



# **SE-23 Prudential Review Report and Recommendations**

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**Rosanne I. Martin  
Assistant Treasurer**

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## EXECUTIVE SUMMARY

Stakeholder Engagement 23 – Prudential Review (the Review) is part of the Independent Electricity System Operator's (IESO) efforts to provide value in all its services and products. One of the important services that the IESO provides to its market participants is the management of credit risk within the IESO-Administered Markets (IAM). The Review was undertaken to assess whether the current prudential requirements are reasonable and whether there are opportunities to reduce the prudential burden while not unduly exposing market participants to risk.

The finding of the Review is that the current prudential system results in market participants posting more collateral than is reasonable. The IESO's quantitative analysis, which can be found in Section 6 of this report, supports this statement in that the expected cost of defaults is lower than the total cost market participants bear to carry their prudential requirements. The statement is further supported, at least in part, by the very low rate of actual defaults and total lack of default levies since the IAM was opened in May 2002. Accordingly, the conclusion from the Review is that the IESO should reduce the amount of collateral, i.e. increase the allowable unsecured credit that Ontario market participants are required to post with the IESO.

The Review included extensive discussions with stakeholders, investigation of credit practices at the other independent system operators (ISOs)/regional transmission organizations (RTOs), and quantitative risk and cost modeling. The stakeholder discussions, completed in both individual and group format, served to: determine the concerns within the stakeholder community with the existing system; identify future directions stakeholders would like investigated; allow stakeholder to react to the issues and possible actions with respect them. The Review examined various options for increasing unsecured credit, using quantitative modeling that projected both estimated costs to market participants of carrying the required credit and the estimated costs of defaults uncovered by prudential support. This analysis led to the choice of the recommended option as best balancing these concerns.

At a high-level, the Review includes the following recommendations:

- Increase the level of unsecured credit for all market participants with a credit rating of BB or better;
- Local distribution companies should be treated differently from other market participants in some aspects of the prudential framework;
- The prices utilized to calculate credit requirements will be based on Ontario Energy Board price estimates included in its semi-annual Regulated Price Plan update; and,
- The IESO should continue to utilize good payment history as the basis for unsecured credit provisions for unrated companies and the IESO should not perform in-house credit worthiness assessments.

Overall, the estimated results of implementing the recommendations of the Review will serve to reduce collateral requirements by approximately \$200 million. This reduction in collateral requirements will result in an estimated annual net savings of some \$900,000 per year for market participants – a savings of approximately \$1.2 million in credit carrying costs and an annual increase in expected default levies of \$300,000.

## **1. INTRODUCTION**

In 2006, as part of IESO's continuing efforts to reduce the financial burden to those participating in the IESO Administered-Markets (IAM), a review of the physical market prudential framework was conducted. This report and its recommendations represent the product of that review.

### **1.1 Terms of Reference for the Review**

The high level goals of the Review were to:

1. Determine if the current amount of prudential security provides market participants with a reasonable degree of financial security;
2. Determine if there are opportunities to reduce the prudential burden while at the same time ensuring the commensurate costs associated with reducing the prudential burden does not erase the value of those reductions or unduly expose market participants to risk;
3. Explore for further efficiency opportunities; and,
4. Ensure that any changes introduced do not increase the barriers to entry to the IAM.

In the interest of time, the scope of this Review included only those items that could be implemented in a timely manner and within the current market design. Also, since other market evolution activities currently underway or scheduled to take place in the near future may lead to design changes, the Review did not address issues that could be affected by potential market design changes, as for example the potential for increasing integration of the Financial Transmission Rights market with the energy market, as might occur with implementation of locational marginal pricing.

### **1.2 Methodology for the Review**

The Review encompassed the following sources of information:

- Information from the individual interviews with members of the stakeholder consultation group;
- Information from stakeholders outside of the consultation group;
- Information on the prudential support practices of other North American ISOs;
- Information from publicly available financial statements of non-rated participants; and,
- Information from credit rating agencies.
  - Probability of bankruptcy statistics assisted with the development of a model that measures the costs and risks of the current prudential support system. This model also allowed for the quantitative consideration of the impacts on

market participants of potential changes in the amounts of unsecured credit offered.

The IESO employed a robust stakeholdering process for this Review. Specifically, for the stakeholder consultations, the IESO formed a Prudential Review Consultation Group (Consultation Group) consisting of 17 stakeholders representing all market participant classes. This provided an opportunity for a representative group of participants to individually communicate their ideas, concerns, and feedback with respect to the current prudential framework and potential changes to it and the recommendations of changes to the IESO Board. The IESO encouraged all other market participants to express their concerns and ideas. The project team also communicated with members of the Consultation Group and other stakeholders to gather further information or clarification to help formulate some of the specific recommendations in this report.

The IESO project team developed a preliminary Issues List reflecting stakeholder concerns noted by IESO staff since market opening to use as a starting point for discussion with the Consultation Group. The team then met individually with each member of the Consultation Group to document its current challenges and any suggestions it wished to be investigated and to review and discuss opinions regarding the Issues List. The IESO project team appreciated the candour that the individual stakeholder meetings allowed. For many of the issues raised and suggestions made by stakeholders in the individual meetings, the project team looked to the various prudential requirements of other North American ISOs for comparison. However, due to the fundamentally different approaches of the IESO's peers, the value of the information was limited in addressing the issues or concerns raised by its stakeholders.

As a living document, a second version of the Issues List was posted for discussion and feedback at the end of the consultations. This version drew on the information from the consultations, the results of the research into practices of other ISOs, and IESO analysis. The final version of the Issues List identified and analysed the final list of 18 issues and arrived at a disposition for each; i.e. whether or not the issue would be carried forward for further consideration. Ten of the issues were carried forward along with an analysis of each for further consideration and rationale was provided for not moving forward on the other eight issues.

### **1.3 Contents of This Report**

This report contains 13 sections, of which this Introduction is the first. The next section describes the current prudential support system in Ontario, and the following one discusses the question of what is reasonable in terms of the level of prudential support requirements against the prospect of a default levy. The following nine sections discuss each of the issues carried forward and recommendations for each. Two of the issues are combined for discussion in one section.

## 2. PRUDENTIAL REQUIREMENTS IN ONTARIO

The IESO does not assume the risk of any loss caused by the default of a market participant. Rather, the market rules allow the IESO to recover these losses from all non-defaulting market participants.

There are two main aspects to prudential requirements. The first is the amount of collateral that is required (Prudential Support Obligation) and the second is the monitoring of participants' actual exposure in relation to the collateral posted. This section provides definitions of the common terms used and a high level description of the prudential framework.

