State of the Market: Framework for Analysis

Directions Paper (June 20, Discussion Draft)

[Date]

PREFACE

The distinguishing feature of the Alberta market compared to most organized electricity markets is that it is 'energy-only', that is, the private sector bears the risk and decides on retirement of generation plant and investment in new capacity mainly driven by revenues derived or expected to be derived from the wholesale market. There is no regulated and centrally administered resource adequacy and planning mechanism. Apart from a price cap and price floor, prices in the spot market are regulated by the forces of competition, within the parameters of the Alberta market design and supporting rules and procedures. Finally, unlike most other organized electricity markets, participants are free to unilaterally engage in strategies to attempt to raise the market price (e.g. through economic withholding) and there is no mechanism to administer prices or offers at some proxy of cost.

Under the circumstances outlined above it is obviously important that competition is doing its job in regulating market outcomes. The MSA can and does exercise its responsibilities to monitor market participant behaviour to ensure that it conforms to the standard set out in the *Electric Utilities Act* and amplified in the *Fair, Efficient and Open Competition Regulation*; however from time to time a more searching broad-based assessment needs to be made. This is the purpose of the MSA's State of the Market report, an outline of which is provided in this Directions Paper.

The Market Surveillance Administrator is an independent enforcement agency that protects and promotes the fair, efficient and openly competitive operation of Alberta's wholesale electricity markets and its retail electricity and natural gas markets. The MSA also works to ensure that market participants comply with the Alberta Reliability Standards and the Independent System Operator's rules.

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Overview

Purpose

The purpose of this document is to communicate the scope, content and analytic framework of the MSA's state of the market report so as to receive advice and feedback from the broad stakeholder community involved in the Alberta electricity market.

The Advisory Group, (see April 5, 2012 Notice) composed of seven representatives of interested parties, has helped shaped the MSA's thinking regarding the report and analysis but are not responsible for, nor necessarily agree with, this Directions Paper. The same proviso applies to the assistance of other stakeholders involved in earlier initiatives announced in March (see March 7, 2012 Notice). Ultimately the state of the market report is the responsibility of the MSA but we believe it is important to be open to advice from stakeholders throughout the process.

What is contained in this document

Section 1 introduces the focus of the report, what products or markets are within scope or given less emphasis and the proposed framework to organize the information to be assembled. Section 2 then lays out the key indicators and metrics. Finally, section 3 communicates the schedule of releases of the separate modules and the eventual state of the market report.

1 Framework for Analysis

The MSA's state of the market report will be an assessment of the state of competition within, and the efficiency of, the Alberta wholesale electricity markets. The report is not intended to be a policy document because that is not within the MSA's mandate; however it will expose facts and analysis that will be helpful in understanding market dynamics. The standard of review is the test set out in the *Electric Utilities Act* and the *Fair, Efficient and Open Competition Regulation* that the Alberta market operates in a way that is fair, efficient and openly competitive.

The report will not be a compendium of market information or market developments over the period under review; rather it will focus on the key indicators of competition and efficiency. The evaluation will be based on multi-year data where the data is reliable. For some aspects year over year comparisons will be helpful, but a proper competition assessment, particularly of an energy only market, requires a relatively long frame of analysis.

The focus of the report will be on the Alberta power pool and the forward financial market. Ancillary services and retail issues will receive less attention given that an assessment of the pool and forward markets is already a large undertaking. The report will also avoid any potential overlap with the work of the Retail Market Review Committee established under Ministerial Order 32/2012.

The MSA intends to employ the standard industrial organization paradigm, describing the market in terms of Structure, Conduct and Performance. This framework is explained in the next section.

