



Quick Hits Discussion Paper Performance Metrics for The Six Month Review

May 29, 2008

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EXECUTIVE SUMMARY

Purpose of this Recommendation Paper

In December 2007, The AESO implemented an integrated package of market design changes which were identified as the “Quick Hits”. This AESO discussion paper provides an outline of the data and analysis that the AESO proposes to undertake to help prepare an assessment report after six months of operating under the new rules.

Background

The Quick Hits rule changes were created in response to the recommendations of the Alberta Department of Energy (“DOE”) electricity market design paper entitled “Alberta’s Electricity Policy Framework: Competitive-Reliable-Sustainable” (the “Policy Paper”) which was released in June 2005. The Quick Hits rule changes that were implemented addressed the following DOE policy recommendation areas:

- Merit Order Stabilizers:
 - Must Offer and Must Comply
 - Restatements
 - Dispatch of Long Lead Time Energy
 - Short Term Adequacy Assessment
- Reconstitution of Pool Price for TMR Energy
- Payments to Suppliers on the Margin
- Treatment of Imports/Exports
- Price forecasting

The Quick Hits rule changes were designed to address the DOE policy intent by implementing rules that have an immediate effect on the visibility of available supply and the credibility, stability, or undue volatility of the pool price.

Quick Hits Rule Change Components and Proposed Metrics

Maximum Capability and Available Capability

The Maximum Capability (MC) and Available Capability (AC) rules were intended to help establish on a hour by hour basis the actual supply available to the market. The AESO is proposing to monitor the impact of the new MC and AC rules on available supply using the metrics outlined in the summary table in Appendix 1.

Restatements

To ensure the AESO is continually updated on the available supply to the market, restatement rules were created to facilitate ongoing supply updates. At the same time, the AESO had a goal of improving pool price stability and reducing undue price volatility so the revised restatement rules included some restrictions two hours before the start of a settlement interval (T-2) and provided participants with enhanced restatement capability and flexibility prior to the T-2 period. The impact

of the new restatement rules will be monitored using the metrics outlined the summary table in Appendix 1.

Transmission Must Run and Dispatch Down Service

To address the unintended consequences of Transmission Must Run (TMR) dispatches on the pool price, Dispatch Down Service (DDS) rules were created to establish a market for generators to offer a price to voluntarily dispatch down and offset the impact of a TMR dispatch. An analysis of the DDS market will be undertaken using the metrics outlined in the summary table in Appendix 1.

Payments to Suppliers on the Margin

The Quick Hits rule changes are intended to create offer stability in the merit order resulting in a more efficient dispatch of the system. The new rules also sought to reduce both intra-hour price volatility and the frequency of short duration dispatches. The new rules regarding payments to suppliers on the margin (PSM) were intended to give generators a better opportunity to receive payments based on their actual offer price and encourage dispatch compliance. The AESO currently has detailed PSM reporting available on its website and will utilize that information in preparing the metrics outlined in the summary table in Appendix 1.

Adequacy and Price Forecasting

A new adequacy assessment report was created to improve the information available to the market by providing daily and weekly assessments which indicate the amount by which supply exceeds demand on an hourly basis.

The new rules were also intended to enable more consistent offer prices due in part to the T-2 lockdown period. The AESO also expected to see improved price forecasts available to the market as a secondary benefit. Existing AESO reports were modified to provide pool price forecasts for the next two settlement hours and to update those forecasts as supply conditions change. The AESO will evaluate the effectiveness of the adequacy assessments and the two hour price forecasts using the metrics identified in the summary table in Appendix 1.

Metric Scope and Confidentiality

The proposed metrics are intended to gather information at several different levels of aggregation, make comparisons over different time periods and examine trends over time. Some metrics will compile information by asset type, by fuel type, by owner and/ or in total for all assets. Others will examine data pre and post Quick Hits implementation, at T and T -2 or other relevant time periods. Hourly, daily, weekly and monthly time trends may also be analysed. The summary tables in each major section of the report provide an indication of the levels of aggregation, time periods and time trends being proposed for each rule area.

As indicated in the summary tables, the AESO will be monitoring an extensive set of metrics, however the final report may not need to include all possible combinations of information and will concentrate on those metrics which best illustrate the conclusions of the analysis. Furthermore, the AESO will not publish confidential participant information in the report although it may conduct internal reviews of any information that will improve the AESO's understanding of the impact of the Quick Hits rule implementation.

1.0 INTRODUCTION

In December 2007, The AESO implemented an integrated package of market design changes which were identified as the “Quick Hits”. The market design changes were created in response to the recommendations contained in an Alberta Department of Energy policy paper ¹ following an extensive period of industry consultation. During the industry consultation process, AESO agreed to assess whether the rule changes achieved the intended results and to make recommendations on further improvements if warranted. This AESO discussion paper provides an outline of the data and analysis that the AESO proposes to undertake to help prepare that assessment report. Although some of the proposed metrics deal with confidential participant information, the AESO report will not include metrics that reveal such confidential material.

The AESO agreed to an industry request that the market assessment report be prepared after six months of operating under the “Quick Hits” rules. However, the AESO is committed to monitoring the effects of any rule changes as they are implemented on an ongoing basis. Undesirable or unintended consequences will be managed through incremental market rule changes on a timely basis.