### 2.1 Definitions

**Prudential Support Obligation (PSO):** The Prudential Support Obligation of a market participant in Ontario is the amount of collateral that a market participant must provide to the IESO. It represents the maximum amount that could be owed – the Maximum Net Exposure – less any unsecured credit allowed under the market rules.

$$\text{PSO} = \text{MNE} - \text{unsecured credit}$$

**Maximum Net Exposure (MNE):** As the starting point to calculate PSO, MNE is the total of a Trading Limit (TL) and a Default Protection Amount (DPA). Both of these are based on an estimate of the amount that the market participant would owe to the IESO (for energy purchases, transmission and ancillary services charges, and other regulated charges) after a number of days of trading.

$$\text{MNE} = \text{TL} + \text{DPA}$$

**Trading Limit:** Each market participant submits to the IESO its own self-assessed trading limit. If that represents seven days or more of expected exposure, the IESO accepts the self-assessed TL. The TL represents the total exposure the IESO could have to the market participant over that period, consisting of the costs and fees that the market participant will be obligated to pay the IESO for that period.

**Default Protection Amount:** DPA is the dollar estimate of all of the market charges that could accumulate between the time a market participant fails to pay an invoice and the time that suspension or disconnection actually occurs. After a failure to pay an invoice, the IESO will initiate procedures to bring the market participant into compliance. These procedures and possible appeals are estimated to require about 21 additional days, so the DPA is based on 21 days of billings calculated in the same way as the Trading Limit.

**Unsecured credit amount:** Unsecured credit reduces the amount of collateral required to satisfy the prudential support obligation. Under current rules, the IESO offers unsecured credit to market participants with investment-grade credit ratings from an established bond rating agency and, for those without any credit ratings, to market participants that have maintained a history of on-time payments to the IESO (good payment history). The IESO

also gives credit to local distribution companies (LDCs) for collateral support they hold from their customers.

**Daily monitoring of Actual Exposure (AE):** The actual amount of energy consumed is usually different from the estimated amount used to calculate PSO. Therefore, during the trading periods, the IESO monitors the Actual Exposure of the market participants. If their Actual Exposure exceeds 70 per cent of their Trading Limit, the IESO issues a warning that the market participant may receive a margin call. If the Actual Exposure exceeds the Trading Limit, the IESO will issue a margin call requiring the market participant to make a prepayment sufficient to bring the Actual Exposure to or below 75% of its Trading Limit within two business days.

**Default Levy:** The default levy is designed to ensure that non-defaulting market participants keep the IESO whole from any default amounts not recoverable through prudential support provided by the defaulting party. If a market participant defaults on its payments, the IESO's first recourse is to collect on any posted collateral. If the collateral is not sufficient to cover the default, the IESO will spread the cost among all market participants (both suppliers and consumers) in proportion to their activity in the market. The amount to be paid is called a default levy.

## **2.2 Prudential Framework**

As a condition of participating in the real-time markets or conveying electricity through the IESO-controlled grid, a market participant must provide the IESO with prudential support to guard against payment default. The need for prudential support arises from the anonymous nature of transactions in the real-time market, the need for comfort gained by suppliers that the total amount due to them will be paid irrespective of the amounts collected from all participants and by the characteristics of electricity itself. That is to say, electricity is consumed at the moment it is generated so it is not possible to recover the physical commodity in the event a payment is not received.

In the electricity market, the only event likely to result in a payment failure (default) is the bankruptcy of the customer. Electricity is crucial to the operation of any business, so any business that plans to continue operations is likely to pay its electricity bill. Therefore, discussion of collateral requirements throughout this report is in the context that the event against which the collateral is posted is the bankruptcy of the customer.

Similar to the risk of non-payment in the electricity market, many sellers of goods and services are exposed to the risk that their customers may default on payment for goods and services already received. Commercial sellers have the ability to manage this risk in various ways; they can choose their customers and deal with only the best credit risks, they can recover the goods sold, and they are able to ask for deposits or other collateral against their bills. If their customers default on payment the company absorbs the loss. The IESO on the other hand cannot choose its customers nor, by the very nature of electricity, can it recover

the commodity sold therefore losses, or the risk of default, are borne by all IAM participants who absorb any losses through a default levy mechanism.

The market rules direct the IESO to pay creditors (net sellers of energy to the market) in full on the payment date with funds received from debtors (net buyers of energy in the market), and to collect prudential support from debtors. However, as a result of reductions for creditworthiness or good payment history, the prudential support held could be less than the defaulted amount. In accordance with the design of the IAM to pay creditors in full on the payment date, any difference between the prudential support held and the actual defaulted amount is collected from all non-defaulting market participants through the default levy process. Therefore, the prudential framework in place must, from the perspective of its participants, balance the conflicting objectives of their collateral requirements and their potential cost of a default levy. Accordingly, the risk management objective of prudential support is to obtain a level of financial security that adds a reasonable degree of protection to participants against a default levy occurring.

### **3. REASONABLENESS OF CURRENT PRUDENTIAL REQUIREMENTS**

One of the goals of this Review was to determine if the current amount of prudential security provides market participants with a reasonable degree of financial security. Therefore, it is important to set out how reasonableness can be measured in the context of prudential requirements.

Financial security in the context of this Review is about managing the risk of a default levy paid by participants. No set of prudential requirements can completely eliminate the risk of a default levy. For example, it is always possible – however unlikely – that a market participant and its credit provider could fail simultaneously. The purpose of the prudential requirement system is therefore not to eliminate risk of a default levy<sup>1</sup>, but rather to keep it within some acceptable probability limit.

Once the purpose of the prudential requirements system is stated in that way, several issues arise:

1. Whose level of “acceptable” risk is to be achieved? Is it the IESO? Is it the market participants? If the market participants, how does the IESO arrive at a level of acceptability from so diverse a group?
2. How can the probability of a default levy be measured?
3. What should be the trade-off between the risk of a default levy or payment interruption and the cost of the prudential requirements system as a whole?

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<sup>1</sup> The term “default levy” is used rather than simply “default” because a market participant’s failure to pay might be called a default, but is not a concern if the IESO is able to recover the default from the market participant’s prudential support.

These basic questions lie at the center of the issue of whether a prudential requirements system is reasonable, because the reasonableness of a system must be judged with respect to its objectives.

This stakeholder engagement, too, will not and need not directly answer the question of how much risk is acceptable. Rather, it will address the subsidiary questions above and then assess the degree of reasonableness in light of the answers.

