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MSA Report

A Review of Imports, Exports, and Economic Use of the BC Interconnection

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Market Surveillance Administrator

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EXECUTIVE SUMMARY

The role and influence of imports and exports into/out of Alberta via the BC interconnection has long been a contentious issue amongst industry stakeholders. A recent issue that has been expressed by some participants concerns the occurrence of imports that appeared to be unprofitable based on economics using the appropriate market index prices. The concern was not so much that the observed imports were unprofitable, but rather that the motivation behind the import behaviour was a desire to influence Pool prices – in this case, to push Pool prices down. If a participant is acting in an opportunistic way with respect to imports and exports, uneconomic behaviour - particularly sustained uneconomic activity - is clearly counter-intuitive. A participant would have no incentive to import or export uneconomically unless the net effect of this activity is beneficial from the perspective of the participant's overall portfolio.

An important focus of the MSA is Pool price fidelity which we define as the ability to reconcile market prices with the basic market fundamentals that are expected to drive them (or more basically the signal to noise ratio). Price fidelity has become a priority of the MSA as we believe a robust price signal in the marketplace is key to building confidence in the market mechanism. Activities such as uneconomic imports into a relatively small market such as Alberta can have a significant dampening effect on Pool prices and, hence on Pool price fidelity. An undue level of uneconomic activity on the tie line that market forces are unable to counteract is viewed by the MSA as detrimental to Pool price fidelity and therefore market efficiency.

In setting out to undertake this review, the MSA elected to broaden the scope beyond the concern which was originally brought to our attention. We included imports and exports for those firms bringing energy in and out of Alberta from the Mid C area on a regular basis. The objective of the paper is to try to assess the economic performance of key participants. The paper then considers what factors may exist that inhibit the market from being able to discipline itself. To the extent that it is unable to do so, the MSA needs to provide that function. The paper sets out the MSA position on uneconomic transactions on the tie line as guidance to participants on their future conduct in the market.

Also considered separately is the activity of the major player on the line – Powerex (deemed for the study to be BC Hydro and Powerex in total). The economics of transactions on the tie line are more complicated for Powerex due to their reservoir storage. They are rarely simply shipping power directly from Alberta to Mid C, or vice versa. We demonstrate a slightly different way of looking at their trades with Alberta.

Profitability of Imports and Exports (Excluding Powerex)

In estimating the profitability of the trades, it was assumed that energy was bought and sold at Pool price in Alberta and Dow Jones hourly Index in Mid C. Transmission costs were used per the respective tariffs. This type of analysis should be considered directional in nature.

For the five firms considered, it was found overall that imports are more profitable than exports on an index-to-index basis. The overall statistics mask the effect of spikes in Alberta Pool prices that do not occur in the much larger Mid C market. These infrequent

spikes mean that imports in those hours can be hugely profitable on an index-to-index basis and skew the results. When the few highly profitable hours of imports are excluded from the analysis, it appears that the economics of imports and exports are roughly comparable among the competing firms.

On an overall basis, the data indicates relatively modest profitability from trading on the BC tie line. The analysis assumes that importers and exporters are opportunistic and attempting to arbitrage the Alberta and Mid C markets. A number of features of the market structure provide challenges to traders attempting to make profitable transactions, including the after-the-fact nature of Pool price coupled with Alberta's steep supply curve. Also, the collective independent actions of several tie line users can have the effect of rendering all their trades unprofitable even though each stand alone import could have been profitable. Several of the most significant users of the tie line are managing portfolios and, as such, imports and exports that look unprofitable on the basis of index-to-index considered herein, are in fact rational and profitable on a portfolio basis.

When we drill down into individual firms' scorecards, however, the wins and losses are not randomly distributed. Rather, in many cases they are grouped and the longer strings of unprofitable trades on the tie are of concern. They seem to correspond with known generator outages and thus suggest covering of a short position. The data indicates that traders are prepared to tolerate significant losses per MWh on an average basis when mitigating (deduced) short positions. If traders find that they are in a short position, the MSA would expect them to consider all sources of energy – including financial trades with Alberta participants either on the electronic exchanges or through the OTC brokers. To the extent that these sources are not considered or deliberately by-passed, it then would start to appear to the MSA that the trader's motivation is more geared towards Pool price manipulation than portfolio management.

The MSA is not concerned with participant profitability per se, except to the extent that predictable, repeated losing trades on the tie indicate a motivation to drive Pool price rather than simply closing an open position, or engaging in normal speculative trades.

The analysis does not support the view that the manipulation of Pool prices is as widespread and systematic as alleged by some participants.

Imports and Exports by Powerex

British Columbia is blessed with an abundance of excellent hydro sites with storage far in excess of what we enjoy here in Alberta. Accordingly, the BC Hydro system is dominated by hydro resources. With Alberta's thermally dominated system, it is natural then that we might expect Powerex/BC Hydro to make use of that storage to trade in the Alberta market. In particular, Powerex buys large volumes of Alberta energy in the off-peak period and sells into Alberta in the on-peak period. Powerex is also a very active trader in the Mid C market.

The analysis for Powerex is complicated by the ability to store energy in BC for a period of time. The analysis herein estimated the returns for Powerex assuming they bought and sold from Alberta at pool price. Mismatch in total volume over the period was assumed to be sold into Mid C at higher than average prices (90-percentile prices). As for the other analyses, the one used here for Powerex must be considered directional in nature.

Overall, the results indicate that Powerex makes money from its trades with Alberta on the BC Tie line. In the 7-month review period, total trade volume was about 830,000 MWh and Powerex netted about $13/MWh profit – a significant amount. However, these profits are modest compared with the perception of some Alberta market participants who contemplate all Powerex's purchases to be at $10/MWh, its re-sales at $100/MWh and a resulting profit closer to $45/MWh for the use of 12 hours of storage in BC.

Recommendations

1) The tie line should be permitted to set price. The MSA strongly recommends that the ongoing wholesale market design effort needs to consider a mechanism of allowing imports and exports to be priced into the Alberta market.

2) Reliable and timely information on ATC needs to be available. The efficient use of the BC tie is a crucial component of the Alberta market. Some of the inefficiency in its use stems from access issues.

3) Some of the business practices for the use of the tie do not lend themselves to the line being used with the highest efficiency and the AESO should seek to find ways to mitigate those sourced in BC as well as any that may be under their own direct control.

4) Restoration of full tie line capability, as required in the new transmission regulation, would remove one of the barriers to the market being able to self-regulate.

MSA Position

An imputed $3.7 million has been spent in the first seven months of 2004 on uneconomic flows which have created an unquantifiable, but obviously greater distortion of Alberta Pool prices. The practice erodes market confidence and the integrity of the price signal upon which our market is based. Until such time as the market is able to self discipline this behaviour, the MSA will pay very close attention to activity on the tie lines. Participants should be cognizant of the line between managing their portfolio and managing the market (manipulating Pool price). Both the MSA and the market expect reasonable efforts by participants to use the tie line in a profitable (or least cost) way that demonstrates an effort to avoid manipulating Pool price. This means adjusting import/export volumes in response to market outcomes and/or transacting in the OTC market when volumes are available and prices make sense.