1.1 Structure-Conduct-Performance Paradigm

1.1.1 Background

The Structure-Conduct-Performance (SCP) paradigm has its roots economic theory developed in the 1930's along with subsequent empirical studies in the 1950's. It is closely associated with competition law and economics that underpins the MSA's approach to applying the FEOC test described in our *Offer Behaviour Enforcement Guidelines.* The three elements are usually described as:

- Structure – meaning market structure, usually described in terms of buyer and seller concentration, barriers to entry, product differentiation. Descriptions of structure sometimes distinguish between derived characteristics like concentration and intrinsic (or basic) demand and supply conditions like available technologies.
- Conduct – refers to firm's behavior including pricing strategies and investment decisions of both incumbents and potential entrants.
- Performance – describes the market outcomes in comparison to benchmarks, usually in relation to concepts of efficiency.

The theory behind the S-C-P paradigm posited a links such that industry structure, led to conduct which led to performance. In particular, concentrated market structures were seen to lead to undesirable performance. A variety of empirical studies subsequently provided support. The combination proved influential in the development of antitrust thinking – a simple prescription to get the structure right and the rest will follow.

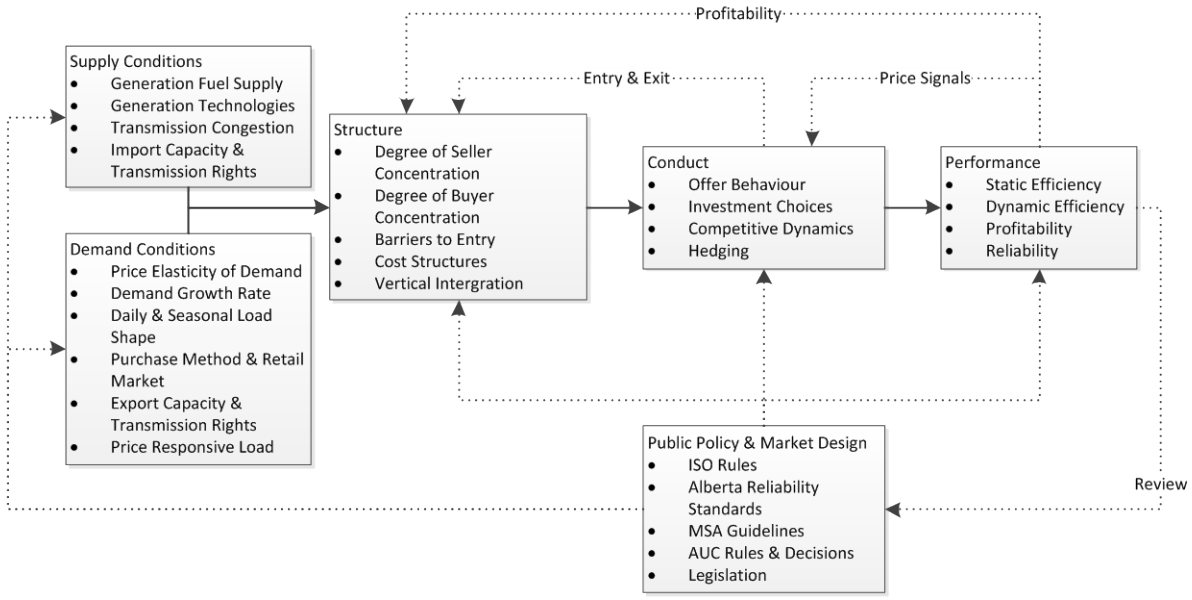
The simple prescription of S-C-P was increasingly challenged in the 1970's both through theoretical and empirical work suggesting causality was not one way. For example, structure may not be independent of conduct - firms can attempt to raise others costs, deter entry, or embark on other strategies designed to create barriers. Similarly, the existence of large firms need not signal a lack of competition, it may indicate they were more adept than their rivals and grew as a result. The consequence of this work was the establishment of a more nuanced view taking into account the interdependencies of structure, conduct, and outcomes rather than purely structural prescriptions. Structure still remains important but with more limited application. For instance, market concentration continues to be used as a screening metric in merger review for relatively homogenous products. Small firms merging in a diffuse industry will, in general, do no harm to competition. Big firms merging in a highly concentrated market have the potential to significantly reduce competition, but the S-C-P framework does not tell us if they will. Since the 1980's game theory has established itself as a method of understanding strategic behaviour and brought insights into dynamic interactions and the importance of information. This in turn has influenced more recent thinking on antitrust.