First, since the default levy risk lies with the market participants and not the IESO, it is participants' tolerance for risk that should be the criterion. Since it is not possible to determine or quantify an acceptable risk level for that entire group, the IESO has assumed that the group's risk appetite is low but that they are not entirely risk averse. That assumption implies, for example, that the group as a whole would be willing to buy insurance to cover most of the risk rather than assume the entire risk itself<sup>2</sup>. The acceptable level of default levy risk, therefore, is low.

Second, a default levy will occur only when an IESO market participant defaults and its prudential support is not sufficient to cover the default. Given that electricity is essential to the operation of any business, a customer will default only when it becomes bankrupt. So the probability of customer default is the bankruptcy probability.<sup>3</sup>

Third, a trade-off between the risk of a default levy and the cost of prudential support exists because the probability that the prudential support will not cover the default depends on the level of support relative to an amount that could be owed in the default and the quality of the support provided. Current IESO market rules require that prudential support equal to the largest possible exposure be provided by all but the customers with investment-grade credit ratings, i.e. those with the lowest probability of bankruptcy, or by those with good payment history. The credit support is also required to be of high quality; that is, to have a low probability of failure when the IESO calls on it. Under the current regime, therefore, the probability of a default levy is low. This is borne out by the actual experience, in that there has not been a default levy in the four years of market operation.

Any action that reduces the level of the credit support or the quality of the support will increase the probability of a default levy. Therefore, such changes should only be considered

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<sup>2</sup> Buyers of insurance are exhibiting risk aversion because the expected value of the insurance must be negative to the buyer. If it were not, the insurance company would expect to lose money. By accepting a loss that is certain (the cost of the insurance), the risk-averse buyer is avoiding some risk of a much larger loss (the event the insurance protects against.)

<sup>3</sup> The probability of a default in the total system can be quantified if the individual probabilities of default are known. Assuming that defaults are independent of each other, the probability of default is

$$P(\text{default}) = 1 - p(\text{no default}). \text{ For the entire customer group, the probability of no default is}$$

$$P(\text{no default})_{\text{total}} = \prod [1 - p(\text{default})_i], \text{ where } i \text{ is the } i\text{th market participant.}$$

The probability of default can be significant even if the individual probability is small. In a system with 300 participants, each of which has a 0.1% chance of failure in a year, the probability of at least one failure in a year is 25%.

if the consequence is to reduce the total cost of the prudential support system. A test of reasonableness for any proposed change, therefore, is whether there is also a meaningful reduction in the expected total cost of the system. If a change reduces the cost of prudential support by more than it increases the expected cost of default levies, then it reduces the expected total cost of the system. But since such a change will also increase risk to the market participants, the reduction in expected total cost should be sufficient to warrant acceptance of the additional risk.

Then, for any proposed change, the question would be whether market participants would prefer to accept the increased risk of a default levy in return for decreased cost of the system. At one extreme, for example, the entire credit support system could be eliminated, and any default would then require a default levy. This would maximize the probability of a default levy.

For this Review, the IESO has undertaken quantitative analyses of the probability of defaults and default levies under various scenarios. These formed the basis for an analysis of alternatives for change to the system of unsecured credit. This analysis compares the reduction in cost of prudential support with the increased expectation of default levies. The methodology and results are presented in Appendix A and in Section 6, with the discussion of unsecured credit amounts.

## **4. POLICY ISSUES**

During the Review, two issues emerged as overall policy issues. The first relates to whether the IESO should perform its own credit assessments. To institute such a change would require a separate change process and would represent a policy change. The second relates to whether the IESO prudential support system should explicitly treat LDCs differently from other market participants.

### **4.1 IESO performance of credit assessment**

#### ***4.1.1 Issue Definition and Alternatives Considered***

The current prudential framework has the IESO relying on recognized credit rating agencies for the determination of the level of unsecured credit it offers market participants based on their financial creditworthiness. The IESO also offers unsecured credit to market participants without credit ratings who have established good payment history and to LDCs for collateral they hold from their customers.

Many stakeholders interviewed think that the IESO should be able to set its own criteria for creditworthiness and perform its own assessment. That would allow the IESO to understand its market participants better and offer them a level of unsecured credit that is appropriate for their circumstances. On the other hand, other stakeholders suggested that additional cost and burdens for participants could be prohibitive and that not all participants would necessarily benefit from such a change.

The alternatives that can be considered are maintaining the current system, under which the IESO does no credit assessment, creating a system in which the IESO does credit assessments for all market participants, and creating a system in which the IESO assesses only those market participants who do not have credit ratings. In the latter two cases, the IESO would replace the existing good payment history reductions with the creditworthiness assessments completed internally.

#### ***4.1.2 Discussion and Analysis***

The common practice in North America is that ISOs assess the creditworthiness of all their participants, both rated and unrated, using scoring systems set up through stakeholder consultation. Typically, the process takes into account a market participant's credit rating (if any), liquidity, leverage and debt coverage, performance and profitability. The common practice then is to allow unsecured credit as a fraction of the market participant's tangible net worth. Of the two ISOs in Canada, one, the New Brunswick System Operator, relies solely on credit ratings, while the other, the Alberta Electricity System Operator (AESO), does its own credit assessment but only for those unrated market participants who request it; unrated participants who do not request a credit assessment do not benefit from any unsecured credit.

To be complete this analysis must consider two aspects of the cases where the IESO does its own creditworthiness assessment:

- The pros and cons of relying on creditworthiness assessments by the IESO, as opposed to relying only on the credit rating agencies, and
- The pros and cons of continuing to offer unsecured credit based on good payment history.

#### ***Pros and Cons of IESO Creditworthiness Assessments***

##### **PROS**

- There is some evidence that ratings from the credit rating agencies do not always reflect the true financial strength of a company.
- It is a very common business practice to perform in-house credit assessments.
- To do so would bring the IESO in closer alignment with the business practices of other North American ISOs.
- Credit assessments are typically more sensitive to the specifics of the customers; this could mean less or more unsecured credit.
- Credit assessments by the IESO could provide earlier warnings when IESO customers could be approaching financial difficulty.
- The default risk could be more accurately measured.

## CONS

- The additional administrative burden for participants will likely be significant as quarterly and annual audited financial statements will be required to be filed with the IESO within certain timeframes.
- Administrative costs of creating and maintaining a credit assessment function within the IESO are estimated at \$600,000 per year. This estimate represents the full cost of three additional permanent employees as well as the annual fees for the necessary tools to perform the assessments.
- The quantitative model estimates that the savings under the IESO proposal for changes to unsecured credit, with no credit assessment function, are similar to the cost of \$600,000 to maintain a credit assessment function.
- The differences between IESO practice and LDC practice with respect to credit support for their respective customers will increase further.