The type of behaviour that the MSA is attempting to eliminate is both sustainable and repeatable – and for now is not easily disciplined by the market itself. Participants who attempt to manipulate Pool price in an environment where the normal forces of the market are unable to apply the appropriate disciplinary measures, should expect to be investigated and if warranted prosecuted by the MSA.

1 INTRODUCTION

The Alberta electric grid system is linked synchronously to BC and, ultimately, the Western Electric Coordinating Council (WECC) via the Alberta-BC interconnection[1] or tie line. The Alberta-BC tie line plays a key role in managing system security and reliability in Alberta as was its original purpose. The interconnection now also supports commercial import and export activity between Alberta and BC and also the Pacific Northwest (PNW) via BC. The market hub most commonly referenced in the PNW is Mid Columbia[2] (Mid C).

The interconnection or tie line, however, has served as a source of concern on occasion as there have been issues around access to the line and use of the line by those with access. Given that imports and exports are required to be price takers in the Alberta market[3], the tie line behaves like a very large generating unit with uncertain/unknown economics and a zero offer strategy. In fact, once the spread between import and export capacity is considered, the tie is usually much larger than any single generating unit in the Alberta system and its energy flows can, and do, have a substantial bearing on Pool price.

The MSA's interest in the BC tie line stems primarily from our concern over the integrity of Pool prices, or 'Pool price fidelity' as we often term it. Pool price fidelity is simply the degree of correspondence between Pool price and the fundamentals that are expected to be its primary drivers. High Pool price fidelity leads to greater market confidence and willing participation by supply, load and speculators alike. Given the current rule environment, certain inappropriate behaviour on the tie line can have the effect of severely distorting Pool price and eroding both Pool price fidelity and consequently, market confidence.

The most recent concern over the use of the BC tie line focused on imports by two firms alleged by a third to be motivated by a desire to depress Pool price. The principle evidence of the motivation was demonstrated by the poor profitability of these imports, assuming that energy was bought in Mid C at the day-ahead strip price and sold into Alberta at Pool price and accounting for transmission costs. The expressed concern was that this behaviour was widespread by some firms and the cited examples occurring over two days were not just isolated cases. While the MSA normally allows the discipline of the market to address such problems, it is not clear that this is possible in this set of circumstances. In principle, an uneconomic import can be counteracted by an export. However, the need to find a trading counter party and the scheduling procedures on the tie line can make this extremely difficult to do in practice.

[1] The AB-BC interconnection is comprised of one 500 kV transmission line between Langdon and Cranbrook B.C. and two 138 kV lines linking the Coleman and Pocaterra substations in Alberta to the Natal substation in BC

[2] Mid Columbia is an electricity market hub referring to an area containing five significant public hydro projects along the Columbia River, overlapping Chelan, Douglas, and Grant Counties in central Washington State.

[3] AESO Rule 6.3.3

The MSA elected to undertake a broad review of the economics of both imports and exports. The time period of analysis spanned 19 months and includes the events brought to the MSA's attention by industry. The results herein focus on the January through July, 2004 period - the results for 2003 were found to be not significantly different. The analysis focused on an estimated profit and loss analysis for those participants most frequently moving energy between Alberta and Mid C. The detailed results of that work are described in Section 2.

Powerex[4] and BC Hydro (simply referred to as Powerex herein) are the dominant users of the BC tie line. However the economic analysis is more complex than for the Alberta firms owing to the opportunity for Powerex to store energy in BC Hydro's reservoirs. Section 3 analyzes the performance of Powerex on the BC tie line over the 7 months January to July 2004. Some useful insights are gleaned from the analysis.

The final section summarizes the work done and some next steps. The MSA encourages feedback on the work presented herein and, more importantly, on the most useful next steps that should be considered.

[4] Powerex is the wholly-owned power marketing subsidiary of BC Hydro

2 IMPORTS AND EXPORTS

2.1 Analysis

The data used in the analysis was the following:

- Imports and exports by firm by hour on the BC tie line
- Hourly prices in Mid C represented by the Dow Jones hourly Mid C index price
- Hourly Pool prices in Alberta
- Transmission costs in BPA, BC and Alberta per the posted tariffs. (The analysis assumed $1/MWh tariff through BC which is the lowest price that can be paid and puts all the transactions in the most favorable light in terms of profitability)

While the data used to construct the analysis is essentially all available from public sources, we have chosen not to identify specific participants herein.

The analysis assumed that tie line users are motivated to export or import in order to arbitrage the two markets. Accordingly, an importer would be looking for those occasions when energy can be bought in Mid C's bilateral market, moved through the transmission systems and then sold into the Alberta spot market for a profit. The exporter would be looking for a similar opportunity in the opposite direction.

Note that the actual transaction arrangements or motivations of the tie line users are not known to the MSA but must be inferred from the data. We do not know the actual price paid or received in either market. Over a period of time, the use of market indices is appropriate as they represent the opportunity cost of the transactions. This type of analysis should be considered directional in nature rather than specific to each transaction.

Neither imports nor exports are regularly scheduled over many hours at a stretch. The decision seems to be made closer to real time and adjusted to suit conditions. We believe that the Dow Jones hourly index for Mid C, rather than the day-ahead on and off-peak strip prices, represents the price of energy consistent with the hourly decision making that seems to be applicable for importers and exporters. Hourly Pool prices are the obvious index for Alberta.

The Mid C market is much larger than Alberta and has a completely different market structure. Mid C is a bilateral market and requires buyers and sellers to seek each other out in order to complete a transaction. Prices are known prior to delivery of the energy and most trades are transacted day ahead over on- and off-peak strips. However, there is a liquid hourly market required by participants to make adjustments to circumstances occurring in real time. The Mid C market is on an hourly schedule that matches the hourly schedules of the BC tie line.

Alberta has a Pool market that is dispatched on a minute-by-minute basis. Pool price for buyers and sellers alike is not known until after the fact. Finally, while the Mid C market is large enough that market prices are not likely responsive to trade volumes with Alberta, the same is not true for Alberta. The steep supply curve that currently exists in Alberta means that the hourly energy on the BC tie line can be a significant swing factor with respect to Pool price. Traders are faced with an after-the-fact Pool price in an environment where it is known the energy flow on the tie line will in fact influence Pool price.

The analysis herein tracked the economics of the five most common users of the BC tie line except for Powerex. Using the methodology outlined above, an estimate of import and export profitability was made for each of the firms based on each hour they were active on the BC interconnection. Not all the transactions by these 5 firms were from Alberta to or from Mid C. Some imports originated in BC from companies such as West Kootenay Power. However the vast majority of the trades were through BC unless they were by Powerex which are excluded here.

2.2 Imports & Exports in Aggregate

The analysis looked at aggregate imports and exports together with the imputed profitability.

