment mechanism"), is a process that market participants must follow when final settlement data is being disputed and the market participants are requesting financial adjustments be made as a result of the dispute.

UFE ("Unaccounted-for energy") reflects the extent of the settlement differences between energy going into the system vs. energy taken out by consumption and losses. UFE reasonable exception reports note instances where UFE was outside the tolerances allowed for in the Code. Load settlement agents (LSAs) are required to investigate and report to the market on such variances.

**Table 4 – PFEC and PFAM Tracking**

Claim Type	Carry-Over	Submitted	Accepted	Rejected	Unresolved	Net kWh Adjustment
<b>PFEC</b>						
Q1/08	15	221	110	78	48	NA
Q4/07	171	47	168	35	15	NA
<b>PFAM</b>						
Q1/08	21	52	35	18	20	385,946
Q4/07	31	51	40	21	21	(86,692)

**Table 5 – Summary of UFE Reasonable Exception Reports**

Quarter	Outstanding	New	Resolved	Unresolved
Q1/08	577	20	74	523
Q4/07	554	22	0	576

## APPENDIX B – TIE LINE METRICS

Table 6 – Q1/08 Tie Line Statistics

	British Colombia			Saskatchewan			Overall		
	Imports	Exports	Net Imports	Imports	Exports	Net Imports	Imports	Exports	Net Imports
	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)
January	111,409	72,152	39,257	59,867	3,303	56,564	171,276	75,455	95,821
February	74,682	50,354	24,328	42,778	6,720	36,058	117,460	57,074	60,386
March	82,594	62,893	19,701	33,022	12,415	20,607	115,616	75,308	40,308
<b>Q1/08 Total</b>	<b>268,685</b>	<b>185,399</b>	<b>83,286</b>	<b>135,667</b>	<b>22,438</b>	<b>113,229</b>	<b>404,352</b>	<b>207,837</b>	<b>196,515</b>

Figure 9 – Market Share of Importers and Exporters (Q1/08)

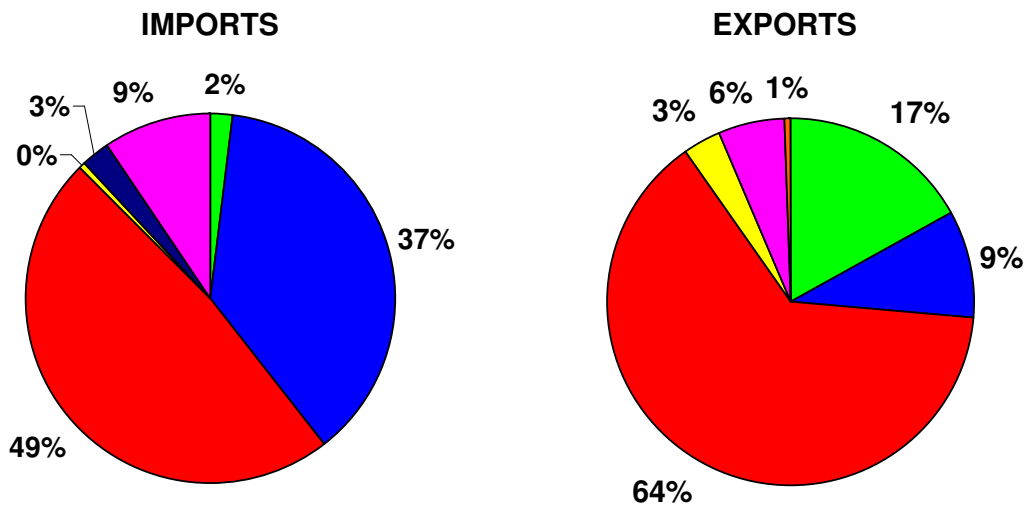


Figure 10 - Tie Line Utilization (Q1/08)