### *Pros and Cons of Maintaining Credit for Good Payment History*

#### PROS

- The main advantage of continuing to allow unsecured credit for good payment history is that (outside of a system without prudential requirements) it is estimated to have a lower expected cost because the administrative burden is significantly lower.
- Maintaining the present system incurs no additional administrative costs.
- A consequence of removing good payment history as a basis for credit will likely be that some market participants who now receive credit for good payment history would have to post prudential support for their entire MNE, which is a negative from the market participant's point of view.

#### CONS

- Market participants can maintain good payment history even when they are experiencing obvious financial difficulties and are in imminent danger of default.
- IESO would continue to be different from many other jurisdictions as it is not common practice amongst ISOs to offer unsecured credit based on good payment history.

#### *4.1.3 Recommendation*

The total cost of the IESO proposal to maintain good payment history is less than the cost of introducing a credit assessment function, including the associated administrative burden. Therefore, it is recommended to maintain the current structure of using good payment

history and public credit ratings as the basis for determining unsecured credit. The question of creditworthiness assessments by the IESO could be reopened in the future.

## **4.2 Differential Treatment of LDCs**

### **4.2.1 Issue definition and alternatives considered**

Local distribution companies have some distinct characteristics which could justify different treatment as compared to direct commercial or industrial customers.

- They are regulated by the Ontario Energy Board (OEB), which can grant rate relief to an LDC that has financial difficulties.
- Almost all are owned by municipal governments, which may provide some financial stability.
- Most LDCs have diverse customer bases from which to draw.
- LDCs' receivables represent the electricity purchases of a large number of end-use customers in all customer classes and are therefore less vulnerable to problems affecting specific industries or activities.

These considerations argue that some further aspects of the prudential support system could treat LDCs differently from other customers. Such differential treatment could occur in any of several ways. The LDCs could be granted more unsecured credit than other market participants in similar circumstances, as for example for those with the same credit rating or good payment history. The base price for computation of the LDCs' MNE could continue to be different than that for other market participants since LDCs implement regulatory price regimes of the government (more details on the price basis for MNE is provided in Section 5 of this report). Their MNE could also be lowered by reducing the number of days for the calculation of the Default Protection Amount.

### **4.2.2 Discussion and analysis**

This project's review of practices in other ISOs shows that the rules in some other ISOs do differentiate between cooperatives and other special kinds of LDCs and other market participants.

Stakeholder opinion on this topic was mixed, with many agreeing that the LDCs have lower risk of bankruptcy and therefore lower risk of default, while others noted that their attributes do not provide greater guarantees of financial stability than other market participants would have.

Current IESO practice with respect to prudential requirements does distinguish between LDCs and other customers. Only LDCs get unsecured credit for collateral they hold from their customers and their reductions for unsecured credit offered under good payment

history are larger than other participants<sup>4</sup>. Also, the price basis for computation of MNE is lower for LDCs than it is for other customers. Therefore, making other distinctions would not be a departure from present practice, but rather an extension of it.

#### **4.2.3 Recommendation**

The recommendation is that, in principle, the IESO have to the ability to, if circumstances warrant, continue to apply different criteria between LDCs and other market participants. Where it is applicable, specific recommendations are made throughout this report.

## **5. PRICE BASIS FOR DETERMINING MAXIMUM NET EXPOSURE (MNE)**

### **5.1 Definition and Alternatives Considered**

The IESO currently uses \$65 per megawatt-hour (MWh) as the basis for calculating the MNE for direct market participants and it uses \$43 per MWh as the basis for MNE calculation for LDCs. The \$65 value has been in effect since market opening and was chosen to be a level that would offer assurance to the IESO that the collateral would be sufficient to cover actual exposure caused by market activity.

During the stakeholder consultations, several stakeholders pointed out that this base price, while still adequate, has not been adjusted during a time when the Ontario market price has been increasing. Some suggested that the IESO adopt a mechanism to allow for periodic review of this price, to ensure that the amount of collateral remains sufficient.

Some stakeholders also said that the price should be adjusted for the impact on prices of Ontario Government initiatives, such as the Global Adjustment and the Ontario Power Generation Non-prescribed Assets Rebate.

The alternatives considered were to leave the base price as it stands, to adjust it now for expected future prices, or to adopt a method of periodic review and adjustment. Also to be considered is whether the current practice of applying a different price basis for LDCs versus other market participants should be continued.

### **5.2 Discussion and Analysis**

Current forecasts<sup>5</sup> do indicate an expectation that the market price for electricity in Ontario will increase over time. An expected increase in reliance on gas-fired generation and the

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<sup>4</sup> LDCs receive additional unsecured credit in the amount \$0.60 on every dollar of collateral they hold for their customers. Good payment history reductions for LDCs and other market participants can be found in Table 1 of Section 6. Price basis differentials for participants are detailed in Section 5.1.

<sup>5</sup> For example, the Ontario Power Authority's estimates of future supply costs are higher than current average hourly prices.

need for significant new or refurbished generation will put upward pressure on prices. Even if the \$65 base price is still adequate, there is no assurance that it will continue to be so.

The IESO does not engage in forecasting electricity prices in Ontario. However, the price basis should be an expected price, rather than an historical one. The OEB does produce a semi-annual price forecast for electricity in Ontario for use in setting retail prices under its regulated price plan (RPP). The IESO believes that this information could be a useful basis for this price calculation.

Although the OEB's forecast is available semi-annually, the IESO does not believe it should review its price basis that frequently because of the additional cost to market participants of adjusting their collateral postings. An annual review should be sufficient. For the same reasons, small adjustments to the price basis should also be avoided.

The OEB forecasts the average electricity supply costs for the RPP. The RPP includes a forecast of the Ontario market price, and adjusts that forecast for the effects of government policy, as some stakeholders had suggested. The most recent forecast of the total RPP supply cost is \$58.95 per MWh. This price has been used as the basis for direct customers' determination of MNE in the calculations in Section 7 on the costs of options for unsecured credit.

In keeping with current practice, a lower price can be chosen for the LDCs. In the current RPP report, the OEB sets a price of \$55 per MWh as the lower tier price for consumers on time of use rates. This price has been used in Section 7 as the basis to calculate the MNE for LDCs.

### **5.3 Recommendations**

1. The price basis for calculating MNE to be reviewed annually.
2. The price basis for LDCs equal the Regulated Price Conventional Meter Tier 1 (RPCMT1) price as reported by the OEB for its tiered RPP prices.
3. The price basis for all other market participants equal the RPP supply cost (RPPsc) as forecast by the OEB.
4. The MNE price basis will change only if the underlying reference price changes by 15% or more.