Figure 1 shows the data for all hours with imports on the BC tie line over the study period. **Figure 1** indicates that there were more unprofitable than profitable hours. However, importers were able to overcome this somewhat by loading more volume into the higher profit hours. As well, due to relative volatility of Pool price as compared to the Mid-C price (**Figure 3**), imports exhibited a long tail on the profitable side of the frequency distribution which we termed 'home runs'. Looked at slightly differently, the Alberta participant who is short faces the frequency distribution with the long tail on the unprofitable side – the 'ship sinkers'.

Figure 2 shows a similar distribution for exports. It can be seen that in this distribution profits are limited by the lack of high prices in Mid C. The long tail on the unprofitable side of the scale indicates how the imputed profit can appear to be financially on the wrong end of a trade where Pool price has spiked. The frequency of profitable trades is higher than for imports.

Figure 1 - Import Profitability - Jan 1 - July 31/ 04

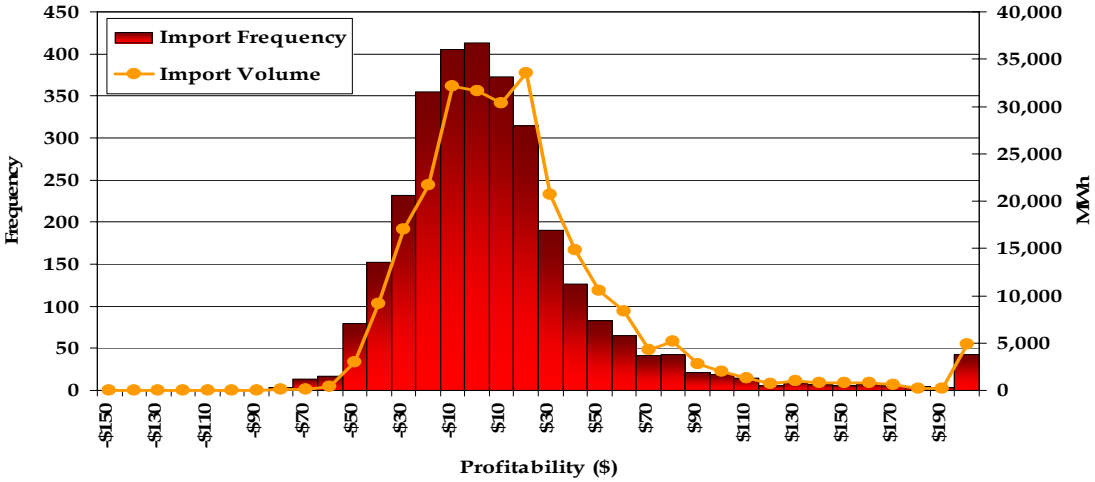


Figure 2 – Export Profitability – Jan 1 – Jul 31 / 04

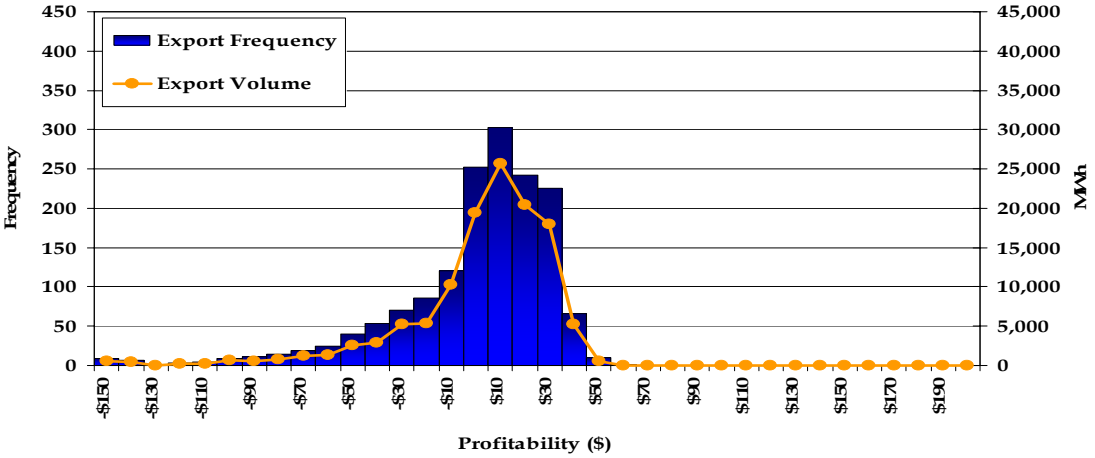


Figure 3 - Price Spread Duration Curves - Jan 1 - Jul 31 / 04

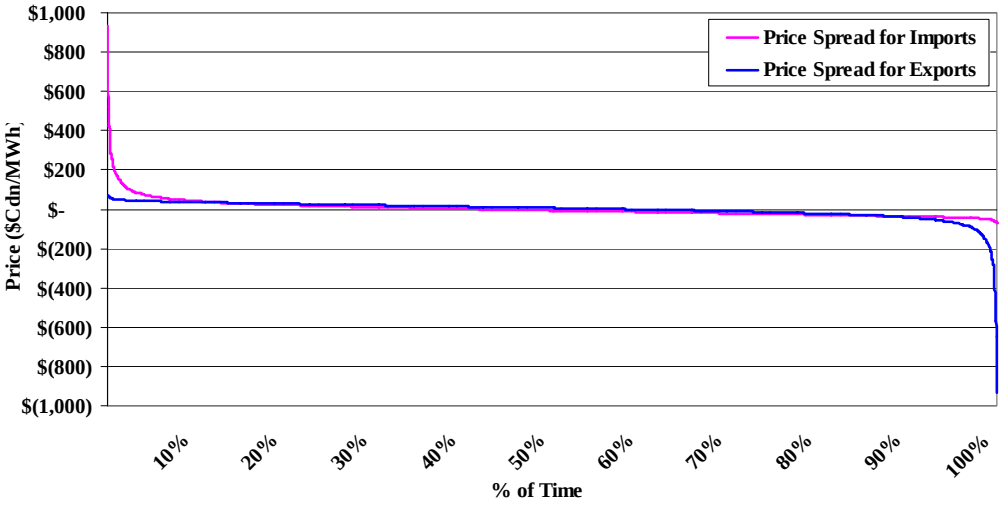
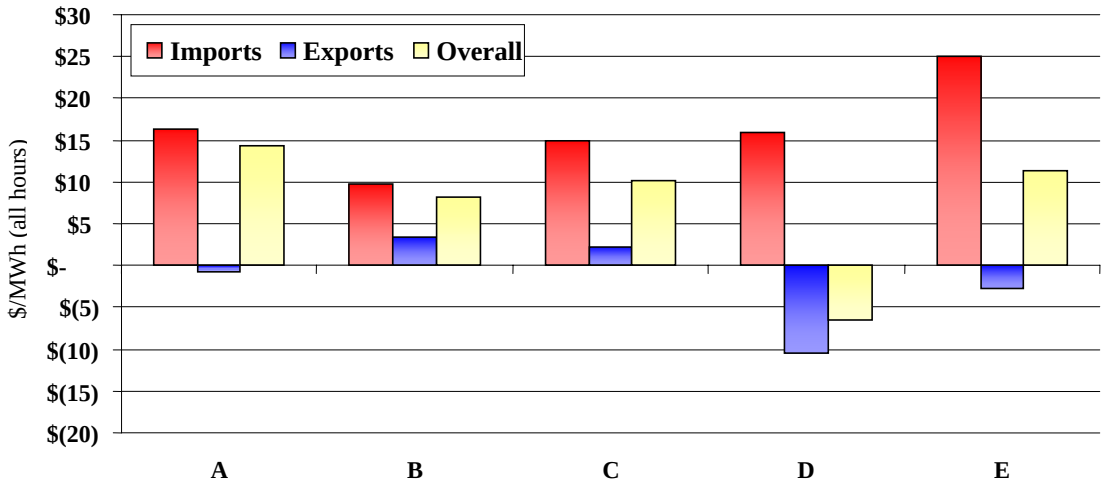