1.1.2 S-C-P and State of the Market Report

In terms of the state of the market report, an expanded S-C-P relationship describing the inter-linkages between each provides an effective way of organizing report. In Figure 1.1 below we have presented a description of the wholesale Alberta market broken into Structure, Conduct and Performance. Structure is further sub-divided showing those basic or intrinsic supply and demand conditions separately from derived structure (e.g. degree of concentration). The main inter-linkages are shown and the influence that public policy and market design have on all three is recognized.

The MSA intends to examine each of the elements in the figure below in the course of the state of the market report. The next section provides further detail and discussion on the key indicators and metrics that the MSA intends to employ in each part of the analysis.

Figure 1.1: Alberta Wholesale Market (NEED TO ADAPT PICTURE ONCE TEXT IS FINISHED)



2 Key Indicators and Metrics

2.1 Basic Structural Features

As noted above, there are certain basic or intrinsic structural features that describe the Alberta electricity market. Some may result directly or indirectly from legislation or the market design. They are important in understanding interactions in the market but are not in and of themselves at an individual participant's control. For this reason, the supply and demand conditions section of the state of the market report is intended to be largely descriptive.

The contribution we expect to make in this section is examining longer terms trends and whether previously reported measures capture elements of structure relevant to an analysis of the state of competition. Certain structural features of the Alberta market are also notable by their absence, for example there is no legislated reserve margin or capacity, while the MSA expects to comment on such features there will be analysis of alternatives.

2.1.1 Supply

2.1.1.1 Generation Technologies

Appendix E: Generation Outlook 2009 - 2029 of the AESO Draft Long Term Transmission Plan provides a comprehensive description of generation technologies applicable to Alberta and includes estimates of levelised unit costs. The MSA does not intend to repeat this work for the purposes of the state of the market report. Instead, the MSA will prepare a short summary of what it believes are the salient features and supplement this with additional material if necessary.

2.1.1.2 Power Purchase Arrangements

The Power Purchase Arrangements (PPAs) still remain an important feature of the Alberta market, both as a constraint on asset control and in the impact that they have upon conduct. A short section will be included in the state of the market report describing the control over PPA capacity, excess energy and the main features of the PPAs that impact market participant conduct.

2.1.1.3 Other Supply Constraints

In this section the MSA will review other constraints on supply, including Transmission Must Run (TMR), Transmission Congestion Management (TCM), Constrained Down Generation (CDG), and overall system losses. .

2.1.2 Demand

2.1.2.1 Measures of Demand

Alberta Internal Load (AIL) is the most commonly used measure to gauge the demand of the province. AIL is defined as:

> a number in MW: (i) that represents, in an hour, system load plus load served by on-site generating units, including those within an industrial system and the City of Medicine Hat; and (ii) which the ISO, using SCADA data, calculates as the sum of the output of each generating unit in Alberta and the Fort Nelson area in British Columbia, plus import volumes and minus export volumes.

Since this measure includes 'behind the fence' load or generation it is less useful when considering the state of competition or the opportunities for generation investment to serve other than on-site load. Consequently the MSA will consider other measures, such as the load on the Alberta Interconnected Electric System (AIES).

2.1.2.2 Breakdown of Demand by Customer Type

Relatively little information is available on the breakdown of demand into customer classes, while more is available for a few groups (like residential). The MSA will examine whether additional data sources, for example records obtained by the MSA for monitoring the retail market, can shed additional light on demand by customer group.