Recommendation #1 is a new IESO obligation and will therefore require a new rule. Recommendations #2 and #3 provide context for the obligation and accordingly, it is recommended that the context for this obligation be achieved through a market rule. Furthermore, a higher level of transparency is realized. Additional supporting details will be provided in the appropriate market manuals. Recommendation #4 represents the materiality threshold of the obligation laid out in Recommendation #1 and, similar to Recommendations #2 and #3, requires the transparency to the market that is achieved through a market rule. As a rule, Recommendation #4 also provides a level of administrative

efficiency by not requiring immaterial, but costly to our participants, changes in prudential support.

## 6. UNSECURED CREDIT AMOUNTS

### 6.1 Issue Definition and Alternatives Considered

Under current practice, a market participants' prudential support obligations may be reduced relative to its MNE by unsecured credit under one of two circumstances:

- The market participant has an investment-grade credit rating from a major bond rating agency, or
- The market participant does not have a credit rating from a major bond rating agency and has paid its IESO bills regularly enough to establish a good payment history.

The amount of reduction depends on the level of its credit rating for a rated entity or its years of good payment history for other entities, as detailed in Table 1. In this table and throughout this report, all credit ratings used are based on Standard and Poor's rating terminology.

To obtain credit for good payment history, the market participant must maintain its payment practices for a minimum of two years. The reduction in the amount of prudential support required increases with each year of good performance up to five years.

Increasing the amount of unsecured credit is one of the most effective ways to

decrease the cost to participants of meeting their prudential requirements because it frees up

<b>Table 1: Current System Unsecured Credit</b>		
<b>Rated Market Participants (based on Credit Rating)</b>		
<b>Greater of % or \$ amount</b>		
	<b>%</b>	<b>\$</b>
<b>LDCs</b>		
AAA- or better	100%	n/a
AA-, AA, AA+	85%	\$25,000,000
A-, A, A+	75%	\$12,500,000
BBB-, BBB, BBB+	50%	\$5,000,000
BB-, BB, BB+	0%	\$0
Below BB-	0%	\$0
<b>Direct Customers</b>		
AAA- or better	100%	n/a
AA-, AA, AA+	85%	\$25,000,000
A-, A, A+	75%	\$12,500,000
BBB-, BBB, BBB+	50%	\$5,000,000
BB-, BB, BB+	0%	\$0
Below BB-	0%	\$0
<b>Unrated Market Participants (based on Good Payment History)</b>		
<b>Lesser of % or \$ amount</b>		
<b>LDCs</b>		
>=5 years	50%	\$5,000,000
>=4, < 5 years	40%	\$4,000,000
>=3, < 4 years	30%	\$3,000,000
>=2, < 3 years	20%	\$2,000,000
< 2 years	0%	\$0
<b>Direct Customers</b>		
>=6 years	25%	\$5,000,000
>=5, < 6 years	25%	\$5,000,000
>=4, < 5 years	20%	\$4,000,000
>=3, < 4 years	15%	\$3,000,000
>=2, < 3 years	10%	\$2,000,000
< 2 years	0%	\$0

capital, decreases banking costs, is relatively easy to implement and adds no further administrative burden. On the other hand, increasing unsecured credit also increases the probability that, in the event of a default, the IESO will not be holding enough prudentials to avoid a default levy to its participants. The test of “reasonableness” attempts to balance this trade-off.

This Review considered a number of alternative combinations of changes to the unsecured credit limits, both for entities with credit ratings and for those relying on good payment history.

#### ***Public credit ratings – key alternatives considered***

The key alternatives considered with respect to market participants with credit ratings were:

- Whether to increase the amount of unsecured credit for all rated customers;
- If it is increased, by how much and whether the increase should be uniform across all rated customers or increase more for some ratings than others;
- Whether to offer some unsecured credit to customers with ratings just below investment grade;
- Whether to differentiate between LDCs and other customers in the amount of unsecured credit offered.

During this Review, these alternatives were discussed with the stakeholders. Most stakeholders felt they would accept some decrease in the total amount of protection if it produced a decrease in their own cost of meeting the prudential requirements. Some stakeholders, from a cross section of classes, indicated that the distinct features of the LDCs warrant differential treatment with respect to unsecured credit. The discussion and analysis below treats these issues more fully.

#### ***Good payment history – key alternatives considered***

The alternatives considered for market participants relying on good payment history therefore relate to the treatment of credit for good payment history:

- Whether to increase the amount of such credit
- Whether to leave the amount of credit for good payment history as it stands,

Stakeholders expressed support for both alternatives during the consultations.

This section examines options for both of these considerations for unsecured credit because they have been analysed together in terms of their impact on total system cost. The discussion in the next section is in the context of considering various options for increasing the amount of unsecured credit offered to market participants in Ontario.

## 6.2 Discussion and Analysis

The amount of unsecured credit offered is a key element of the prudential support system for the IESO and for other ISOs. Like the IESO, other ISOs set a support requirement based on some projection of the market participant's maximum potential exposure based on their respective market rules.

This system has three major sources of cost:

- The cost to the market participants of providing the required collateral,
- The cost to the market participants of default levies, if any, and
- The cost to the ISO and the market participants of administering the system.

Of these, the first two are the most important in an analysis of comparative costs for unsecured credit, since (except for the case where the IESO does its own assessments or, as described later, the elimination of prudential requirements) the third cost does not vary materially with the amount of unsecured credit offered.

For this project, therefore, the IESO undertook quantitative analysis of the first two of the costs listed above, in an effort to determine the total costs of the prudential support system under various proposals. Appendix A contains a detailed description of the methodology used for this quantitative analysis.

Briefly, the approach taken is to estimate, for each market participant:

- Its prudential support obligation and the direct financial cost of meeting this obligation; this varies with the options on the amount of unsecured credit;
- How likely it is to default on its electricity bill to the IESO, and the likely amount of this default; this does not vary with the unsecured credit options;
- How much of this default is likely to be covered by the prudential support it has posted; this will vary between the options; and,
- The total default levy likely to be created by all market participants in an average year, and how much of this levy each market participant would likely have to pay; this will vary between the options.

The calculation was done in two separate ways. In the "probability" approach, amounts are multiplied by probabilities to estimate expected values. In the "Monte Carlo" approach, events (such as whether or not each market participant defaults) either happen or don't happen, based on random number generation; the calculations are repeated many times and averages are calculated. The two approaches give very similar results. The Monte Carlo approach has the advantage of allowing the calculation of probability distributions (how often certain results occur) rather than only averages.