Figure 3 shows price spread duration curves for importers and exporters for the January – July 2004 study period. Importers are faced with the (AB – Mid C) spread, while exporters are faced with the opposite. It can readily be seen that Alberta prices have a much greater range relative to Mid C prices. The skewed distributions evident in **Figures 1 and 2** result from the characteristics of the Mid C and Alberta market prices. Importers are long with respect to Pool price volatility (buy Mid-C, sell Alberta Pool) while exporters are short Pool price volatility (buy Alberta Pool, sell Mid-C). A useful analogy might be the stock of XYZ Company – if you hold the stock (long), your potential loss is limited by what you paid (the stock can at worst, go to zero) while if you are short (you have sold the stock & need to buy to cover your position), your potential loss is limited only to how high the stock price may go.

2.3 Imports & Exports – Participant Level

Figure 4 shows estimated average import and export profitability per MWh at the participant level. Imports were, on average, reasonably profitable for each participant. Exports were unprofitable for three of five participants, and only marginally profitable for the other two.

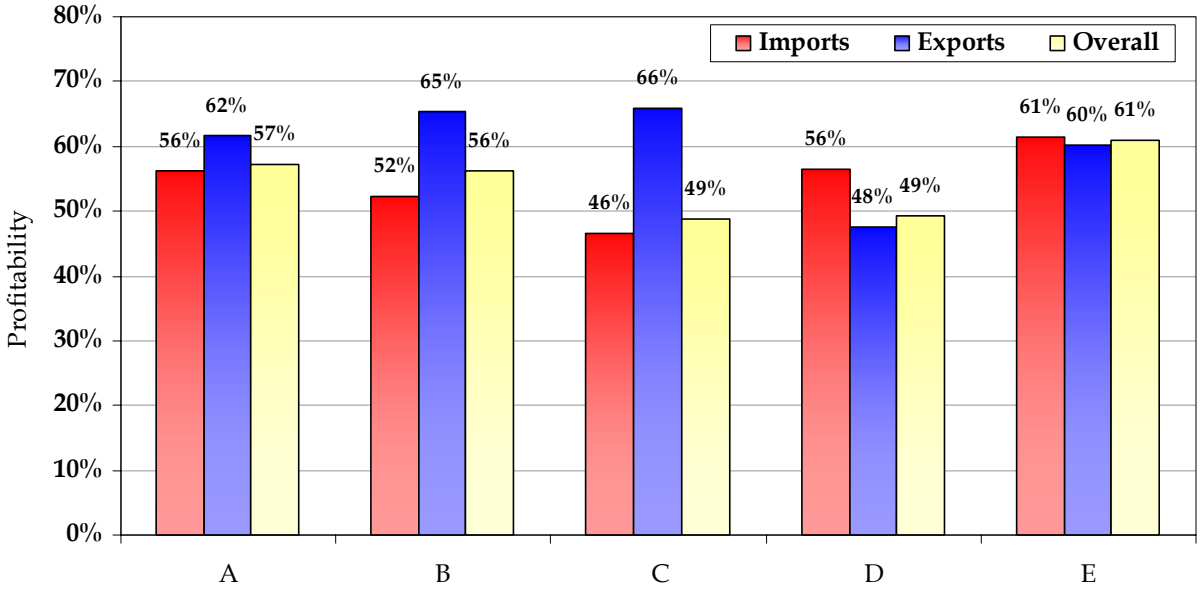
Figure 4 - Estimated Tie Line Profitability by Participant



In reviewing the conduct of participants on the interconnection, in addition to dollar profitability, it is interesting to note the success rate or "batting average" of participants (defined as any hour with an imputed profit). One might expect that over an extended period, this "batting average" should be somewhat greater than 50%. **Figure 5** indicates the batting averages on an import, export, and overall basis for the study period. Import averages ranged from 46% to 61% while export averages ranged from 48% to 66%. The asymmetry in the profit margins between imports and exports may well explain the difference in these averages. A speculative trader may well be prepared to tolerate more (modestly) unprofitable hours in return for the occasional home run. Similarly, a participant covering a short

position in Alberta will absorb similar modest losses to avoid the occasional ship sinker.

Figure 5 - 'Batting Average' - Jan 1 - Jul 31 / 04

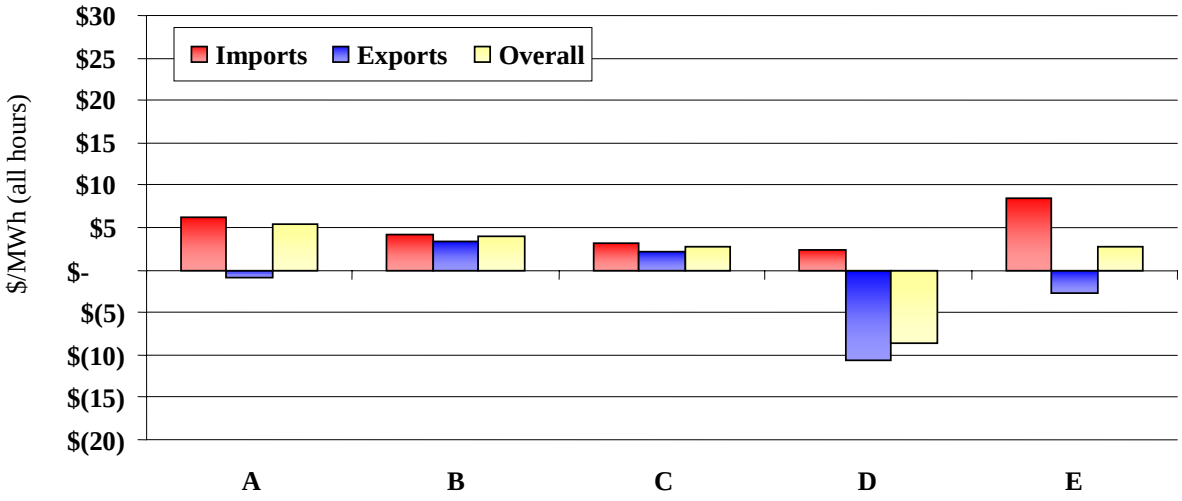


If we exclude the import hours that had 'home runs', defined here as profitability greater than $100/MWh, **Figure 6** shows that importing and exporting are much closer in terms of risk and profitability for the traders.