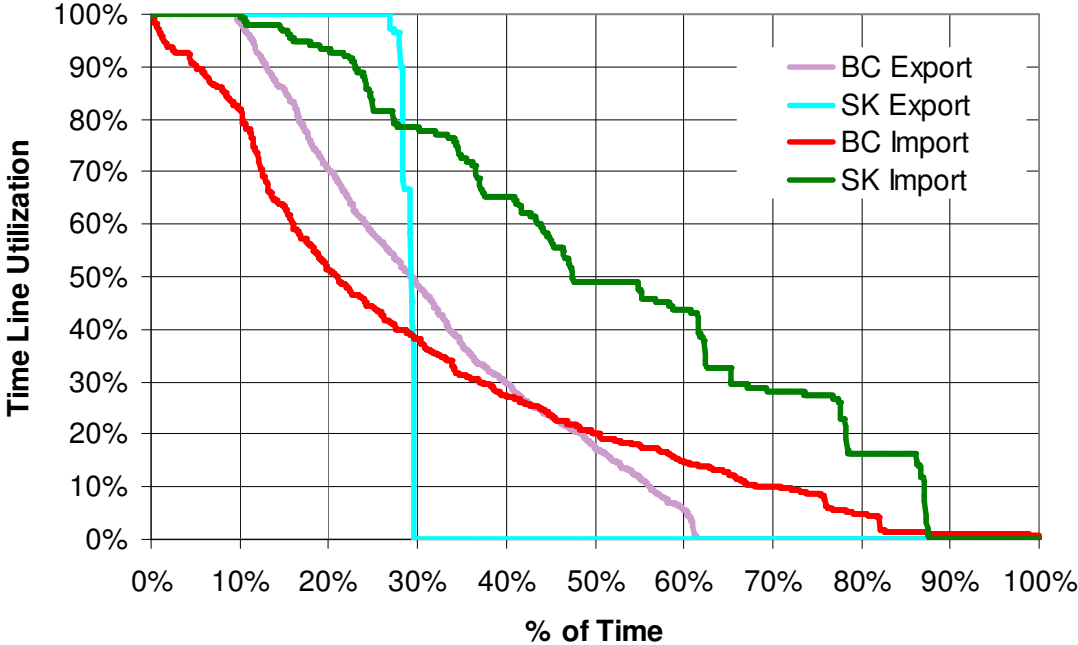


Figure 11 - Imports with Trade-weighted Prices