Information on probabilities of default for each credit rating category was sourced from Moody's Investor Services. This information was then used to evaluate a number of possible

combinations of unsecured credit for both rated entities and unrated entities receiving credit for good payment history. Each of the cases was evaluated against two benchmarks:

- The existing IESO prudential requirements system and
- A system in which all prudential requirements are eliminated.

The latter of the two measures is presented here as a reference case only. It represents a situation in which no market participants are required to post collateral and all supply market participants are required to share in the payment of any resulting default levy, consistent with the current system. This is clearly one extreme of the spectrum of tradeoffs between cost of the prudential support system and cost of default levies and is offered to allow some further perspective on the other options. This option represents a very

significant change to the IAM, would likely require changes to how the default levy is distributed and, as such, is considered to be a change in market design.

Furthermore, it is the IESO's opinion that more history is required prior to implementing this type of change.

### 6.2.1 Description of proposed unsecured credit changes

Table 2 shows the amount of unsecured credit offered by the current IESO system, one proposed variation of the current system, and the system which eliminates prudential requirements.

The proposal offers increased unsecured credit for all rated participants including the addition of unsecured credit for participants rated BB by Standard and Poor's. Historical information from the credit rating agencies indicates that the

<b>Table 2</b>						
<b>Rated Market Participants (based on Credit Rating)</b>						
<b>Greater of % or \$ amount</b>						
	<b>Current System</b>		<b>Proposed System</b>		<b>No Prudential Support</b>	
<b>LDCs</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
AAA- or better	100%	n/a	100%	n/a	100%	n/a
AA-, AA, AA+	85%	\$25,000,000	100%	n/a	100%	n/a
A-, A, A+	75%	\$12,500,000	90%	\$30,000,000	100%	n/a
BBB-, BBB, BBB+	50%	\$5,000,000	75%	\$15,000,000	100%	n/a
BB-, BB, BB+	0%	\$0	50%	\$5,000,000	100%	n/a
Below BB-	0%	\$0	0%	\$0	100%	n/a
<b>Direct Customers</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
AAA- or better	100%	n/a	100%	n/a	100%	n/a
AA-, AA, AA+	85%	\$25,000,000	100%	n/a	100%	n/a
A-, A, A+	75%	\$12,500,000	85%	\$25,000,000	100%	n/a
BBB-, BBB, BBB+	50%	\$5,000,000	60%	\$10,000,000	100%	n/a
BB-, BB, BB+	0%	\$0	25%	\$3,000,000	100%	n/a
Below BB-	0%	\$0	0%	\$0	100%	n/a
<b>Unrated Market Participants (based on Good Payment History)</b>						
<b>Lesser of % or \$ amount</b>						
	<b>Current System</b>		<b>Proposed System</b>		<b>No Prudential Support</b>	
<b>LDCs</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
>=6 years	50%	\$5,000,000	70%	\$7,000,000	100%	n/a
>=5 years	50%	\$5,000,000	60%	\$6,000,000	100%	n/a
>=4, < 5 years	40%	\$4,000,000	40%	\$5,000,000	100%	n/a
>=3, < 4 years	30%	\$3,000,000	30%	\$4,000,000	100%	n/a
>=2, < 3 years	20%	\$2,000,000	20%	\$3,000,000	100%	n/a
< 2 years	0%	\$0	0%	\$0	100%	n/a
<b>Direct Customers</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
>=6 years			40%	\$6,000,000	100%	n/a
>=5 years	25%	\$5,000,000	25%	\$5,000,000	100%	n/a
>=4, < 5 years	20%	\$4,000,000	20%	\$4,000,000	100%	n/a
>=3, < 4 years	15%	\$3,000,000	15%	\$3,000,000	100%	n/a
>=2, < 3 years	10%	\$2,000,000	10%	\$2,000,000	100%	n/a
< 2 years	0%	\$0	0%	\$0	100%	n/a

probability of default is very low (effectively almost zero) for entities rated AA- or above and low for entities rates A- or above.<sup>6</sup> The decision to make this offer is based mostly on the quantitative analysis where the probability of default of a BB rated entity is estimated to be approximately 1.19%, which in the IESO's opinion remains within an acceptable range for allowing some unsecured credit. Please refer to Appendix A – Table A3 for the complete table of probability of defaults used in the quantitative analysis.

Most notably:

- The increases in unsecured credit are higher for LDCs. The proposed system offers more unsecured credit (and a higher increase in unsecured credit) to LDCs than it does to direct customers with the same credit rating. This decision is based on the rationale set out in Section 5 of this report.
- It increases the amount of unsecured credit offered to unrated entities relying on good payment history, but it does so by creating as a new category: those which have maintained good payment history for six years or more. (It is expected that most market participants that have five years of good payment history will also have six years, but this criterion does subject the increase in credit subject to more stringency than would an unconditional increase in credit.)
- The proposed system, shown in Table 2, is the result of analysis of a wide range of possible systems, assessing various levels of unsecured credit offered both to market participants with credit ratings and to those relying on good payment history. The proposal shown here represents a reasonable trade off between overall cost of the system and the risk of a large default levy.

### *6.2.2 Quantitative analysis of the current and proposed systems*

The purpose of the quantitative analysis is to assess the reasonableness of these changes. The analysis allows an explicit quantitative trade-off between the reduction in the cost of the prudential support system and the likely increase in default levies. A minimum criterion for reasonableness is that the savings from the reduction in prudential support requirements are greater than the increased cost of default levies.

The analysis compares the costs of the current system – both prudential support costs and expected default levies – to the costs of the proposed system. The first step in the quantification of these costs is to understand the cost of the current system; these are shown in Table 3. For a proper comparison, the costs are shown using the recommended new prices bases for computation of MNE.

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<sup>6</sup> Entities with good credit ratings can have financial defaults, but generally their financial difficulties become known before they do, and their credit ratings are reduced accordingly. The data indicate the probability of default of a business with the particular credit rating at the time of the default.

The first column gives the amount of the current prudential support obligation (PSO) for six customer groups: rated and unrated LDCs and direct customers, and customers using a parental guarantee to meet their PSO. The third column is the estimate of the annual cost of carrying these prudential requirements, expressed as a fraction of the requirement. Finally, the fourth column shows the estimated cost to the market participants of maintaining their prudential requirements. This is now about \$5.4 million per year.