However, these results do not support the concern that any firm is consistently and systematically importing or exporting at a loss in a concerted attempt to drive Pool prices. Overall, the firms seem to perform roughly comparable

The overall picture can mask important behaviour and accordingly we looked in more detail at the hourly economics of the firms' transactions. One might expect that when a participant has a profitable import or export, the participant will try to repeat (or even enhance) the profit in the subsequent hours. Following a loss, one might expect a trader to make some adjustments to not repeat the loss in future hours. By this logic, one might expect profitable hours to be grouped, but not the unprofitable ones. However, the actions of competing firms will also affect the outcomes. Following a profitable hour, other traders may well react to close the arbitrage, and possibly lead to a loss position for all transactions on the line. Following an unprofitable hour, several firms might respond by bailing in the next hour - leaving an arbitrage opportunity for any who elect to continue to flow energy.

Figure 6 - Profitability Excluding 'Home Run' Imports



We undertook simple non-parametric (requiring no assumption on underlying distribution function) runs tests on sequences of profitable and unprofitable hours when participants were active on the tie line. The analysis ignored hours in which they did not trade on the tie line. The results quite clearly indicated for all five firms that the patterns were not random. There were significantly fewer sequences of profitable and unprofitable trading hours than would be expected if they were independent.

Apparent, or imputed, uneconomic imports or exports can occur for a number of legitimate reasons. What is disconcerting to the MSA and which tends to fuel the notion that some participants are making a concerted effort to influence Pool price, are instances where apparent uneconomic behaviour persists for multiple hours at a time. Using a (generous) loss threshold of $10/MWh to define a losing hour, **Figures 7 and 8** show frequency histograms for the durations of such losing importing and exporting hours by participant. The results show, as one might expect, that these uneconomic stretches were concentrated in the 1- and 2-hour duration categories with a marginal, but not inconsequential, number of longer stretches of hours. Note that this analysis looks only at frequency of sequences and does not take volume into account.

Figure 7 – Consecutive Hour Uneconomic Imports by Participant[5]

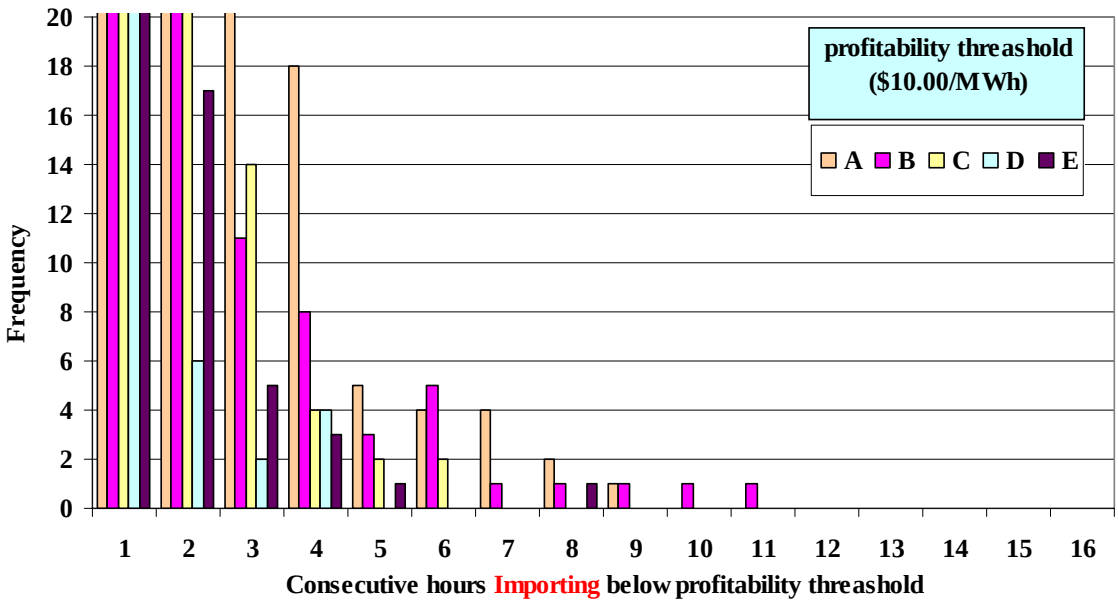
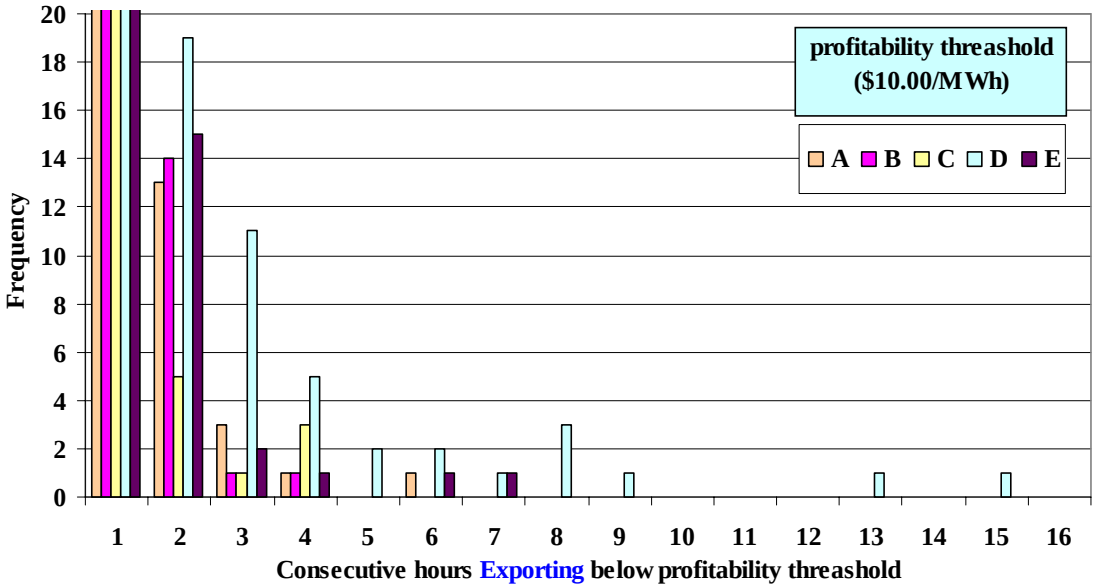