2.0 BACKGROUND

Following extensive stakeholder consultations regarding Alberta’s competitive electricity market, the Alberta Department of Energy (“DOE”) released a June 2005 electricity market design paper². In the Policy Paper, the DOE recommended that the energy only market be maintained with modifications and improvements.³

With respect to short term adequacy, the Policy Paper contained a number of recommendations regarding market design improvement. After extensive industry consultation, the AESO recommended a package of design changes and implemented new ISO rules implementing those changes effective December 3, 2007. Early on in the process, the package of market design changes were given the name “Quick Hits” as it was anticipated that these areas of the policy could be implemented in a reasonable amount of time, having an immediate effect on either the visibility of available supply, or the credibility, stability, or undue volatility of the pool price.

The Quick Hits rule changes that were implemented addressed the following policy recommendation areas:

- Merit Order Stabilizers:
 - Must Offer and Must Comply
 - Restatements

¹ Alberta’s Electricity Policy Framework: Competitive – Reliable – Sustainable June 6, 2005 Alberta Department of Energy, the “Policy Paper”

² Policy Paper

³ Policy Paper, page 22

- Dispatch of Long Lead Time Energy
- Short Term Adequacy Assessment
- Reconstitution of Pool Price for TMR Energy
- Payments to Suppliers on the Margin
- Treatment of Imports/Exports
- Price forecasting

During the industry consultation process, AESO agreed to report on the market after six months of operating under the “Quick Hits” rules. The following sections outline the proposed “Quick Hits” metrics to be created and analysed to determine if the “Quick Hits” design elements are operating as intended.

The proposed metrics are intended to gather information at several different levels of aggregation, make comparisons over different time periods and examine trends over time. Some metrics will compile information by asset type, by fuel type, by owner and/ or in total for all assets. Others will examine data pre and post Quick Hits implementation, at T and T -2 or other relevant time periods. Hourly, daily, weekly and monthly time trends may also be analysed. Summary tables have been included in each major section of the report to provide an indication of the levels of aggregation, time periods and time trends being proposed for each rule area.

3.0 MERIT ORDER STABILIZERS

The AESO is proposing to monitor the impact of the new Merit Order Stabilizer rules using the metrics described below and further outlined the summary tables in Appendix 1.

3.1 MAXIMUM CAPABILITY

One of the goals of the Quick Hits rule changes was to improve the AESO’s visibility of supply. The Maximum Capability rules were intended to establish a baseline of potential supply available to the market under optimal conditions.

3.1.1 Description:

Under the new rules, generating assets and imports are assigned a Maximum Capability (MC) and must offer their total MC to the market. MC for generating assets means the maximum quantity (MW) that the generating asset is physically capable of providing under optimal operating conditions for that asset while complying with all applicable ISO rules and terms and conditions of the ISO tariff. The MC for each asset is approved by the AESO and is fixed unless or until the asset owner requests a change. The AESO must agree upon all MC change requests.

3.1.2 Metric Objective:

The AESO proposes to document the initial market MC shortly after the rules were implemented and track any changes to MC over the review period.

3.1.3 Proposed Metrics:

- *MC Changes during period*

Description: The AESO proposes creating a table or graphic outlining approved changes to MC by unit, fuel type and in total over the period.

Purpose: The summary data will provide an overview of the changes to the system for reference in further analysis and as a potential indication of the improved stability of supply.

- *Comparison of MC and AC*

Description: The AESO proposes to create a series of tables and/or graphics which compares MC to AC by generating asset, by fuel type and in total.

Purpose: The comparisons will determine how often AC is equal to MC and whether MC is a good indicator of available supply.

3.2 AVAILABLE CAPABILITY

One of the goals of the Quick Hits rule changes was to improve the AESO's visibility of supply. The Available Capability (AC) rules were intended to establish on a day to day basis the actual supply available to the market.

3.2.1 Description:

Under the new rules, all generating assets will have their AC set to the MC of the asset as per the value in ETS. All generating assets must then offer all of their AC unless they have an Acceptable Operational Reason (AOR) for not doing so. The AOR must be provided with the restatement which reduces the AC below the MC.

AC must be submitted for each hour of the next trading day before noon of the day before. Participants can change an assets AC only for an acceptable operational reason. The following metrics are intended to monitor the AC MW level before and after restatements.

3.2.2 Metric Objective:

The AESO proposes to document the status of asset AC initially and track the changes to AC over the period. The AESO would also compare AC to historical Total Declared Energy (TDE) submissions. The use of TDE was discontinued when the Quick Hits rules were put in place, however, TDE and AC can be compared to identify similarities or differences in information provided in similar time periods. The analysis is intended to identify significant trends in market submission behaviour over time with regard to outages and derates.

3.2.3 Proposed Metrics:

- *Comparison of AC and TDE*

Description: The AESO proposes to create a series of tables or graphics comparing AC to TDE by unit, fuel type and in total for day ahead submissions and in real time.

Purpose: The comparisons will determine whether frequency and accuracy of outage / derate submissions has changed particularly in real time and has improved the visibility of supply. Analysis needs to recognize that TDE submissions were allowed to be greater than the asset offers in the merit order.

- *AC trends over the period*

Description: The AESO proposes to create a series of tables or graphics comparing AC values over time by unit, fuel type and in total for the day ahead, T-2 and in real time.

Purpose: The summary data will determine whether AC values are fluctuating significantly between time periods and whether AC values have more or less stability over time. The analysis will provide an indication of whether the AESO's visibility of supply has improved. This analysis primarily examines outage submissions and is linked to, but separate from, the price restatement metrics discussed below.