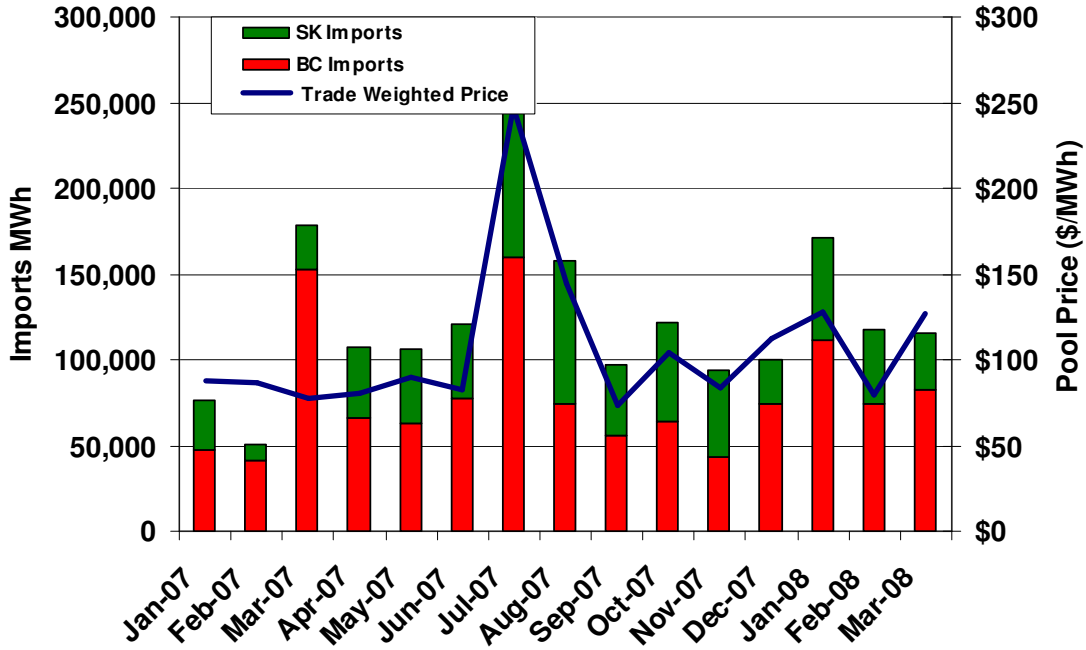
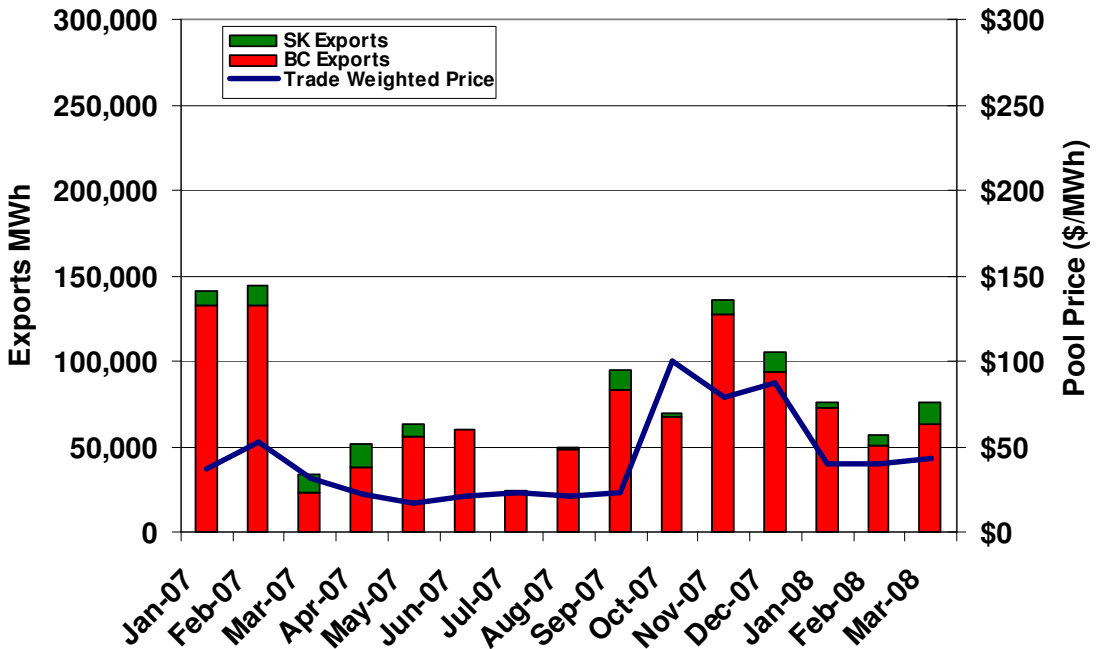
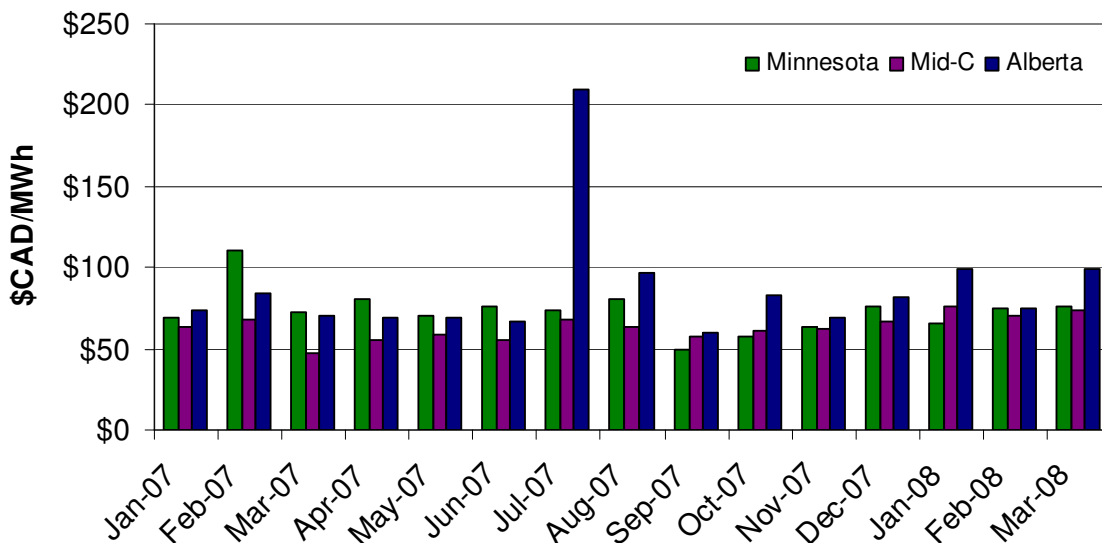