Figure 8 - Consecutive Hour Uneconomic Exports by Participant

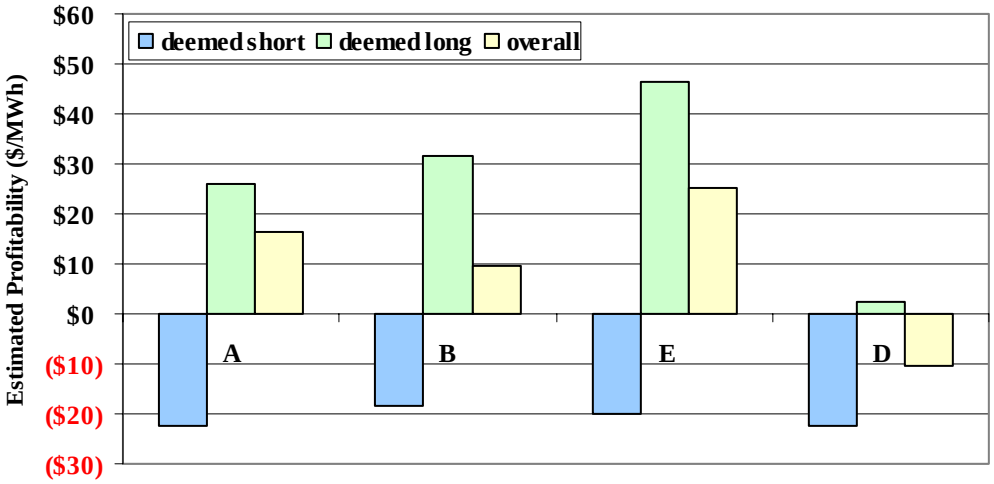


One of the primary drivers for trading on the tie line is to mitigate a short position – often created by an outage of a generating unit in a trader's portfolio. In such situations, a trader is perhaps less concerned about direct profit from the trade on the tie and more focused on risk mitigation. As a check on this idea, for four of the firms, the hours when it appeared

[5] One participant had a substantial quantity of 1 MW imports which were disregarded for the purposes of this figure.

that they would, or could, be in a short position was deduced and the trading performances analyzed for the 'deemed short' and 'not deemed short' cases. (The firm omitted from this analysis trades on the BC tie but has no physical assets in either Alberta or the PNW and hence we are unable to estimate their position) For each firm that was analyzed, the hours were split into the two categories and the profitability calculation redone. It must be remembered that the MSA does not actually 'know' when any participant is short or long in the market and this exercise can only be considered approximate. However, the results are still interesting and somewhat instructive. **Figure 9** shows the results of this exercise. For the import cases (A, B and E), for the hours in which it was deemed they were short, there was a significantly higher degree of red ink than in the not-deemed-short case. Similarly, on the export side (D) losses to cover the short position (outside Alberta) were significant and exports otherwise were profitable. These imputed losses from trading to cover a deemed short position seem excessive even on an overall average basis being near the $20/MWh mark for all the companies.

Figure 9 - Estimated Profitability Based on Tie Flows When Deemed Physically Short[6]



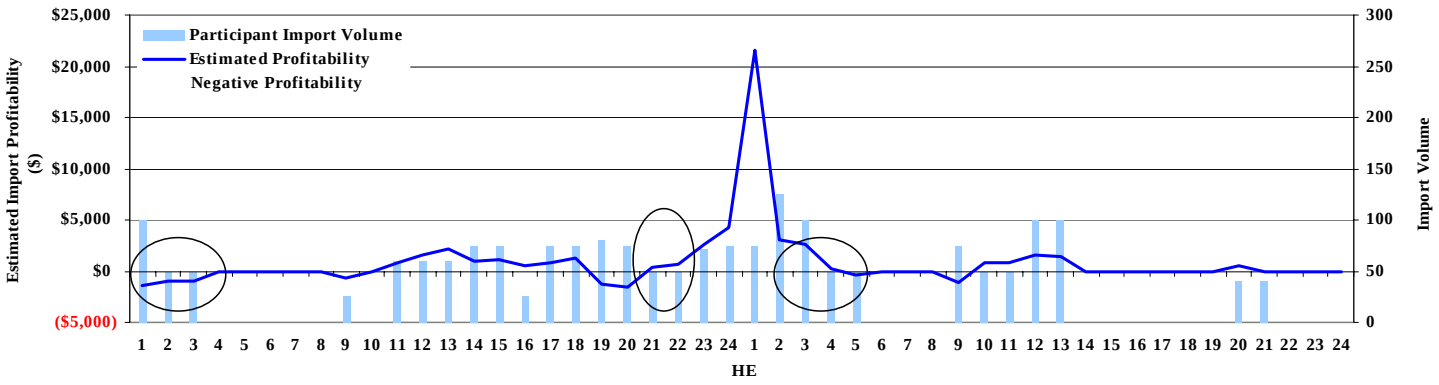
In attempting to understand what 'behaviour' seems to occur on the tie line that is of interest to the MSA, it is illustrative to go through a few examples taken from the study period.

Figure 10 depicts a two day period in June in which a participant was an active importer of energy on the BC tie line. The example shows that the participant's import volumes appeared profitability responsive. The participant imported 100 MW at a loss in HE 1, although the previous HE 24 (not shown) was profitable with 100 MW of imports. The volume was adjusted to 50 MW in the next and subsequent hours. Importing resumed

[6] For A, B and E the tie line flows are imports, and for D the tie line flows are exports to cover the deemed short positions.

in HE 9 with a loss, and no volumes flowed in the next hour. In later hours when profitability declined and became negative in HE 19, volumes were scaled back for HE 20 and again in HE 21. It is this type of profit maximizing (or loss limiting) behaviour that one would expect to see when participants are acting opportunistically on the tie line. Note that the participant was estimated to be short in this period.

Figure 10 - Import Example #1



Uneconomic imports do occur unwittingly due to the aggregate price dampening effect of a number of parties choosing to import in the same hour. Recall that imports are all forced to be priced at zero and are automatically in merit. Several participants may each make a sensible ex-ante decision to import that collectively 'tanks' the Pool price and leaves all the concomitant trades unprofitable. **Figure 11** shows a one day period in January when relatively strong Pool prices were encountered in HE 8 and 9 with moderate BC import volumes coming into Alberta. Then with the expectation that strong prices would persist into HE 10, four other participants imported in HE 10 while another increased import volume from the prior hour. These actions contributed to a lower Pool price that consequently made the transaction seemingly uneconomic for all importers in HE 10.