3.3 ENERGY RESTATEMENTS AND ACCEPTABLE OPERATING REASONS

To ensure the AESO is continually updated on the available supply to the market, restatement rules were created to facilitate ongoing supply updates. At the same time, the AESO had a goal of improving pool price stability and reducing undue price volatility so the revised restatement rules included some restrictions two hours before the start of a settlement interval (T-2) and provided participants with enhanced restatement capability and flexibility prior to the T-2 period.

A comparison of the timelines for the types of restatements allowed under the AESO rules before and after the Quick Hits implementation is provided in Figure 1. Before Quick Hits, participants would inform the AESO of a change in the amount of supply available at any time during the trading day but they could only adjust the offer prices once per day (commonly referred to as a Locking Restatement). Now, if Available Capability (AC) changes for an Acceptable Operating Reason (AOR) and there is no need to adjust their offer prices, participants must submit a Mandatory Energy Restatement type a (MERA referring to section 3.5.3.2 a of the rules). However, if the participants offer no longer represents the operating state of the asset and the participant can no longer submit a Voluntary Price Restatement, participants must submit a Mandatory Energy Restatement type b (MERb) which revises the offer. Mandatory Energy Restatements need to include the reason for the change and, if requested by the AESO, need to be accompanied with documentation regarding the basis on which it determined that there was an AOR.

Restatement type a (MERa) can occur at any time during the trading day and the assets highest priced offer block size is automatically adjusted to reflect the new AC.

ISO Rule 3.5.3.2b identifies another type of restatement referred to as Mandatory Energy Restatement type b (MERb). A MERb allows participants to change the offer prices for that asset if the participants existing offer no longer represents the operating state of the asset and the participant can no longer submit a Voluntary Price Restatement. A MERb is similar to the previously allowed restatements commonly referred to as a “Locking Restatement (LR)” except that a LR could only be used once per day and there is no daily limit to the number of times a MERb can be used as long as a related acceptable AOR exists.

Participants must also submit the reason(s) for the restatement which outline the AOR which supports the change.

3.3.1.2 Metric Objective:

The AESO proposes to monitor the need for these types of energy restatements by tracking the frequency of their use before and after Quick Hits implementation as well as over time. Comparisons to the previously allowed “Locking Restatement” will be undertaken to provide historical context.

3.3.1.3 Proposed Metric:

- *Comparison of Restatements Pre and Post Quick Hits*

Description: The AESO proposes to create a series of tables or graphics comparing restatements by individual unit, by fuel type and in total over comparable periods and for comparable types of restatements.

Purpose: The comparisons will determine pattern and frequency of use of restatements before and after Quick Hits to determine if the rules changes have impacted restatement activity.

- *Mandatory Energy Restatement trends over the period*

Description: The AESO proposes to create a series of tables or graphics comparing frequency of restatement use over time by unit, fuel type and in total before and after T-2.

Purpose: The summary data will determine whether the need for and nature of restatements is changing over time and whether or not the rule is meeting its intended purpose.

3.3.2 ACCEPTABLE OPERATIONAL REASON

3.3.2.1 Description:

Participants submitting an Energy Restatement within the T-2 period must provide an AOR to justify the submission.

AOR, as described in the rules, means:

- A circumstance ... which if it operated could reasonably be expected to affect the safety of the generating asset, the environment, personnel working at the generating asset or the public.
- Re-positioning an asset ...due to the need to meet a dispatch...to serve the stand-by ancillary service market
- Re-position...to manage physical or operational constraints (includes constraints associated with interconnections)
- Force majeure
- Exempt energy (solely produced & consumed on site)

3.3.2.2 Metric Objective:

The AESO proposes to monitor the types of AOR submissions and to identify significant trends in AOR behaviour over time.

3.3.2.3 Proposed Metric:

- *AOR Categories*

Description: The AESO proposes to categorize submitted AOR's by type and create a series of tables or graphs to establish category trends over time.

Purpose: The summary data will determine whether the nature of AOR events are changing and is resulting in improved merit order stability and supply visibility.

- *AOR Frequency*

Description: The AESO proposes to create a series of tables or graphs to monitor AOR use over time by unit, fuel type and in total. Some historical comparisons in comparable time periods will be compiled.

Purpose: The summary data will determine whether the frequency of AOR use is changing over time and is reducing undue volatility and improving supply visibility.

3.4 VOLUNTARY PRICE RESTATEMENTS

The merit order stabilizers (must offer, must comply and limitations on restatements) are intended to create offer stability in the merit order resulting in a more efficient dispatch of the system that eliminates the unnecessary volatility that is caused by last minute restatements to price and volume. The T-2 lockdown period for a Voluntary Price Restatement is a key component of the rules changes intended to enhance merit order stability and to reduce intra-hour volatility, the frequency of short duration dispatches and price-chasing. The metrics proposed in this section focus on trends in the use of Voluntary Price Restatements themselves. Energy market merit order, dispatch and pool price impact metrics are discussed in section 3.5 of this paper.

3.4.1 Description:

Under the new rules, participants may submit a Voluntary Price Restatement prior to two hours before the start of a settlement interval. The Voluntary Price Restatement is a revised offer of an asset which restates the price, the quantity for each block of the asset or both. Voluntary Price Restatements cannot result in a change to the AC of the asset. Participants may submit an unlimited number of Voluntary Price Restatements for a settlement interval from the time of the initial day ahead submission until two hours prior to the settlement interval.