2.1.2.3 RRO Regulation

A short section will describe the importance of the Regulated Rate Option (RRO) as a component of demand. The combination of legislation and energy price setting plans result in RRO load participating in the market in a particular and restricted manner.

2.1.3 Interties

A short section will be included detailing the trend in Available Transfer Capability since market opening and a description of the seams issues that exist between Alberta and interconnected markets.

2.1.4 Data Transparency

Market data transparency has been the focus of some recent work by the MSA and features in a number of parts of the *Fair, Efficient and Open Competition Regulation*. A description of information set available to

market participants and the restrictions placed on information sharing included in legislation will complete the MSA's section describing basic structural features.

2.2 Market Structure

In this section we will consider derived structural features that result from market participant choices or as a result of the intrinsic structure of the market.

2.2.1 Vertical Integration

Vertical integration describes those instances where a company expands operations by moving to other parts of the supply chain. A trend towards vertical integration has been observed in other electricity markets (e.g. Australia, New Zealand, and U.K.) and the degree of vertical integration is important for understanding participation in the forward market; essentially, vertically integrated entities may be less likely to transact in the forward market. The MSA notes there is no clear causality from vertical integration to lower forward market liquidity. In fact vertical integration can itself be a response to insufficient liquidity.

Two types of vertical integration can be distinguished in the Alberta electricity market: firstly, where a major retailer has acquired significant generation assets. This type of vertical integration is common in other markets, leading to so-called 'gentailers'). Secondly, a significant number of industrial loads have elected to build generation rather than purchase electricity from others. The MSA intends to examine the apparent historic trend towards vertical integration, possible causes and consequences thereof.

2.2.2 Market Concentration and Market Power

Market concentration metrics will not be limited to considering sellers in the energy market and will also include an examination of the forward market and transmission holdings on the intertie. The MSA may also consider regional concentration metrics that may become an important driver of market outcomes in the event of congestion. There is little data collected on the market concentration of load customers, in this area the MSA expects to focus on the role of the major RRO providers in the forward market.

The MSA will consider the application of a number of methods ranging from simple concentration measures like market shares and concentration ratios to more sophisticated measures of market power like pivotal supplier analysis and residual demand analysis.

2.2.3 Barriers to Entry

As part of the MSA's state of the market we have commissioned a piece of work entitled *Generation Investment in the Alberta Electricity Market*. This is expected to be completed by late July 2012 and the MSA expects this work to provide some understanding as to the extent to which there are perceived barriers to entry for new generation investment.

The MSA has also undertaken a load survey that sheds some light on whether industrial loads believe there are barriers to participating in forward transactions.

Once both these pieces of work are complete the MSA will assess whether additional analysis is required or whether empirics are available that would support or refute the survey results.

2.3 Market Conduct

2.3.1 Active Market Participants

Since late 2007 market participants have been able to change prices associated with offers up to two hours prior to the start of a settlement interval. It appears a number of market participants only infrequently make use of this opportunity preferring to remain with offers declared day-ahead. The MSA will measure 'active market participants' as those changing prices associated with offers during a particular trading day and examine what appears to drive this conduct (for example, are participants more active on days with more volatile pool price). Included in this assessment will be the number of loads also choosing to respond ('price responsive load'). The intent is to provide a description of the competitive dynamics that emerge from the Alberta market.

2.3.2 Forward Market Participation

The load survey is expected to provide information about the participation of industrial loads in forward markets. In addition the MSA will examine the role financial market participants play in forward transactions and whether their participation is increasing or diminishing as the Alberta market evolves. Participation by generators also varies considerably both between firms and over time.

2.3.3 Exercise of Market Power

Under the analysis of structure the MSA will have presented evidence as to whether market participants have market power. In this section we will consider whether that power is exercised in forward markets or the power pool. For example, a large market participant that is vertically integrated or chooses to sell forward may have limited incentive to exercise market power. Consequently the MSA will augment market power metrics with information on financial positions. The MSA will also examine whether market power is only exercised at particular thresholds and whether market power is only when multiple participants are incented to economically withhold.