Figure 12 - Exports with Trade-weighted Prices

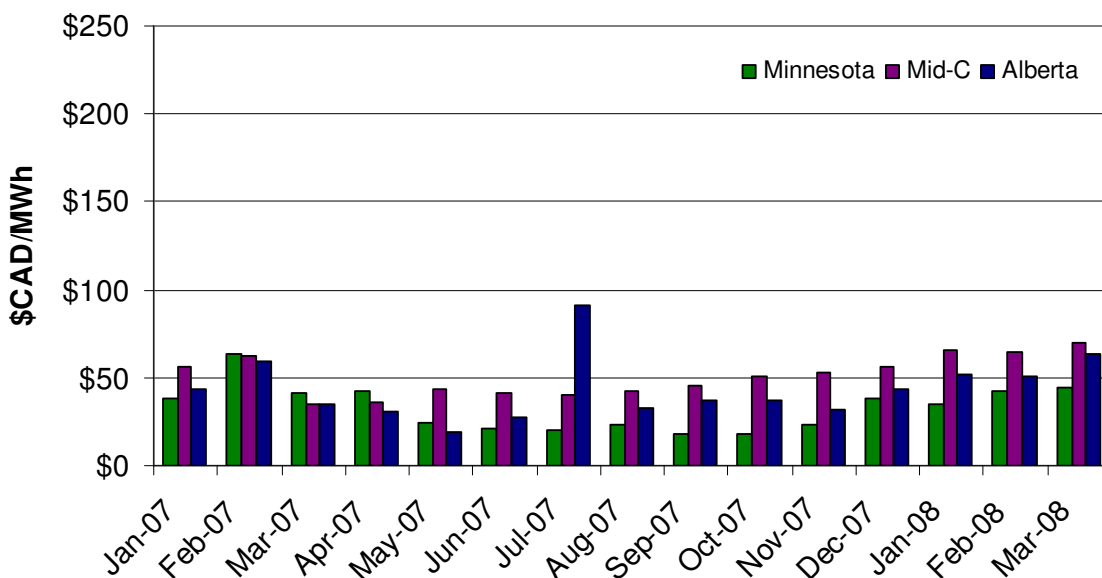




**Figure 13 - On-Peak Prices in Other Markets**



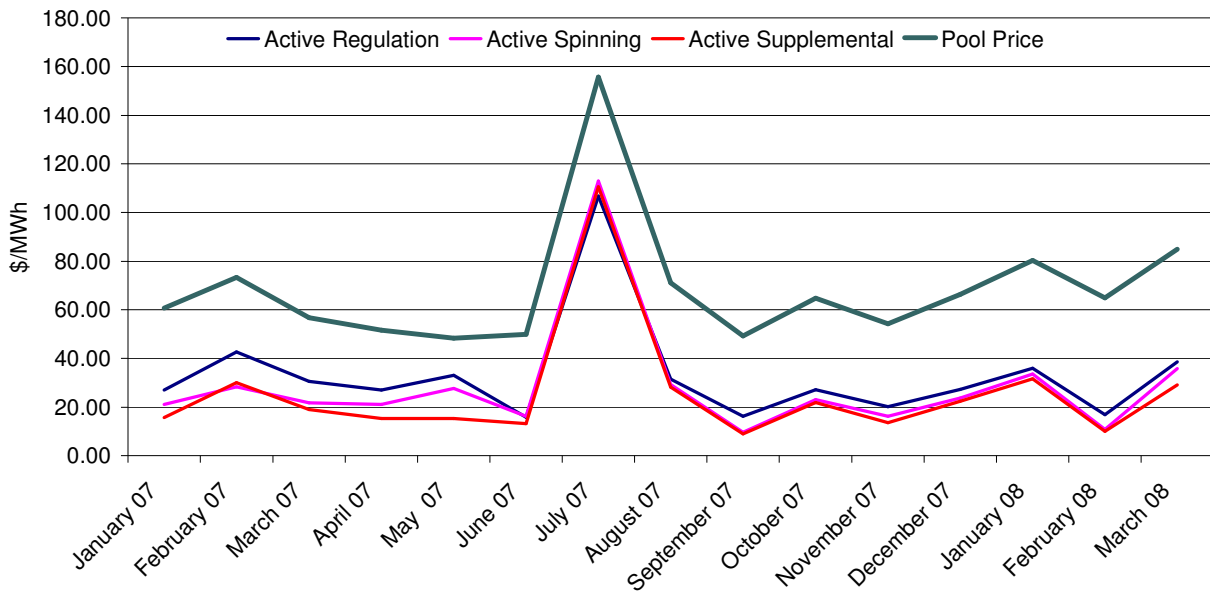
**Figure 14 - Off-Peak Prices in Other Markets**



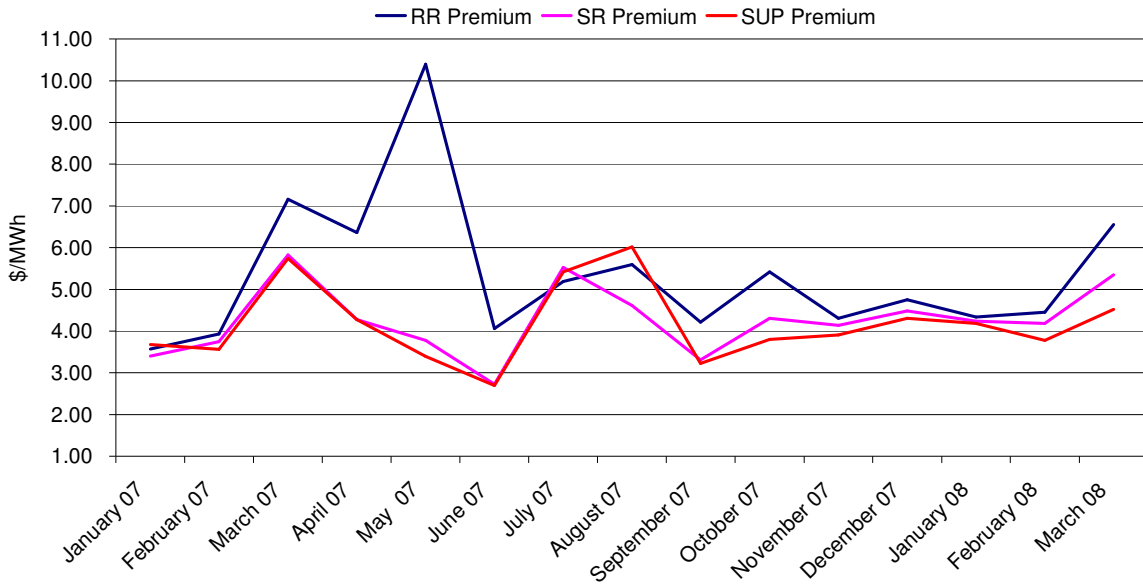
## APPENDIX C – ANCILLARY SERVICES MARKET METRICS

Ancillary services are the system support services that ensure system stability and reliability. The Alberta Interconnected Electric System (AIES) is required to carry sufficient reserves in order to assist in the recovery of any unexpected loss of generation or an interconnection. Reserves are competitively procured by the AESO through the Alberta Watt-Exchange (Watt-Ex) and over the counter (OTC). Standard ancillary services products (contracts) include active and standby products for each of Regulating, Spinning, and Supplemental reserves. The majority of active reserve products are indexed and settled against Pool price prevailing during the contract period. Standby reserve products are priced in a similar manner to options with a fixed premium and an exercise price (activation price). The activation price is only paid in the event that the contract is activated.