3.4.2 Metric Objective:

Participants offer behaviour will in part be reflected in their restatement activity. The AESO intends to monitor Voluntary Price Restatement activity to determine if there are any specific trends that develop in the participant's use of Voluntary Price Restatements in terms of timing and frequency. The AESO will be looking to see if the Voluntary Price Restatement activity is consistent with the development of a more stable merit order and if any unintended consequences have developed over time from the new rules.

3.4.3 Proposed Metrics:

- *Voluntary Price Restatements and Restatements Pre Quick Hits*
Description: The AESO proposes to create a series of tables or graphs comparing the use of restatements before and after the Quick Hits rule implementation. The metrics will compare the restatement frequency in comparable time periods (daily/monthly) in total and by fuel type.

Purpose: The summary data will indicate whether the nature of restatement use has changed under the new rules.

- *Voluntary Price Restatement Trends*

Description: The AESO proposes to create a series of tables or graphics comparing frequency of Voluntary Price Restatement use over time by unit, fuel type and in total on a daily, weekly and monthly basis. Restatement use in different hourly time periods will also be compared focusing on the hours leading up to the T-2 period.

Purpose: The summary data will indicate whether the use of Voluntary Price Restatements has stabilized, increased or decreased over time and whether restatement activity patterns have developed.

3.5 OFFER BEHAVIOR AND POOL PRICES

The AESO intends to monitor the merit order to determine if offer behavior has changed compared to historical behavior and whether the resultant merit order appears more or less stable. The AESO will also be looking to see if any unintended consequences have developed from the new rules.

3.5.1 OFFER STRUCTURE

The merit order stabilizers (must offer, must comply and limitations on restatements) are intended to create offer stability in the merit order which would reduce both intra-hour volatility and the frequency of short duration dispatches.

3.5.1.1 Description:

The energy market merit order is the list of all valid offers and bids for a settlement interval sorted in order of offer and bid price blocks. The shape of the merit order provides an indication of the likely price change that would occur given the unexpected loss of supply or a change in load. The merit order can change from hour to hour and season to season in response to market fundamentals and participant offer behaviour.

3.5.1.2 Metric Objective:

The AESO proposes to analyze the energy market merit order to determine if there has been significant changes in the it's shape since the implementation of the Quick Hits and whether there are any significant trends in overall market offer behaviour occurring over time.

3.5.1.3 Proposed Metrics:

- *Energy Market Merit Order Before and After Quick Hits*

Description: The AESO proposes to graphically compare the merit order during a settlement interval for comparable periods before and after the Quick Hits implementation. Comparisons will be made for specific hours on and off peak and for hours on comparable days of the week and months of the year. If appropriate, a numerical or statistical analysis will be undertaken to measure the magnitude of any changes evident from the data.

Purpose: The graphical analysis will indicate whether the rules changes have impacted the merit order in a way that would reduce intra-hour volatility and the frequency of short duration dispatch.

- *Energy Market Merit Order Stability*

Description: The AESO proposes to graphically compare the merit order during a settlement interval for comparable periods since the implementation of Quick Hits to determine whether the frequency and magnitude of offer shifts are increasing or decreasing over time.

Purpose: The graphical analysis will indicate whether the rules changes have impacted the merit order in a way that would indicate merit order stability is improving as intended.

- *Energy Market Merit Order Zero Dollar Offers*

Description: The AESO proposes to graphically compare the zero dollar offers in the merit order during a settlement interval for comparable periods before and after the Quick Hits implementation. Zero dollar offer comparisons will be made

for specific hours on and off peak and for hours on comparable days of the week and months of the year.

Purpose: The graphical analysis will indicate whether the rules changes have impacted the nature of zero dollar offer behaviour.

3.5.2 MERIT ORDER DISPATCH

Many of the changes introduced with the Quick Hits were intended to enhance merit order stability, reduce intra-hour volatility and the frequency of short duration dispatches. The AESO believes that while actual dispatch frequency could be measured, the overall rule impact on dispatch frequency and price is effectively captured if system marginal price (SMP) data is utilized for analysis purposes.

3.5.2.1 Description:

The system marginal price (SMP) at each minute is the highest eligible asset marginal price of all assets required to meet AIES demand and generally reflects the price block of the last dispatched asset. SMP changes reflect the underlying volatility of supply and demand as well as the frequency and duration of merit order dispatch.

3.5.2.2 Metric Objective:

The AESO proposes to monitor SMP activity to determine, on a relative basis considering other market influences, whether the frequency and duration of SMP changes points to a more efficient market dispatch and lower price volatility since the implementation of Quick Hits.

3.5.2.3 Proposed Metrics:

- *Daily and Hourly Count of SMP Changes*

Description: The AESO proposes to create a series of tables or graphics tracking the frequency of SMP changes before and after Quick Hits implementation over time and for comparable time periods. Daily total, on peak and off peak information will be analysed in addition to hourly analysis which will track the frequency of upward and downward movements during the hour.

Purpose: The SMP analysis will indicate whether the character and nature of SMP movements have significantly changed since Quick Hits implementation.

3.5.3 POOL PRICES BEFORE AND AFTER QUICK HITS

The Quick Hits rules changes were introduced to achieve many specific objectives but a major overall objective was to improve the credibility, stability, or undue volatility of the pool price. The AESO believes that tracking pool price movements over time is important and combined with other analysis may reveal directional trends or important consequences related to the Quick Hits rule changes.

3.5.3.1 Description:

The hourly pool price is the price for electric energy in \$/MWh reported by the AESO for each settlement interval of the trading day.