2.3.4 Outage Scheduling Practices

How do we tell these got more efficient?

If unit availability is higher in Alberta v. elsewhere does that indicate we are doing well?

2.3.5 Investment Choices

In this section the MSA will consider whether any barriers to entry identified through survey work are supported or refuted by actual investment / exit choices made by market participants. The MSA will examine investment trends (incumbents vs. entrants), recent merger and acquisition behaviour, asset retirements

2.4 Market Performance

In the view of the MSA, competition is a means to an end. The end is economic efficiency; that is maximizing static total welfare (i.e., both consumer and producer surplus) and spawning new investment and new products (dynamic efficiency). Competition meets the FEOC standard when it demonstrably

produces economic efficiency. For dynamic efficiency that means the pool price is high enough on average to induce efficient investment and reinvestment but no higher.

Market performance measures thus focus on efficiency, whether prices are sufficient to induce more investment and how the signals conveyed by prices can themselves been seen as a driver of participant conduct.

2.4.1 Static Efficiency

Static efficiency is relatively easy to measure. There is production inefficiency (the lowest cost units are not all running, units are dispatched out of merit) and allocative inefficiency (loads cut back in response to a pool price exceeding marginal cost or over-consumption if the pool price is below marginal cost).

We can infer something about static inefficiency from the excess of the pool price over the cost of the MW that ought to have been marginal at the each hour. We can do this by creating a marginal cost-based offer stack (merit order). So if load is 10,000 MW, you can compare the actual cost of supply with the lowest attainable cost of supply (given the existing mix of generation). The difference is production inefficiency. We can also ask what load would have been if the pool price had been equal to the cost of the marginal supplier in the cost-based merit order. That gives allocative inefficiency. Given that relatively few loads vary consumption with price, allocative efficiency losses are expected to be relatively small in electricity markets.

The MSA will consider the appropriate methodology for assessing static efficiency loss and the performance of simple measures (such as the incidence of out of merit offers) in comparison to those relying on a reconstruction of the merit order. Where possible the MSA will try to disaggregate the cause of the efficiency loss. For example, is the productive efficiency loss associated with dispatch of Transmission Must Run. In some instances we may supplement the analysis with additional metrics, for example examining the economics of net intertie flow. The MSA will also try to examine the trend with respect to efficiency losses.

2.4.2 Dynamic Efficiency

Allocative and productive efficiency are static concepts – they are tests conducted at a given point in time. Dynamic efficiency recognizes that over time there is the ability to innovate and invest leading to superior allocative and productive outcomes. In a market economy the forces of competition are seen as key in providing the correct incentives to innovate and adapt. In practical terms this means dynamic efficiency is more difficult than static efficiency to measure. Some structural measures may shed light on whether price signals have resulted in an efficient response from market participants, for example:

- Is the mix of generation technologies (and import capability) efficient given the constraints?
- Are reinvestment decisions efficient (value of power lost due to outages, repair costs)?
- Is capacity expansion efficient both in terms of timing and scale of additions (chronic excess or deficient capacity, rates of capacity utilization, and incidents of forced reductions in load)?

2.4.3 Long Run Marginal Cost / Net Revenue Analysis

For several years, the MSA has undertaken simple net revenue calculations as a means to check the health of the market. The analysis looks at the potential profitability of different types of new generating assets.

The analysis requires a number of assumptions but is generally indicative of whether the market in a given period generated sufficient returns to incent new investment. The MSA intends to include the analysis in the state of the market report.

In some other markets the analysis is refined to use actual rather than hypothetical revenues received by a given technology. This has the advantage of being able to include revenue from non-energy sales (typically operating reserves). The MSA doesn't believe that this technique will be useful in Alberta. Firstly, the prevalence of portfolio bidding means that revenues assigned to individual units might be misleading in terms of the opportunities available. Secondly, given the size of the Alberta market the number of units of a given technology is relatively small and as such calculations based on actual revenues may reveal commercially sensitive information.