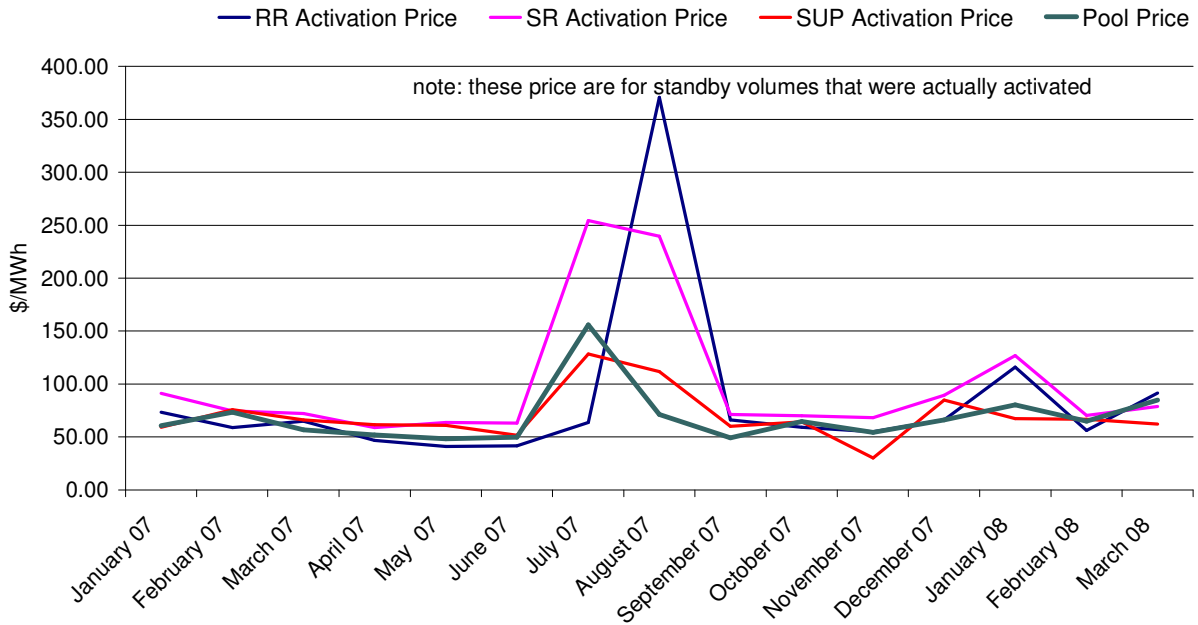
**Figure 15 - Active Settlement Prices - All Markets (Watt-ex and OTC)**



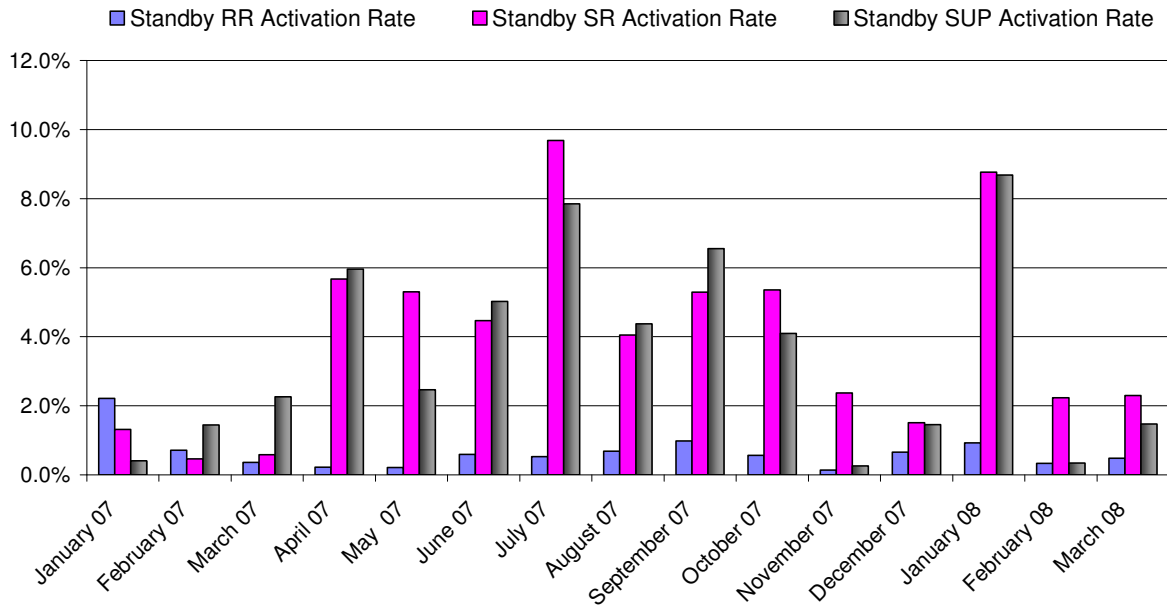
**Figure 16 - Standby Premiums - All Markets (Watt-ex and OTC)**