<b>Table 3 Cost of Current Prudential Support System</b>							
	<b>Current Prudential Support Obligation</b>	<b>Current Prudential Support Posted</b>	<b>Estimated Current Annual PSO Cost</b>	<b>Estimated Annual Cost of Maintaining PSOs</b>	<b>Loss to Market / Contribution to Creation of Default Levy</b>	<b>Loss to Participant / Contribution to Payment of Default Levy</b>	<b>Total Cost (PSO plus Levy)</b>
	<b>(\$ million)</b>	<b>(\$ million)</b>	<b>(%)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
<b>LDCs</b>							
Rated	\$202.0	\$192.3	0.40%	\$807,959	\$149,622	\$209,462	\$1,017,421
Guarantor Rated	\$99.0	\$154.6	0.40%	\$396,173	\$21,572	\$28,207	\$424,381
Unrated	\$263.9	\$265.0	0.51%	\$1,356,812	\$121,179	\$92,696	\$1,449,508
<b>Total LDCs</b>	<b>\$565.0</b>	<b>\$611.8</b>	<b>0.45%</b>	<b>\$2,560,944</b>	<b>\$292,372</b>	<b>\$330,366</b>	<b>\$2,891,309</b>
<b>Direct Customers</b>							
Rated	\$69.9	\$72.1	1.22%	\$855,024	\$75,378	\$29,218	\$884,242
Guarantor Rated	\$75.6	\$80.3	0.40%	\$302,529	\$1,746	\$6,654	\$309,183
Unrated	\$124.9	\$130.1	1.35%	\$1,679,935	\$425,438	\$31,230	\$1,711,165
<b>Total Directs</b>	<b>\$270.4</b>	<b>\$282.5</b>	<b>1.05%</b>	<b>\$2,837,488</b>	<b>\$502,563</b>	<b>\$67,102</b>	<b>\$2,904,590</b>
<b>All Consumers</b>	<b>\$835.4</b>	<b>\$894.3</b>	<b>0.65%</b>	<b>\$5,398,432</b>	<b>\$794,936</b>	<b>\$397,468</b>	<b>\$5,795,900</b>
<b>All Sources</b>						<b>\$397,468</b>	<b>\$397,468</b>

The next section of Table 3 relates to losses caused by defaults and default levies. The first of these columns shows the magnitude of the cost to the market – the expected amount of default levy – caused by market participants in each of these six groups. Under the current system, the total cost of default levies is expected to be under \$800,000 per year.<sup>7</sup> The next column gives the amount that each customer group would have to pay as a result of the default levies. Finally, the last column shows the total cost (carrying cost of prudential requirements plus the cost of the default levy) for each customer group under the current system. The total cost of the system is about \$6.2 million, of which \$5.8 million is paid by consumers and \$0.4 million is paid by suppliers.

<sup>7</sup> This expectation is much worse than the actual experience in Ontario to date. Since the market opened in 2002, there have been only two defaults for a total of under \$300,000 and no default levies (the defaulted amounts were covered by the prudentials held).

For comparison, Table 4 shows the cost of the entire system under the IESO proposal. It also compares these costs to those of the present system. It shows that the IESO proposal is estimated to:

- reduce the expected total cost by almost \$1.0 million;
- reduce prudential support obligation by approximately \$200 million;
- result in fees savings to the consumer side of the market of \$1.2 million per annum; and,
- reduce the prudential support obligation for virtually all net debtors to the IAM.

As mentioned earlier, an increase in unsecured credit automatically increases the potential default levy. In this proposal, the consequent expected increase in the default levy is estimated to be:

- \$300,000 to the system; or
- \$150,000 to all consumers; and
- \$150,000 to generators.

The next step is the evaluation of reasonableness, where the IESO takes into consideration the increase of the potential default levy versus the decrease in costs. From the perspective of the whole system, it is estimated to be an expected net gain of \$900,000, representing the difference between the estimated fee savings of \$1.2 million and the estimated increase in the expected default levy of \$300,000. Looked at another way, under the proposed system the expected overall system cost will be lower than under the present system in about three years of every four, with no default levies at all expected in two years out of five. In about one year out of five, the cost of default levies would be expected to be higher than the savings from the reduced cost of prudential support. On average, the expected overall savings will be about \$900,000. It is the IESO's opinion that a 4:1 ratio of saving versus increase of the expected default levy is a reasonable risk/reward trade-off.

Table 4 also shows that all classes of consumer market participants would have a reduction in their expected total costs for their prudential support as a result of implementation of this proposed system.

And finally, Table 4 also provides the probability distribution of the results obtained from the Monte Carlo analysis.

The summarized probability distribution results are:

- Under the current system, the default levy is expected to be under \$ 1 million in about four years out of five, whereas,
  - the proposed system would have the default levy expected to be that low in about three years out of four.

**Table 4 - Cost of IESO Proposed System**

		Loss to Market/ Contribution to Default Levy			Total Cost (PSO plus Default Levy)			
Proposed System Prudential Support Obligation		Current System	Proposed System	Elimination of Prudential Support	Current System	Proposed System	Elimination of Prudential Support	Elimination - Only Consumers Pay Levy
LDCs	(\$ million)	(\$ 000's)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Rated	\$78.4	\$149,622	\$192,740	\$220,145	\$1,017,421	\$603,930	\$954,802	\$1,909,605
Guarantor Rated	\$95.9	\$21,572	\$23,855	\$158,112	\$424,381	\$422,633	\$128,579	\$257,158
Unrated	\$215.3	\$121,179	\$185,633	\$519,594	\$1,449,508	\$1,095,867	\$422,542	\$845,085
<b>Total LDCs</b>	<b>\$389.6</b>	<b>\$292,372</b>	<b>\$402,228</b>	<b>\$897,851</b>	<b>\$2,891,309</b>	<b>\$2,122,430</b>	<b>\$1,505,924</b>	<b>\$3,011,848</b>
Direct Customers	(\$ million)	(\$ 000's)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Rated	\$48.3	\$75,378	\$165,510	\$698,672	\$884,242	\$622,625	\$133,184	\$266,368
Guarantor Rated	\$72.4	\$1,746	\$1,857	\$37,300	\$309,183	\$298,794	\$30,333	\$60,666
Unrated	\$113.7	\$425,438	\$531,777	\$1,989,777	\$1,711,165	\$1,572,606	\$142,359	\$284,718
<b>Total Directs</b>	<b>\$234.4</b>	<b>\$502,563</b>	<b>\$699,145</b>	<b>\$2,725,749</b>	<b>\$2,904,590</b>	<b>\$2,494,025</b>	<b>\$305,876</b>	<b>\$611,752</b>
<b>All Consumers</b>	<b>\$623.9</b>	<b>\$794,936</b>	<b>\$1,101,373</b>	<b>\$3,623,600</b>	<b>\$5,795,900</b>	<b>\$4,616,455</b>	<b>\$1,811,800</b>	<b>\$3,623,600</b>
<b>All Sources</b>					<b>\$397,468</b>	<b>\$550,686</b>	<b>\$1,811,800</b>	<b>\$0</b>
Probability that Cost will be in Range:								
None		53.0%	44.2%	17.0%	0.0%	0.0%	17.0%	17.0%
Up to \$1 million		27.2%	29.7%	25.3%	0.0%	0.0%	25.3%	25.3%
\$1-5 million		17.0%	21.5%	34.4%	0.0%	73.0%	34.4%	34.4%
\$5-10 million		2.1%	3.6%	14.1%	96.7%	23.7%	14.1%	14.1%
\$10-50 million		0.57%	0.83%	8.89%	3.19%	3.17%	8.89%	8.89%
> \$50 million		0.11%	0.15%	0.33%	0.13%	0.16%	0.33%	0.33%