Figure 11 - Import Example #2

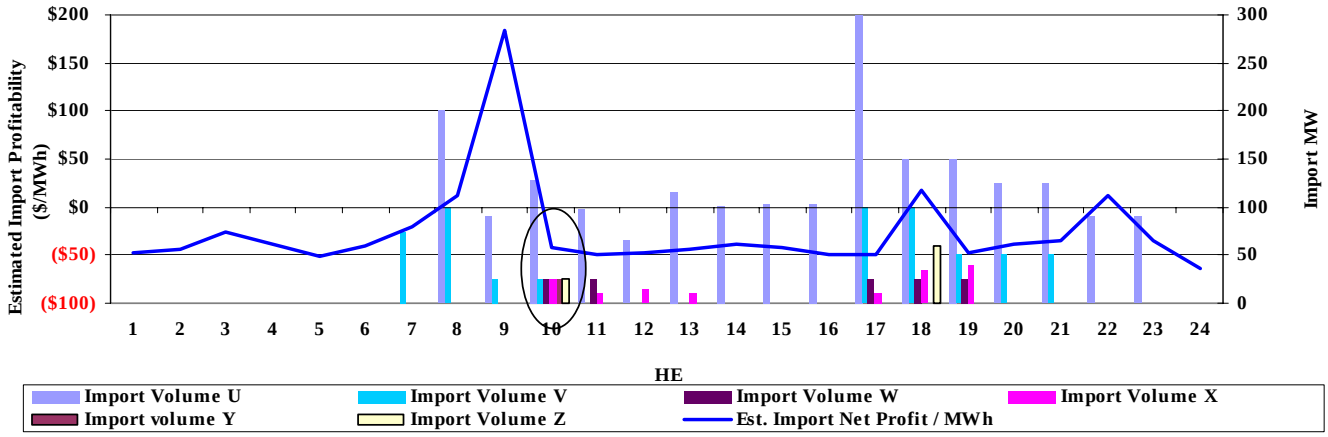
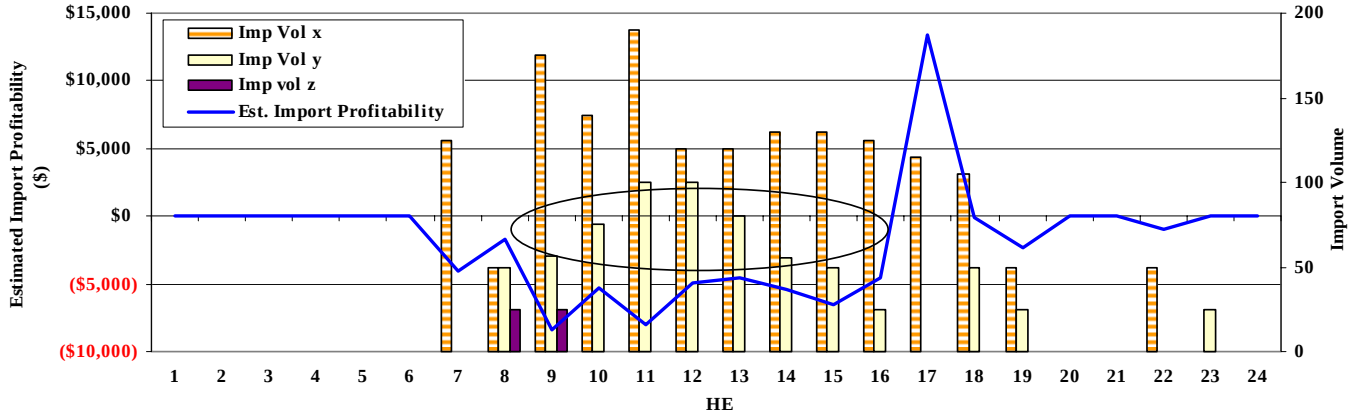


Figure 12 depicts a one day period in May when a participant (Importer 'x') was actively importing into Alberta on the BC tie line and doing so at substantial apparent loss for 10 consecutive hours. Based on our economic assumptions, the participant would have lost approximately $53,000 importing from HE 7 to HE 16. While HE 17 turned out to be a lucrative hour, the participant's estimated apparent losses for the day were still a substantial $43,000. Clearly, other traders (identified as Importers 'y' and 'z' in **Figure 12**) were importing in this period at the same time and this makes it difficult to isolate the impact of the behaviour of any specific participant.

Figure 12 - Import Example #3



While a participant may have good reasons for such import behaviour, persistent stretches of apparently substantial uneconomic behaviour leads the market and the MSA to believe that such an importer may be intentionally trying to depress Pool price to suit their portfolio. It is instances such as these where the MSA may have an interest as to the operational circumstances that may be leading a participant to behave

similarly on the interconnection, and may request that the participant demonstrate that such behaviour is not deliberate manipulation of Pool price.

2.4 Trading Patterns

Normal MSA philosophy is to allow the market to discipline inappropriate activity – such as uneconomic imports and exports. To the extent that such market forces cannot be applied due to structural issues or for other reasons, the MSA will provide that function.

Some participants have expressly asked for specific guidelines on what the MSA considers to be acceptable behaviour and, by subtraction, what is not acceptable. The MSA cannot be so specific about this matter.

In undertaking their transactions on the tie line, participants need to consider the following:

- Any persistent pattern of apparent losses on imports or exports by a participant will be of interest to the MSA. The concern of the MSA is directed to the fidelity of the Pool price signal.
- A participant managing its portfolio to suit the circumstances of the market is normal and expected. Managing the market to suit the needs of its portfolio is not.
- Indicators that the MSA will use in assessing the behaviour are:
    - The potential profitability from the trades;
    - The scale of the apparent loss in terms of both volume and unit loss;
    - The extent to which the participant attempted to manage its volumes on the tie in a way to avoid the appearance of Pool price manipulation; and,
    - The extent to which the participant attempted to execute exchange or OTC trades for similar products at prices that were equivalent or better than those purchased to flow on the tie.
- The MSA will contact participants in such circumstances and will expect to see detailed information on the items listed above.

3 IMPORTS AND EXPORTS BY POWEREX

Imports and exports by BC Hydro and its wholly owned subsidiary, Powerex, have long held a dominant position in terms of market share on the BC tie line. Over the period January through July 2004, their market share by volume of energy flow was 69%. For comparison, over the same period the second most dominant firm had a market share of only 12%. Many Alberta market participants have issues about the BC tie line in terms of access. However, it is not very surprising that Powerex, the company that can rationally use the line the most often, is the most dominant user.

The economic framework that was applied to the other tie line users in the preceding section cannot be applied to Powerex owing to the existence of the storage reservoirs in BC[7]. It is often said that you cannot store electricity but in fact this is not entirely accurate. Water stored in a reservoir that feeds a hydro station is effectively stored electricity. Accordingly, BC has electricity storage and is well positioned to buy electricity when prices are low, store the electricity as water in its reservoirs until better prices are to be had, and then to convert the stored water to electricity for resale.

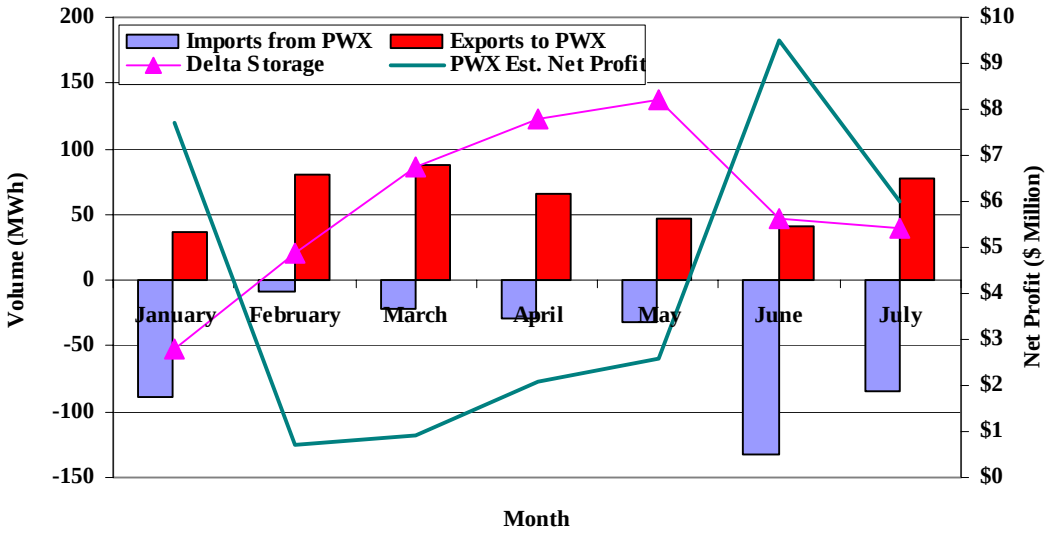
Alberta, with its thermally dominated system, provides a good market for Powerex to do business. Overnight prices here can be quite low and daytime prices are usually much higher. There is frequently a daily pattern of exports to Powerex in the off-peak hours and imports from them in the on-peak hours. This is a very rational practice – and efficient.