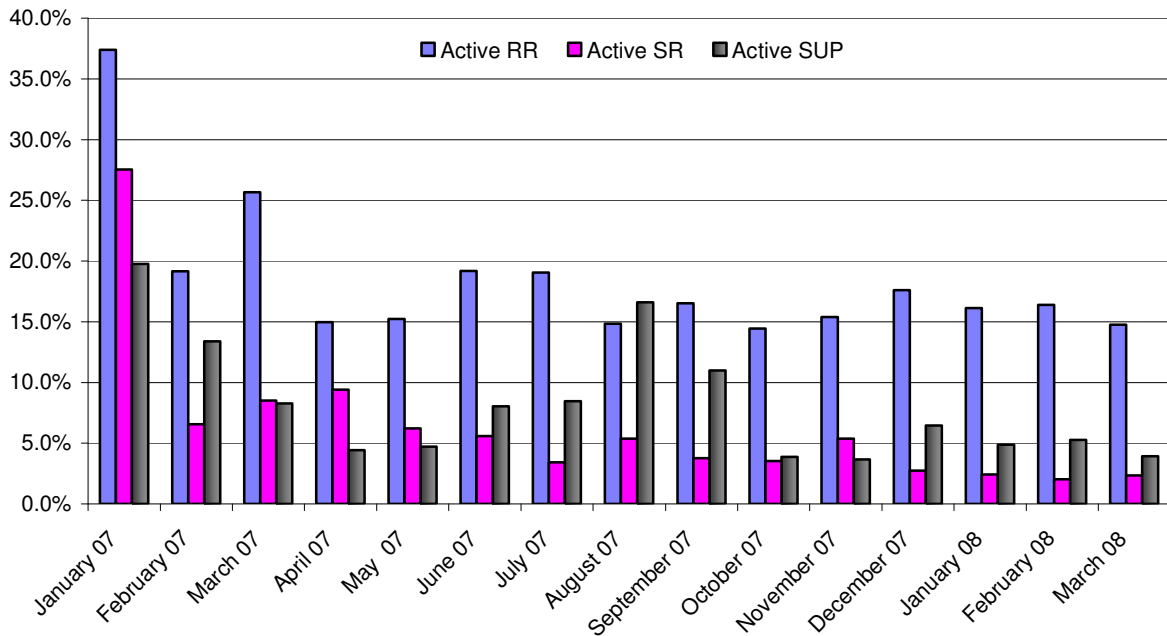
**Figure 17 – Activation Prices – All Markets (Watt-ex and OTC)**



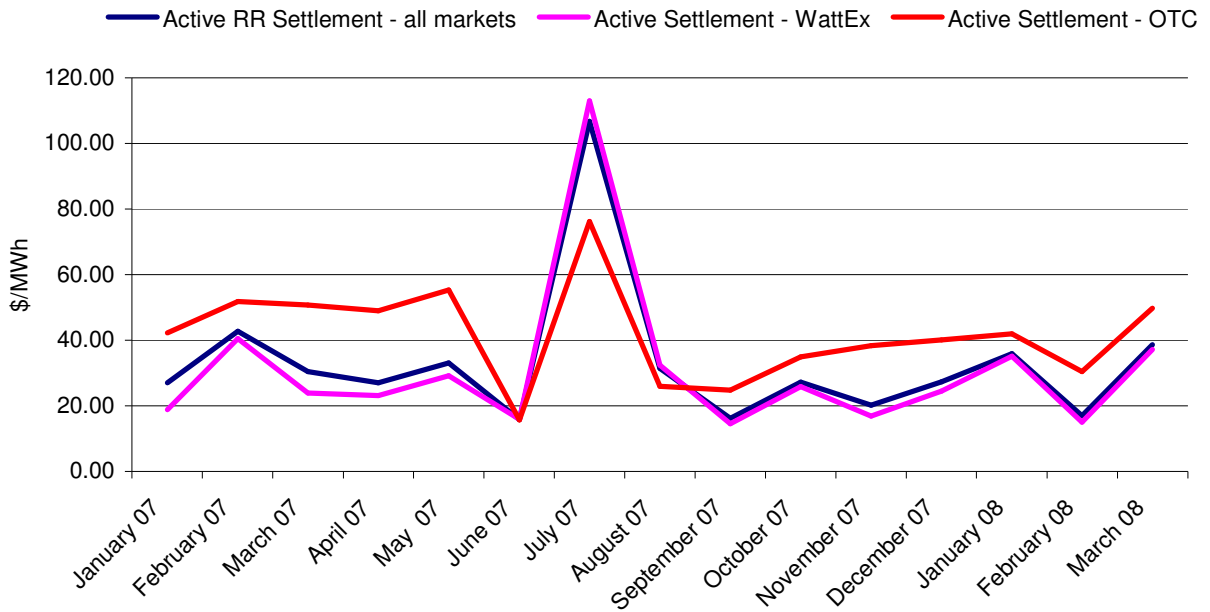
**Figure 18 - Standby Activation Rates**



