

Cost-Benefit Analysis and Relevant Decision Criteria

With a discussion of the peak vs. average pre-dispatch demand forecast issue



Statement of Issue

The IESO has conducted a cost-benefit analysis (CBA) to assess the economic efficiency impacts and reliability impacts of using an average demand forecast in pre-dispatch compared to the current use of a peak demand forecast. The analysis also includes an assessment of the overall impact on consumers' electricity costs. The IESO analysis indicates that using an average demand forecast in certain hours would generate economic efficiencies for the province as a whole with no material impact to reliability. However, it is also expected that the change would lead to higher electricity costs for current electricity consumers.

The IESO has committed to making a decision on this issue by the end of 2008. However, as is often the case, to make a decision, the IESO will in effect, have to balance two competing objectives of the *Electricity Restructuring Act, 2004*:

1. To protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service; and
2. To promote economic efficiency and cost effectiveness in the generation, transmission, distribution, sale and demand management of electricity and to facilitate the maintenance of a financially viable electricity industry.

Prior to making a decision on the peak vs. average issue, the IESO will consult with members of both the Market Pricing Working Group and the Stakeholder Advisory Committee (SAC) on a broader public policy question: what decision criteria should the IESO apply when comparing the costs and benefits of proposed changes to market rules, market procedures, or market design, particularly those that require a balancing of the two listed objectives. Achieving general resolution on a decision criterion would increase the degree of transparency and objectivity of the current IESO decision making process in such matters. It should also expedite a decision on each issue. At a minimum, stakeholder's comments and opinions will provide the IESO with valuable information to be used in making a decision in the peak vs. average issue.

At the December 3, 2008 meeting of the Stakeholder Advisory Committee (SAC), the IESO will request that each SAC member provide his/her position on the broader public policy question, the appropriate decision criterion for the industry, and the narrow issue of the use of peak vs. average demand forecast in pre-dispatch.

Background

The issue of peak vs. average demand forecast

- The IESO introduced the use of an hourly peak demand forecast for pre-dispatch scheduling prior to the opening of the market. Based on pre-market testing, it was decided that the hourly peak demand forecast was needed for reliability; the peak demand forecast was chosen to ensure that in the pre-dispatch scheduling process the IESO plans to commit enough resources to satisfy the highest expected demand within each delivery hour.
- The use of a peak demand forecast in pre-dispatch was first identified as an issue in the Market Surveillance Panel's (MSP) inaugural report on Oct 07, 2002. The MSP identified the use of peak demand as a problem for two reasons:
 - *Inaccurate price signals and transparency*: it contributes to a persistent positive difference between the pre-dispatch price and the HOEP and provides participants with an inaccurate signal to plan their operations;
 - *Inefficiency*: the use of peak demand means that too many imports (too few exports) may be scheduled in pre-dispatch than what are required (efficient) in real-time, especially in those intervals with demand lower than the peak. Similarly, the use of peak demand may affect the start (shut-down) decision of fossil units with the units either starting sooner or shutting down later than is efficient given their start-up costs and speed-no load costs.
- The use of a peak demand forecast has also been a standing issue before the Market Pricing Working Group since the start of the group in July 2004. Addressing the use of peak versus average hourly demand forecast in pre-dispatch is also one of the IESO's corporate performance measures for 2008.
- With the support of the Market Pricing Working Group, the IESO conducted analysis to assess the economic efficiency impacts, reliability impacts and impacts to stakeholders (specifically consumers) of using an average demand forecast in pre-dispatch compared to the current use of a peak demand forecast. The IESO analysis indicates the following:

Reliability:

- The potential risk to reliability of using an average demand forecast in hours where demand is increasing significantly (generally the ramp hours of 6 to 9 and 16 to 19) likely outweigh any potential efficiency gains in those hours;
- However, in all remaining hours, the IESO believes that the risks to reliability of using an average demand forecast is immaterial and would be manageable.

Efficiency Benefits:

- Using an average demand forecast in all hours except ramp-up periods would increase economic efficiencies (result in a lower overall cost of meeting demand) by approximately \$3.4 million annually. This represents a net benefit or economic gain for the province as a whole. These efficiencies would be achieved by scheduling fewer imports and more internal generation when on balance the imports were more costly than the internal generation.