3.5.3.2 Metric Objective:

The AESO proposes to monitor pool price trends to determine, on a relative basis considering other fundamental influences, whether the Quick Hits rules have positively contributed to the credibility, stability, or undue volatility of the pool price movement.

3.5.3.3 Proposed Metrics:

- *Pool Price Volatility*

Description: The AESO proposes to measure the standard deviations of the on peak and off peak pool prices to give a representation of price volatility before and after Quick Hits implementation both over time and for comparable time periods. Daily price velocity, the rate of movement of price, will also be measured based on the overall average price and on the daily average price both reported on a monthly average basis.

Purpose: The analysis will reveal changes in price volatility over time which may be related to the Quick Hits rule changes.

4.0 TRANSMISSION MUST RUN (TMR) AND DISPATCH DOWN SERVICE (DDS)

The Policy Framework established that the present energy only market design will be maintained but enhanced. One important enhancement identified and implemented with the Quick Hits rules involves a change to the way Transmission Must Run (TMR) energy is treated within the market rules. The rule changes created a new Dispatch Down Service (DDS) which is intended to improve pool price fidelity. The AESO is proposing to monitor the impact of the new DDS rules using the metrics described below and further outlined in the summary tables in Appendix 1.

4.1 Description:

TMR means a generator is constrained on to operate at a minimum specified MW output level in order to maintain transmission security. Dispatching TMR displaces in-market energy and could have an impact on pool price. If the price is artificially depressed by constraining on TMR energy, then the correct price signal is not being sent to the market.

To address the unintended consequences of TMR dispatches on the pool price, DDS was created to establish a market for generators to offer a price to voluntarily dispatch down and offset the impact of a TMR dispatch. The DDS

market was not intended to compete with the energy market and was not to be a long term source of funding for generators given that the transmission constraints which cause TMR dispatch were expected to be eventually eliminated.

The DDS rules established a number of constraints for DDS use as well as specific DDS offer and dispatch parameters. A Reference price was established and when the market price is above the Reference price, DDS cannot be dispatched. The Reference price is determined monthly, cannot set SMP and is set at 12.5 times the Alberta AECO "C" bidweek spot natural gas price index.

As outlined in section 6.3.6.1 of the AESO rules, any dispatchable asset can participate in the DDS market provided that specific DDS offer criteria are met regarding size, timing, compliance and other considerations intended to create an efficient, manageable DDS merit order. DDS payments only occur if there has been a DDS dispatch.

The costs of providing the DDS service are allocated to suppliers (generators & imports) by metered volumes in a manner which is effectively a "financial pro rata" among suppliers who generated during a settlement interval.

4.2 Metric Objective:

The AESO proposes to track DDS offers, use and cost. DDS offer information will be used to evaluate if the market is active and competitive. DDS use data will provide an indication of how often and how much DDS dispatch is occurring over time. The cost of providing DDS will be determined by analyzing the cost statistics and an estimate of the impact DDS may have had on pool price will be made.

4.3 Proposed Metrics:

- *DDS Supply and Dispatched DDS*

Description: The AESO proposes to measure daily total DDS offers over time and compare the offers to actual daily DDS dispatch, TMR dispatch, reference price and pool price.

Purpose: The analysis will reveal several important trends. Offer history will indicate trends in the timing and magnitude of market supply. Comparisons of offer supply and DDS use will provide information on the DDS supply demand balance. Total TMR use and DDS dispatch comparisons will reveal instances where DDS is not available when required or when DDS is not dispatched because the pool price is higher than the reference price.

- *Daily Average Cost of DDS*

Description: The AESO proposes to measure total DDS cost per MW of generation in \$/MWh over time and compare the hourly, daily and monthly DDS cost to pool price. Daily DDS cost will also be compared to the daily average pool price increase.

Purpose: The analysis will indicate the relative cost of providing DDS service to generators and also provide relevant comparisons to market price changes in the same period.

- *DDS Impact on Pool Price*

Description: The AESO proposes to estimate what the pool price might have been if DDS had not been dispatched in \$/MWh on an hourly, daily and monthly basis.

Purpose: The DDS service was intended to correct the price impact of out of market TMR dispatch and the proposed metric will attempt to provide an indication of the magnitude of the impact of the DDS rules.

5.0 PAYMENTS TO SUPPLIERS ON THE MARGIN

The Quick Hits rule changes are intended to create offer stability in the merit order resulting in a more efficient dispatch of the system. The new rules also sought to reduce both intra-hour price volatility and the frequency of short duration dispatches. The new rules regarding payments to suppliers on the margin were intended to give generators a greater opportunity to receive payments based on their actual offer price and encourage dispatch compliance. The AESO is proposing to monitor the impact of the new Payments to Suppliers on the Margin rules using the metrics described below and further outlined in the summary tables in Appendix 1.

5.1 Description:

Under the current market design, the System Marginal Price (SMP) at each minute is equal to the highest eligible asset marginal price of all assets required to meet AIES demand. However, generators receive payments based on the hourly pool price which for any settlement interval is the time weighted average of the 60, one minute SMP values of the settlement interval. Often participants offer behaviour and dispatch response is influenced by the forecast pool price during the hour as opposed to the current SMP. If a participant believes the pool price will be lower than their offer price, they may not immediately respond to the dispatch or they may tend submit higher offer prices in hours with larger dispatch swings to ensure that they receive adequate compensation. The payments to suppliers on the margin rules guarantee that they will be paid their offer price for the energy they produced during a settlement interval if they comply with the dispatch. Settlement will be in the form of an uplift payment to the supplier. Settlement charges for payments to suppliers on the margin will be applied to all load based on their proportion of total load within the settlement interval. Settlement payments and charges will be applied against the pool participant's monthly invoice.