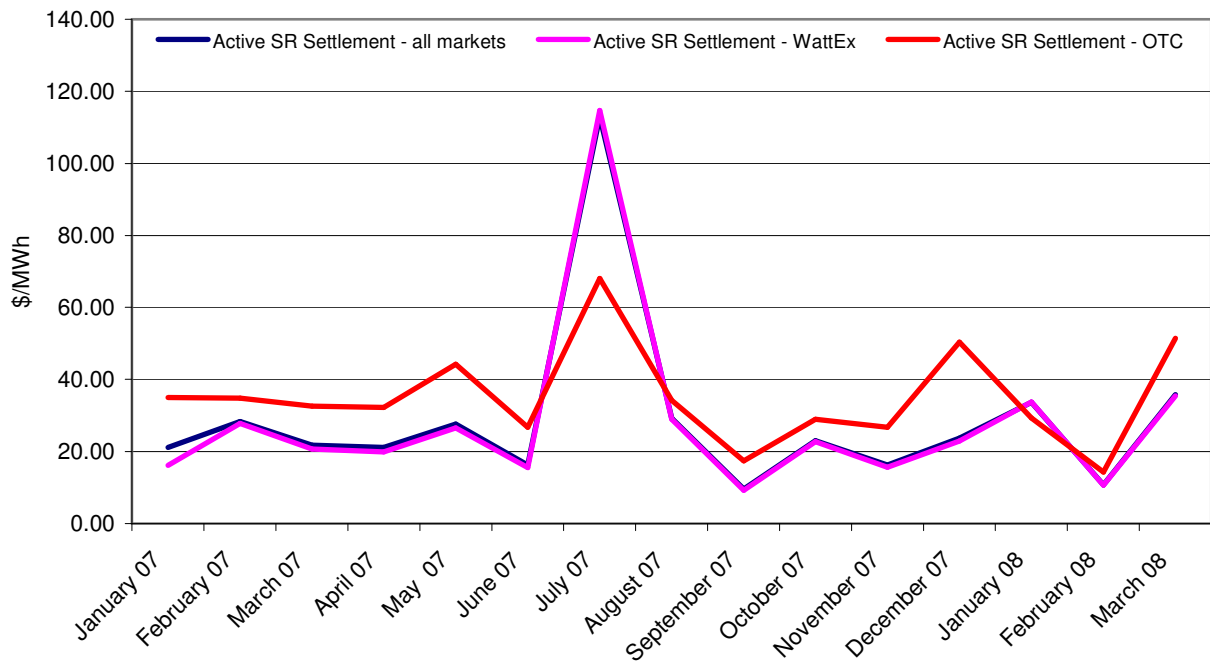
**Figure 19 - OTC Procurement as a % of Total Procurement**



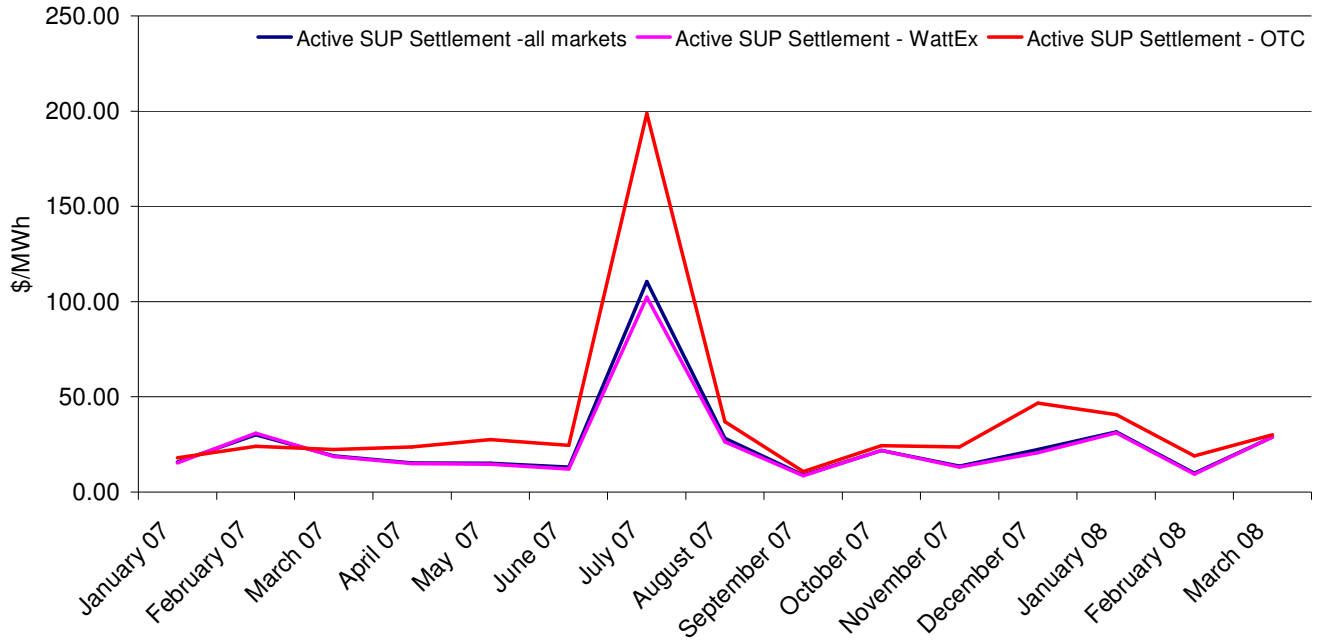
**Figure 20 - Active Regulating Reserve Settlement by Market**