ADD DISCUSSION ON LRMC

2.4.4 Price Signal

In a competitive market both the level and distribution of prices send important signals that determine the profitability of market participant conduct. The MSA will examine a number of metrics related to the price signal, some of which are set out below. In each case the MSA will examine the implications for market participant conduct and the expected reaction in a competitive market to price signals over the short and medium term. To the extent these reactions are observable the MSA would conclude that the price signal is functioning (i.e. there are no barriers). To the extent that expected reactions have not been observed the MSA would consider whether it would warrant ongoing monitoring.

2.4.4.1 Price Volatility

In this section the MSA will consider volatility of both forward market and pool price. The MSA will quantify the extent to which volatility is increasing along with any evidence that this is a driver of market participant conduct.

2.4.4.2 Price Received by Different Generating Technologies

The MSA observed in its *Annual Report 2008* that the high correlation of output between different wind generators had resulted in a strong negative correlation between wind generation and pool price. This trend appears to have continued. In this section of the report the MSA will examine the price typically received by different generation technologies, including wind.

2.4.4.3 Forward Market Convergence

In this section the MSA will examine the extent to which forward market prices converge with spot prices generated in the power pool. We will try to assess the risk premium associated with forward purchases / sales and whether there appears to be an observable trend.

2.4.4.4 Relationship between Scarcity and Price

Since 2010 the MSA has been reporting on the relationship between 'supply cushion' (the number of available but undispatched MW in the merit order) and pool price. In 2011 the MSA observed the relationship between supply cushion and pool price had changed, perhaps in part because of the MSA's *Offer Behaviour Enforcement Guidelines*. Evidence suggests that high pool prices now occur more frequently outside conditions of scarcity (very low levels of supply cushion). In this section of the report the MSA intends to re-examine the evidence it has collected and consider the implications for competition.

3 Report Timing and Conclusions

In the March 7 Notice announcing the MSA's state of the market initiative the MSA indicated it intended to release a number of preliminary reports as they become available. These will serve as 'building blocks' for the state of the market report, hopefully avoiding an extremely lengthy final report and allowing each piece to be released as it is finished and involve and inform stakeholders as the work progresses. The MSA expects to release the following reports with the timetable shown in Table 3.1. The timeline and scope of the building block reports may change depending on progress in different areas.

Table 3.1: State of the Market Report – Expected Timeline

Report	Expected timeline
Supply Cushion Methodology	May
Survey of Industrial Loads	July
Basic Structural Features	Late July Is it even worth sharing this?
Generation Investment Survey	Late July / Early August
Market Concentration and Market Power Metrics	August
Static Efficiency Assessment	August
State of the Market Report	Q4 2012

It is anticipated that the state of the market report will include a tabular summary of conclusions. The table would be broken down into the three main areas of structure, conduct and performance and then each metric or area identified would be considered in turn. Based on the evidence collected the MSA would conclude whether it suggested an outcome consistent with competition or not.

References

Alberta Department of Energy

Ministerial Order 32/ 2012

http://www.rmrc.ca/MO_32-2012_Retail_Market_Review_Committee_-_Including_Terms_of_Reference_(March_18_2012).pdf

Market Surveillance Administrator

Notice RE: MSA State of the Market Report – Advisory Group, March 7 2012

http://albertamsa.ca/uploads/pdf/Archive/2012/Notice%20re%20SOTM%20Advisory%20Group%20030712.pdf

Notice RE: MSA State of the Market Report – Advisory Group, April 5, 2012

http://albertamsa.ca/uploads/pdf/Archive/2012/Notice%20re%20%20Advisory%20Group%20Members%20040512.pdf

Annual Report 2008

http://www.albertamsa.ca/files/2008_Annual_Report.p

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