5.2 Metric Objective:

The AESO proposes to monitor the payments to suppliers on the margin to determine how frequently the payments are required and how significant a financial impact the payments are to suppliers and to load. The AESO would also examine the price and dispatch metrics proposed in this paper to see if there are any signs of reduced volatility or improved dispatch efficiency that can be attributed to the periods of higher payments.

5.3 Proposed Metrics:

- *Monthly Payment History*

Description: The AESO proposes to track monthly payment history for payments to suppliers on the margin in terms of event frequency, total dollar cost, MW volume and \$/MWh.

Purpose: The summary data will provide an indication of the financial significance to the market as a whole.

- *Payments by Fuel Type and Customer*

Description: The AESO proposes to track monthly payment history in terms of the fuel type of the assets receiving payments as well as the aggregated ownership of the assets receiving payments. Data on the event frequency, total dollar cost, MW's paid for and \$/MWh uplift for the assets by fuel type and ownership will be collected and tracked over time.

Purpose: The summary data will provide an indication of the financial significance to the type of asset on the margin and will indicate how broadly the payments are being spread among market participants.

- *Payments by Time of Day*

Description: The AESO proposes to track monthly payment history in terms of the hours of the day when payments occur. Data on the event frequency, total dollar cost, MW's paid for and \$/MWh uplift for the hour will be collected and tracked over time.

Purpose: The summary data will provide an indication of what hours of the day have significant payment activity and will identify seasonal or other trends over time.

6.0 TREATMENT OF IMPORTS AND EXPORTS

The Alberta electricity market design needs to facilitate the import and export of electricity in a fair, efficient and openly competitive manner. The Policy Framework clearly states that "to the extent possible, imports are to be treated the same as intra-Alberta generators". The Quick Hit rules and protocols are intended to treat importers and intra-Alberta generators as consistently as possible given the operating procedures of other control areas. The AESO is proposing to monitor the impact of the Quick Hits rules on imports and exports

using the metrics described below and further outlined the summary tables in Appendix 1.

6.1 Description:

All suppliers including importers and exporters are subject to the T-2 requirement. However, unlike generators, import and exporters must submit electronic tags (e-tags) for each interchange transaction and must make reasonable efforts to procure transmission service for the offered Available Capacity (AC). A Mandatory Energy Restatement must be submitted if the sum of the e-tag quantities is less than AC for an Acceptable Operating Reason (AOR). If the total imports in the energy merit order are greater than import Available Transfer Capability (ATC), imports with transmission should flow and the interchange should be fully utilized. Imports and exports are non-dispatchable and are not able to set pool price. Imports offer in at zero dollars and exports offer in at the price cap.

6.2 Metric Objective:

The AESO proposes to monitor import activity and evaluate whether the market rules are impacting export and import availability.

6.3 Proposed Metrics:

- *Import and export AC and ATC trends over the period*

Description: The AESO proposes to create a series of tables or graphics comparing import and export AC values over time for submissions at T-2 and in real time. Comparisons to historical actual volumes in similar time frames would also be provided for context. Additionally, the AESO would prepare a comparison of the import level to the posted ATC and track the number of times when ATC limited the availability of imports and the magnitude of those restrictions. The analysis will examine import and export AC levels separately as well as the net interchange flow.

Purpose: The summary data will determine whether import and export AC values are fluctuating significantly between the relevant time periods, whether import and export AC values have more or less stability over time and whether imports or exports are encountering more or less restrictions to market participation. The analysis will reveal the extent of counter flow activity on the interchange as well.

7.0 ADEQUACY AND PRICE FORECASTING

The Quick Hits rule changes were intended to improve visibility of supply for the AESO and for the market. A new adequacy assessment report was created to provide daily and weekly assessments which indicate the amount by which supply exceeds demand on an hourly basis. The assessments protect confidential information by aggregating the information and categorizing the excess available supply forecasts into relevant surplus ranges. Through this

report, participants receive ongoing updates reflecting restatements relative to the AESO's forecast of demand.

The AESO also expected to see improved price forecasts available to the market as a secondary benefit. Existing AESO reports were modified to provide pool price forecasts for the next two settlement hours and to update those forecasts as supply conditions change.

The AESO is proposing to monitor the impact of the new Adequacy and Price Forecasting rules using the metrics described below and further outlined the summary tables in Appendix 1.

7.1 ADEQUACY ASSESSMENT

7.1.1 Description:

The AESO provides an adequacy assessment which covers each settlement interval for both the trading day and for the 6 remaining days of the forecast scheduling period. The trading day forecast is updated every five minutes until the end of that trading day and the remainder of the scheduling period is updated every hour.

7.1.2 Metric Objective:

The AESO adequacy assessment attempts to consistently measure the anticipated supply surplus given a number of dynamic, highly variable market fundamentals. Weather changes, wind production, demand response, cogeneration net output and other factors can cause wide swings in supply and demand in a very short period of time. Nevertheless, for some periods of the day, the AESO proposes to gauge the accuracy of the forecast dispatch price to the actual pool price.

7.1.3 Proposed Metrics:

- *Comparison of Actual to Two Hour Forecast Supply Surplus*

Description: The AESO proposes to create a series of tables or graphics comparing the actual supply surplus for the settlement interval to the forecast supply surplus from two hours preceding the settlement interval. On peak and off peak hours will be separately considered.