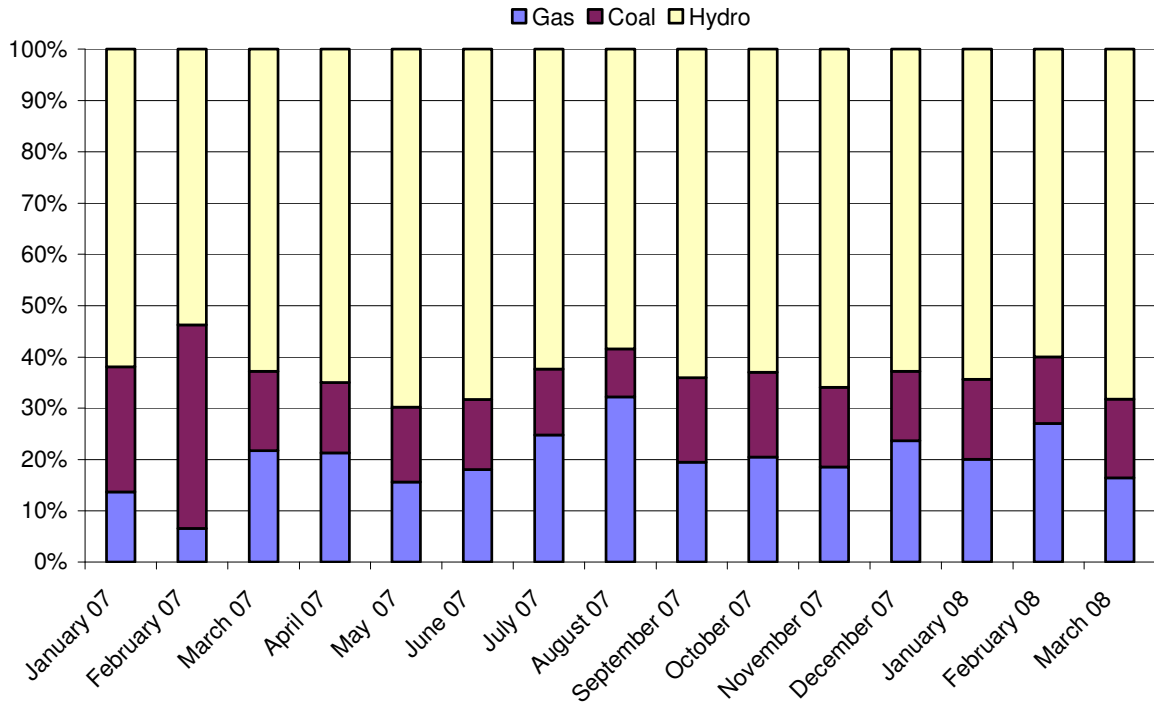
**Figure 21 - Active Spinning Reserve Settlement Price by Market**



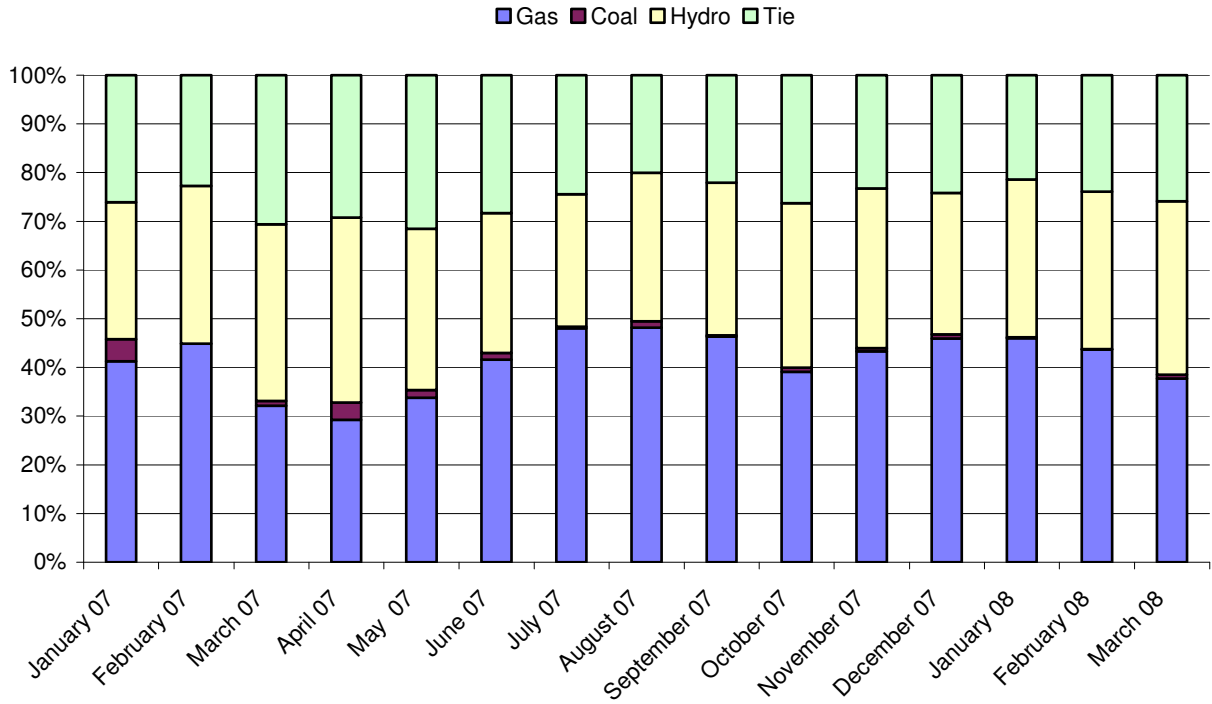
**Figure 22 - Active Supplemental Reserve Settlement Price by Market**



**Figure 23 – Active Regulating Reserve Market Share by Fuel Type**



**Figure 24 – Active Spinning Reserve Market Share by Fuel Type**



**Figure 25 – Active Supplemental Reserve by Fuel Type**