Stakeholder Impacts:

- By scheduling fewer imports which don't set price in real-time and more internal generators which do set price, the change to average demand would have an impact on the HOEP. The proposed change would result in an average annual increase in HOEP of approximately \$0.72/MWh. At the same time, scheduling fewer imports would lead to a reduction in IOG payments estimated to be roughly \$4.3 million annually. After accounting for the affect of the global adjustment and the OPG rebate, the change to average demand in the non-ramping hours would result in a net increase in consumers' bills of roughly \$17 million annually. With an annual Ontario demand of roughly 152 TWh, this change would represent an increase on an average consumer's bill of roughly 0.01cents/kWh; an approximate increase of 0.1% on the total electricity bill. Some consumers, particularly those that consume proportionately more of their total load in off-peak hours, will experience slightly higher overall bill impacts.
- Importers on balance would be made worse off by the change as would exporters that have to pay the higher HOEP.
- Internal generators would be schedule more often than imports. The higher HOEP and increased output for internal generators would mean that they would be made better off by the change. Although it has not been computed directly, the benefits to internal generators would be well in excess of \$17 million annually. That is, the use of average instead of peak would redistribute income for consumers, exporters and importers to internal generators.

Other non-quantified benefits:

- Improved convergence of the real-time and pre-dispatch prices;
 - Reduction in surplus baseload generation (SBG);
 - Reduced global adjustment – higher HOEP means more of the overall cost of electricity is reflected in the hourly energy price (which can be hedged) and less in the uplift (global adjustment and IOG) which is more difficult to hedge.
- The IESO is updating its analysis to incorporate comments received from members of the market pricing working group. The IESO's current report can be found at http://www.ieso.ca/imoweb/pubs/consult/mep2/MP_WG-20080516-Item2-Issue9.pdf

Cost-Benefit Analysis and Decision Rules

- In 2007 the IESO hired Dr. Michael Trebilcock of CRA International to provide a report on CBA – how it is applied in public policy issues. The report can be found at http://www.ieso.ca/imoweb/pubs/mear/CRA_Overview-of-Cost-Benefit-Analysis.pdf. The following highlights some of the relevant points made in this paper.
- CBA provides an analytic framework that facilitates a disciplined approach to assessing the net benefits (costs) of a proposed policy change or project decision. By quantifying all costs and benefits in monetary terms, and discounting, it is possible to determine the net benefits (costs) of an option in

today's dollars. These net benefits (costs) can then be used to quantitatively rank alternative options, whether it is between a given option and the baseline scenario, or between competing options. The advantages of these analyses include its transparency, which encourages a greater level of accountability by exposing any potential options that are not supported by disciplined analysis.

- When economic resources are re-allocated as a result of a policy change, some parties will gain, while others may lose. Except in the simple (and very rare) case where a policy decision benefits all individuals equally and harms no one, policy makers are required to compare the benefits of the policy to “winners” with the costs borne by others, and then decide whether the benefits are worth the costs.
- The modern day CBA typically employs the Kaldor-Hicks criterion (also known as the Potential Pareto Improvement Criterion) as the decision rule for approving a policy change. This criterion is usually stated as requiring that a change be approved if the winners from the change could hypothetically compensate the losers and still be better off. More accurately, the change is approved if the gains to ‘winners’ exceed the losses to ‘losers’, such that the change creates benefits that are sufficiently large to offset the losses. This criterion does not require that losers are actually compensated to accept a change; it only requires that the overall gains are such that “winners” could theoretically provide compensatory transfers to other parties to make them at least as well off as before while themselves remaining better off than under the status quo.
- CBA may not take into account all factors that bear on the social benefits of a project. An important difference between CBA and other decision rules is that, strictly speaking, CBA considers only the implications of a project for economic efficiency, while ignoring the effects of the project on wealth distribution. Most changes to regulations will harm some individuals while benefiting others, and depending on the identities of the winners and losers, this redistribution of wealth may be socially undesirable (for example if high income groups benefit at the expense of lower income groups). Although CBA does not account for wealth distribution effects, the analysis can be modified to give more weight to the effects of a policy change on certain socially protected or disadvantaged groups.

Key Question – What should be the relevant decision criterion applied by the IESO?

- Before it can proceed with any substantial change to the market, the IESO believes it must provide a sound business case for doing so. This is a view supported by the SAC and stakeholders more broadly. The cornerstone of any good business case is a CBA.
- A standard CBA recommends changes that are economically efficient, while ignoring the effects of the change on wealth distribution. However, efficiency is typically not the sole criterion for public policy decision; analysis of who gains and who loses can be critical to the final decision.
- Strict application of the Kaldor-Hicks criterion to the peak vs. average issue would lead to the approval of the decision to use average; the expected net efficiency gains are \$3.4 million annually. The consumer impacts would not factor into the decision under this criterion.