Purpose: The AESO will attempt to measure the accuracy of the forecast in different time periods. The analysis will include an examination of the supply and demand variations separately to determine the most important sources of variation and identify potential areas of improvement.

- *Two Hour Forecast Trends*

Description: The AESO proposes to create a series of tables or graphics tracking the forecast accuracy in different time periods when looking at the actual supply surplus for the settlement interval to the forecast supply surplus from two hours preceding the settlement interval.

Purpose: The AESO will attempt to measure whether the accuracy of the forecast is changing over time or whether there are important seasonal factors which impact the assessment accuracy that could be used to improve the methodology.

7.2 Two Hour Pool Price Forecast

7.2.1 Description:

The AESO makes available during the preceding two settlement intervals for each settlement interval of the trading day's operation the forecast dispatch price in \$/MWh. The forecast is updated during the hour as required to reflect known supply changes.

7.2.2 Metric Objective:

The AESO will try to determine whether the dispatch forecasts are providing consistent and useful forecast information to the market.

7.3.3 Proposed Metrics:

- *Comparison of Actual to Two Hour Forecast Prices*

Description: The AESO proposes to create a series of tables or graphics comparing the actual pool price for the settlement interval to the forecast price from two hours preceding the settlement interval.

Purpose: The AESO will evaluate how accurate the forecasts are in different time periods and whether the forecast accuracy is improving over time.

8.0 ALIGNMENT WITH GOVERNMENT POLICY

The Quick Hits rules changes were designed to directly address some of the short term adequacy (STA) issues and recommendations identified in the Alberta Department of Energy policy paper.⁴ In the paper, the DOE stated that "the issue of STA can be defined as having two components. The first is referred to as Offer Shortfall, in which the system operator does not always know if there will be enough generation available in the supply stack to meet the load".⁵ The AESO notes that the Merit Order Stabilizer components of the Quick Hits implementation directly addresses the Offer Shortfall issue and the proposed metrics are intended to measure the improvement of supply information available to the system operator to ensure alignment with government policy.

The DOE paper also referred to a second issue which is that "there is significant volatility / instability of the merit order. This volatility arises from two sources: dispatch signals which do not recognize physical plant parameters and corresponding market flexibility which allows last minute restatements and does

⁴ Alberta's Electricity Policy Framework: Competitive – Reliable – Sustainable June 6, 2005 Alberta Department of Energy the "Policy Paper"

⁵ Section 4.2 page 20

not require adequate dispatch compliance.”⁶ Since 2005, the AESO has instituted rule changes and compliance processes which helped to address the DOE merit order issue. The rule changes related to restatements and the payments to suppliers on the margin that are part of the Quick Hits are specifically intended to reduce undue volatility of the merit order. The metrics proposed in this paper will try to identify the impact that the Quick Hits rule changes have had on merit order volatility / stability to ensure alignment with government policy.

The impact on pool price of Transmission Must Run (TMR) was also discussed in the DOE paper and the AESO was required to create processes, practises and rules to address the TMR impact on pool price and appropriate methodology for reconstitution.⁷ The new Dispatch Down Service (DDS) rule changes were intended to result in “energy price signal fidelity”⁸ as required by DOE policy.

9.0 NEXT STEPS

The AESO welcomes feedback on the Quick Hits metrics recommendations put forward in this paper. A comment matrix has been prepared to make it easier for stakeholders to submit their comments. After receiving feedback from stakeholders, the AESO will review the feedback and respond to comments, suggestions and concerns. The AESO will use the feedback to continue developing the metrics and will use the metrics to monitor the market on an ongoing basis.

The AESO intends to issue a Quick Hits summary report containing the results of the six month metric analysis after June 2008. Prior to preparing that report, the AESO will be soliciting stakeholder feedback on the rules and would be particularly interested in receiving comments on any problems created by specific rules or by the lack of a specific rule. To assist the AESO in understanding of any stakeholder issue, the AESO will request that the comments identify the problem created by the Quick Hits rule(s) and identify suggestions for an effective solution. The AESO will place a rules comment matrix on our website at that time to make it easier for stakeholders to categorize the concern areas and for the AESO to respond to concerns raised. The AESO will also conduct an internal review of the operational impacts of the Quick Hits rules. The AESO summary report will utilize the insights obtained from the metric analysis, the stakeholder feedback and the operational assessment to make recommendations for rule changes if required.

Please use the comment matrix on the AESO website to submit your feedback to Gordon Nadeau at gordon.nadeau@aeso.ca by June 12, 2008.

⁶ Section 4.2 page 20

⁷ Section 4.4.2 page 38

⁸ Section 4.4.2 page 38

APPENDIX 1: QUICK HITS METRICS SUMMARY TABLES

Summary tables are provided for each major section of the report and highlight for each metric the category, time periods and time trend analysis that is being proposed for the relevant rule area.

The summary tables identify for each rule component the type of information that will be tracked. For example, in the Merit Order Stabilizer section, the first column entitled MC in the category area indicates that Maximum Capability will be tracked in MW units in all four categories, that is by asset, fuel type, owner and in total.

The summary tables also use consistent abbreviations and or footnotes. An X in the table indicates that a metric is not being contemplated while an asterisk (*) in the table indicates that a metric is proposed for that area and category. Some summary tables may contain a reference to a specific comparable rule area which will have a metric developed to cover the topic (for example, the time period table below indicates that AC and Total Declared Energy or TDE will be compared in MW's graphically on a pre and post Quick Hits basis and as indicated in the category table the comparison will be undertaken for all category types).