The simplified analysis that was undertaken was to assess the cash flow of Powerex's trades with Alberta using Pool price and accounting for transmission costs. Account was kept of the difference in volume between the imports and exports as Delta Storage (a mythical reservoir in BC). The basic results are shown in **Figure 13**.

It can be seen that volumes of imports and exports were not equal on a monthly basis. However, at the end of the analysis period the mismatch in total volume of imports and exports is only 40,000 MWh or roughly 5% of the total volume of trade by Powerex. To value this stored energy accurately is not straightforward but, given its small size, is not critical to this analysis. Powerex was assumed to sell the energy to Mid C on average at 90 percentile prices over the same period.

[7] While we have not mentioned the names of specific firms in the analysis of Section 2 of this report, there is no way of avoiding naming Powerex in this section. Again, we restate that the analyses used herein are directional in nature and do not speak to the specific financial profits of any of the companies.

Figure 13 - Powerex Tie Line Flows to/from Alberta



It is clear from the analysis that Powerex is able to trade profitably with Alberta. On average, it realized an imputed net profit of about $13/MWh on the approximate 830,000 MWh total volume that were traded. While this may seem high compared with the profitability of the firms analyzed in the preceding section, it is probably less than many Alberta market participants imagine it to be. It may serve to dispel the myth that Powerex routinely buys from Alberta at $10/MWh and resells for $100/MWh yielding a net gain of $45/MWh on the total volume traded for the loan of storage in BC for 12 hours.

Also, it is less likely that Powerex is covering a short position compared with some of these other firms and hence their import/export strategy will more closely match the strategy assumed in this analysis.

4 SUMMARY AND RECOMMENDATIONS

Analysis of the profitability of imports and exports for the five most frequent users of the BC tie line shows clearly that some firms will trade uneconomically for several hours in succession, presumably when their portfolios are short in Alberta (imports) or in Mid C (exports). In some cases, the losses on these trades appear quite significant, and there does not seem to be much attempt to fine tune the volume of tie line flow. The MSA is not concerned with participant profitability per se, except to the extent that predictable, repeated losing trades on the tie indicate a motivation to drive Pool price rather than simply closing an open position, or engaging in normal speculative trades.

The analysis does not support the view that the manipulation of Pool prices is as widespread and systematic as alleged by some participants.

Analysis of the profitability of imports and exports by Powerex is not simple due to the existence of storage in BC. However, the directional analysis undertaken herein is useful in illustrating the following points:

- Powerex is able to trade profitably with Alberta on a frequent basis netting about $13/MWh for the volume of trade;
- The profitability is less than many participants might have guessed; and,
- Uneconomic flows widen the arbitrage between Alberta and the PNW distorting Alberta prices and reducing efficiency. The effects of Powerex's trades are generally to narrow the arbitrage between Alberta and PNW and the intra day Alberta market arbitrage. As such, both contribute to the fidelity of Alberta's price fidelity and the efficiency of our market.

The AESO rule requiring both importers and exporters to be price takers creates a number of issues:

- It contributes to the inefficient use of the tie line;
- It negatively impacts Alberta Pool price fidelity; and,
- It makes enforcement difficult against Pool price manipulation using the tie.

Recommendations

1) The tie line should be permitted to set price. The MSA strongly recommends that the ongoing wholesale market design effort needs to consider a mechanism of allowing imports and exports to be priced into the Alberta market. While there are some obstacles to be overcome to allow this to happen such as the lack of dispatchability of tie participants, there are potential solutions. Recent developments around the use of dynamic schedules to California (unidirectional – imports to California only) may indicate some prospect for a change away from the more rigid scheduling procedures currently in place. As well, virtual dispatchability could be

created in Alberta by in-merit generators who could provide the dispatch service to tie line participants unable to respond within the hour. The dispatch service would have to be bought by the tie line participants from generators willing to provide the service. Although permitting the tie line to set price does not necessarily prevent energy to be offered at $0, it does improve the prospect for efficient dispatch and it also eliminates the defense of inadvertence when trading at a loss, making successful prosecution more likely.

2) Reliable and timely information on ATC needs to be available. The efficient use of the BC tie is a crucial component of the Alberta market. Some of the inefficiency in its use stems from access issues.

3) Some of the business practices for the use of the tie do not lend themselves to the line being used with the highest efficiency. The AESO is involved with the tariff proceedings in BC by BCTC and the MSA recommends they seek to modify any of the procedures which can improve the seams issues that erode the efficiency of use of the tie line. The AESO should also look at any of its own business practices relating to the tie that may also be contributing to the problem.

4) Restoration of full tie line capability would remove one of the barriers to the market being able to self-regulate. Recently, the DOE issued a policy document on transmission in Alberta that was subsequently put into regulation. Part of the regulation speaks to the restoration of full tie line capability. For some time, export capacity has been severely constrained due to various technical problems. They need to be overcome as required by the transmission regulation. Currently, with limited export capability in the on-peak periods, it is difficult for a participant to counter flow against uneconomic imports that might occur. Recently, Enmax reported that it had completed its repairs to the capacitor bank that had severely restricted exports and the MSA will be monitoring to see the effects on participants' behaviour. Uneconomic imports are often not confirmed until near the gate closure for the upcoming hour and do not allow much time for a response.

MSA Position

An imputed $3.7 million has been spent in the first seven months of 2004 on uneconomic flows which have created an unquantifiable, but obviously greater distortion of Alberta Pool prices. The practice erodes market confidence and the integrity of the price signal upon which our market is based. Until such time as the market is able to self discipline this behaviour, the MSA will pay very close attention to activity on the tie lines. Participants should be cognizant of the line between managing their portfolio and managing the market (manipulating Pool price). Both the MSA and the market expect reasonable efforts by participants to use the tie line in a profitable (or least cost) way that demonstrates an effort to avoid manipulating Pool price. This means adjusting import/export volumes in response to market outcomes and/or transacting in the OTC market when volumes are available and prices make sense.

The type of behaviour that the MSA is attempting to eliminate is both sustainable and repeatable – and for now is not easily disciplined by the market itself. Participants who attempt to manipulate Pool price, either up or down, in an environment where the normal forces of the market are unable to apply the appropriate disciplinary measures, should expect to be investigated and if warranted prosecuted by the MSA.

We encourage the opinions of market participants on this work and will consider them in our ongoing monitoring analyses