- Along with promoting economic efficiency for the sector, a key objective defined by the Electricity Restructuring Act, 2004 is “to protect the interests of consumers with respect to prices and the adequacy, reliability and quality of electricity service.” The IESO believes it must be mindful of this objective when reviewing significant changes to the market.
- In the Ontario Energy Board review of the IESO market rule amendment MR-00331-R00: “Specify the Facility Ramping Capability in the Market Schedule” (the 3-times ramp rate hearing), the OEB was required to make a ruling on a matter that was expected to result in improved efficiencies for the province but would lead to higher electricity bills for average consumers – an efficiency/equity trade-off. The OEB ruling stated that:
 - “The Board concludes that the efficiency benefits that are anticipated to arise as a result of the Amendment are consistent with the purpose of the Act that speaks to promoting economic efficiency in the generation, transmission, distribution and sale of electricity. The Amendment also supports the purposes that relate to encouraging electricity conservation, demand management and demand response; ensuring the adequacy, safety, sustainability and reliability of electricity supply in Ontario; and protecting the interests of consumers in relation to the adequacy and reliability of electricity service. While the Board acknowledges that the Amendment may result in an increase in average consumer bills, that increase is anticipated to be modest.”
- The change in ramp rate was expected to lead to annual efficiency gains of \$13 million annually and a net increase in consumer’s costs of \$6.7 million. The ratio of annual efficiency gains to annual increase in consumer cost was much larger than the comparable ratio for the peak vs. average issue (\$3.4 million efficiency gain with a \$17 million increase in consumers’ bills).
- In its review of the day-ahead market mechanisms, the IESO stated that stakeholder impacts, particularly the impact on the province’s consumers would be considered and factored into the IESO’s final recommendation to the Board.

Next Steps and Request of SAC Members

- The IESO has hired Dr. Peter Townley to provide guidance and expert opinion on the broader public policy question (What is the appropriate decision criterion for the industry?) and the specific issue of the use of peak vs. average demand forecast in pre-dispatch. Dr. Townley is Head of the Department of Economics at the University of Windsor. He is a specialist in welfare economics and cost-benefit analysis. Dr. Townley has also been an advisor to Government on key public policy matters that involved consideration of the efficiency/equity trade-off. Dr. Townley’s CV is attached to this memo.
- Dr. Townley has drafted a report, “A Microeconomic Policy Perspective of the IESO’s Pre-dispatch Forecasting Proposal.” In this report, Dr. Townley does two things. First, he sets out a general framework for microeconomic policy decision making when the general objective is to enhance the

aggregate well-being of a population such as the province of Ontario. In this framework he offers a method for addressing potential efficiency/equity trade-offs that can arise in most policy matters. Second, he applies this general framework to the specific policy proposal – the use of average demand instead of peak demand in pre-dispatch in non-ramping hours.

- The IESO is asking stakeholders to review this paper and comment on Dr. Townley’s findings and suggestions towards a potential decision criterion for our industry. The IESO would appreciate that written comments be submitted to stakeholder.engagement@ieso.ca by November 13, 2008.
- Ultimately, the IESO would appreciate SAC members position on the following question:
 - What decision criterion should the IESO apply when comparing the costs and benefits of proposed changes to market rules, market procedures, or market design?
- In reviewing the paper and preparing a position to the broader question above, stakeholders may give consideration to the following questions:
 - Is the Balancing Weights Approach (BWA) a reasonable approach for our industry? Why or why not?
 - If the BWA is reasonable for our industry, are there different groups that should be provided a different weight? Should all consumers be provided a weight or should different consumer classes be assigned a different weight?
 - If you believe different weights should be assigned, what should this (these) weight(s) be? What are the grounds for your assessment of this weighting? Do you feel you have sufficient information to assign weights? If not what additional information would you need to do so?
 - Should the approach treat imports/exports as out-of province participants and assign them a weight of zero regardless of their affiliation or should some effort be given to determine the extent to which the profits earned by these participants will remain in province?
 - By design, the various regulations and contractual arrangements provide mitigation against wholesale spot price changes by redistributing the wealth effects of the price change, whether it be from generators to consumers when prices rise or from consumers to generators when prices fall. Does the presence of these mitigating arrangements tend to support the use of equal weights under the BWA (i.e., the Kaldor-Hicks or Potential Pareto Improvement decision criterion)? Why or why not?
- The IESO will review all stakeholder comments and share these comments with Dr. Townley for his review and potential revision of his paper. The IESO will also respond to specific questions posed to the IESO. The IESO will release the revised paper (if necessary) and its response to questions by November 24, 2008.
- At the December 3, 2008 meeting of the Stakeholder Advisory Committee (SAC), the IESO will request that each SAC member provide his/her final position on the broader public policy question, the appropriate decision criterion for the industry, and the narrow issue of the use of peak vs. average demand forecast in pre-dispatch.

- The IESO will then use Dr. Townley's paper and the positions of the Stakeholders to form its recommendation on the peak vs. average demand forecast issues and make its decision public by December 17, 2008. If there is general agreement on the appropriate decision criterion amongst SAC members, the IESO will begin to use this criterion in future stakeholder issues. Regardless, the discussion on this matter will assist the IESO in the trade-off required for decision making on market changes.