As illustrated by the summary tables, the AESO will be monitoring an extensive set of metrics, however the final report may not need to include all possible combinations of information and will concentrate on those metrics which best illustrate the conclusions of the analysis. Furthermore, the AESO will not publish confidential participant information in the report although it may conduct internal reviews of any information that will improve the AESO's understanding of the impact of the Quick Hits rule implementation.

A) MERIT ORDER STABILIZERS - MUST OFFER AND RESTATEMENTS

The summary tables below highlight the Merit Order Stabilizer metrics being proposed and illustrate the various categories, time periods and time trend analysis that are being contemplated.

Component	MC	AC	AOR	MERa	MERb	VPR
Category						
Asset	MW	MW	Count& type	Count	Count	Count
Fuel Type	MW	MW	Count& type	Count	Count	Count
Owner	MW	MW	X	X	Count	Count
Total	MW	MW	Count& type	Count	Count	Count

Component	MC	AC	AOR	MERa	MERb	VPR	SMP	EMMO
Time Periods								
Pre & post QH	vs AC	vs TDE	*	*	vs LR	*	Count	Distribution
Day Ahead, T-2 & T	X	*	X	X	*	n/a		Distribution
Time Trends (6 Mth)								
Hourly	X	*	*	*	*	*	Count	Distribution
Daily	X	*	*			*	Count	n/a
Monthly / weekly	*	*	*	*	*	*	Count	n/a
Comparison to Price			*	*	*	X	n/a	n/a

Legend: *- Metric monitored; X- Metric not proposed;
 MC- Maximum Capability;
 AC- Available Capability; AOR- Acceptable Operating Reason;
 MERa- Mandatory Energy Restatement type a;
 MERb- Mandatory Energy Restatement type b;
 VPR- Voluntary Price Restatement; SMP- System Marginal Price;
 EMMO- Energy Market Merit Order

B) TRANSMISSION MUST RUN (TMR) AND DISPATCH DOWN SERVICE (DDS)

The summary table below highlights the DDS metrics being proposed and illustrates the various categories and time trend analysis that are being contemplated.

Component	DDS Supply	DDS Dispatched	DDS Cost	TMR Dispatched
Category				
Asset	MW	MW	\$/MWh	X
Fuel Type	MW	MW	\$/MWh	X
Owner	MW	MW	X	X
Total	MW	MW	\$/MWh	MW
Time Trends (6 Mth)				
Hourly	*	*	*	*
Daily	*	*	*	*
Monthly / weekly	*	*	*	*
Pool Price Impact	n/a	\$/MWh	n/a	X

Legend: *- Metric monitored; X- Metric not proposed;
 DDS- Dispatch Down Service; TMR- Transmission Must Run

C) PAYMENTS TO SUPPLIERS ON THE MARGIN (PSM)

The summary table below highlights the PSM metrics being proposed and illustrates the various categories, time periods and time trend analysis that are being contemplated.

Component	PSM Frequency	PSM Volume	PSM Cost	PSM Total \$
Category				
Asset	count	MW	\$/MWh	\$
Fuel Type	count	MW	\$/MWh	\$
Owner	count	MW	\$/MWh	\$
Total	count	MW	\$/MWh	\$
Time Trends (6 Mth)				
Hourly	*	*	*	*
Daily	*	*	*	*
Monthly / weekly	*	*	*	*
Uplift Cost	n/a	% of Mkt	\$/MWh	% of Mkt

Legend: *- Metric monitored; X- Metric not proposed;
PSM- Payments to Suppliers on the Margin

D) TREATMENT OF IMPORTS AND EXPORTS

The summary table below highlights the import / export metrics being proposed and illustrates the various categories, time periods and time trend analysis that are being contemplated.

Component	BC Import AC	BC Import ATC	BC Export AC	BC Export ATC	BC Net Import AC	BC Net Export AC
Category						
Asset	n/a	n/a	n/a	n/a	n/a	n/a
Fuel Type	n/a	n/a	n/a	n/a	n/a	n/a
Participant	MW	MW	MW	MW	MW	MW
Total	MW	MW	MW	MW	MW	MW
Time Periods						
Pre & post QH	*	*	*	*	*	*
T-2 & T	*	X	*	X	*	*
Time Trends (6 Mth)						
Hourly	*	*	*	*	*	*
Daily	X	X	X	X	*	*
Monthly / weekly	X	X	X	X	*	*
ATC Restrictions on AC	X	n/a	X	n/a	count	count

Legend: *- Metric monitored; X- Metric not proposed;
 AC- Available Capability; ATC- Available Transfer Capability
 Statistical analysis will include Average, Maximum and Minimum MW in period

E) ADEQUACY AND PRICE FORECASTING

The summary table below highlights the pool price metrics being proposed and illustrates the various time periods and time trend analysis that are being contemplated.

Component	Forecast Vs Actual Price	Adequacy Forecast Vs Actual Demand	Adequacy Forecast Vs Actual Supply	Adequacy Forecast Vs Actual Surplus
Time Periods				
Pre & post QH	X	n/a	n/a	n/a
T-2 & T	\$/MWh & %	MW	MW	MW
Time Trends (6 Mth)				
Hourly	\$/MWh & %	X	X	MW / %
Daily	\$/MWh & %	X	X	MW / %
Monthly / weekly	\$/MWh & %	X	X	MW / %

Legend: *- Metric monitored; X- Metric not proposed