- The current system has no default levy in just over half the years, whereas,
  - the proposed system has no default levy in over 40% of the years.

Looking at the probability of large default levies only:

- The current system would expect a levy of \$10 million or more in about one year in two hundred, whereas,

- the proposed system would expect to have a default levy that large in about one year in one hundred;

This analysis suggests that the proposed changes are reasonable. They increase the expected cost of the default levies by significantly less than they reduce the cost of the prudential support system. The probability of no default levy is not much higher in the proposed system, and the probability of a large default levy is low in both cases.

To complete the quantitative analysis, the case in Table 5 presents the consequences of eliminating the prudential support system completely and simply assessing default levies on any occasion of a buyer default. The total expected levies, and therefore the total expected cost of the system, are about \$3.6 million in this case. That is below the total cost of about \$4.2 million under the proposed IESO system. In this case, the default levies would be paid only by consumers, since they get all the benefits of the reduced cost of carrying prudentials.

Table 5 Cost of System with No Prudential Requirements								
	Revised Prudential Support Obligation	Estimated Annual Cost of Maintaining PSOs	Savings in Annual Costs	Loss to Market / Contribution to Creation of Default Levy	Increase in Creation of Default Levy	Loss to Participant / Contribution to Payment of Default Levy	Total Cost (PSO plus Levy)	Total Cost with Only Consumers Paying Levy
LDCs	(\$ million)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Rated	\$0.0	\$0	\$807,959	\$220,145	\$70,523	\$954,802	\$954,802	\$1,909,605
Guarantor Rated	\$0.0	\$0	\$396,173	\$158,112	\$136,540	\$128,579	\$128,579	\$257,158
Unrated	\$0.0	\$0	\$1,356,812	\$519,594	\$398,415	\$422,542	\$422,542	\$845,085
<b>Total LDCs</b>	<b>\$0.0</b>	<b>\$0</b>	<b>\$2,560,944</b>	<b>\$897,851</b>	<b>\$605,479</b>	<b>\$1,505,924</b>	<b>\$1,505,924</b>	<b>\$3,011,848</b>
Direct Customers	(\$ million)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Rated	\$0.0	\$0	\$855,024	\$698,672	\$623,293	\$133,184	\$133,184	\$266,368
Guarantor Rated	\$0.0	\$0	\$302,529	\$37,300	\$35,554	\$30,333	\$30,333	\$60,666
Unrated	\$0.0	\$0	\$1,679,935	\$1,989,777	\$1,564,338	\$142,359	\$142,359	\$284,718
<b>Total Directs</b>	<b>\$0.0</b>	<b>\$0</b>	<b>\$2,837,488</b>	<b>\$2,725,749</b>	<b>\$2,223,186</b>	<b>\$305,876</b>	<b>\$305,876</b>	<b>\$611,752</b>
<b>All Consumers</b>	<b>\$0.0</b>	<b>\$0</b>	<b>\$5,398,432</b>	<b>\$3,623,600</b>	<b>\$2,828,665</b>	<b>\$1,811,800</b>	<b>\$1,811,800</b>	<b>\$3,623,600</b>
<b>All Sources</b>						<b>\$1,811,800</b>	<b>\$1,811,800</b>	<b>\$0</b>

This option would produce a default levy of over \$10 million one year in five and no default levy only about one year in seven. This proposal does not pass the reasonableness test because its total reduction in costs is relatively small and its increase in risk is large.

The IESO proposal achieves a better balance. It reduces the expected total cost of the system by close to \$1 million, while not producing a major increase in the probability of a large default levy. It therefore passes the reasonableness test.

### **6.3 Recommendation:**

It is recommended that the system of unsecured credit identified as the proposed system in Table 2 above be adopted.

## **7. PHYSICAL BILATERAL CONTRACTS**

### **7.1 Issue definition and alternatives considered**

A physical bilateral contract (PBC) removes responsibility for settlement for electricity purchased from the IESO and transfers it to the contracting parties. Under a PBC, the buyer agrees to pay the seller the contract price for the contracted electricity, and the seller agrees to provide that quantity of electricity to the grid. The IESO does not collect from the buyer nor pay the seller for the contracted quantities. In effect, the credit risk shifts from IESO market participants to the seller of the PBC. The current system does not fully recognize this shift, because only actual exposure is adjusted for PBCs, not the PSO.

Two concerns have been raised. First, if the buyer becomes bankrupt, it would have to buy any future electricity from the IESO, but because it would come under protection of the bankruptcy court the IESO would not be able to impose prudentials and would be exposed to any further default. Second, if the seller fails to deliver the electricity and has not posted collateral, the IESO has no recourse except to deduct the value of the undelivered electricity from any amounts it may otherwise owe the seller. Most sellers of PBCs are large net creditors of the IESO at the present time, but if that status changes in the future the IESO could be exposed to their failure.

Given these concerns, alternatives that can be considered are to leave the existing practice in place or to adjust the MNE for the quantities of electricity specified in the PBC. To address the concerns raised, other conditions could be imposed on the parties to the PBC. For example, the buyer could be required to demonstrate low risk of bankruptcy or the seller could be required to post collateral.

### **7.2 Discussion and Analysis**

In general, stakeholders agreed that the amounts of energy a buyer is acquiring under a PBC should reduce their prudential requirements. Stakeholders also were concerned with the issues raised.

Some stakeholders pointed out that the level of contracting in the Ontario market is quite low at the present time. They expect that some market evolution initiatives, notably the creation of Load Serving Entities to provide default service, could lead to a large increase in

the amount of electricity that is traded under PBCs. Such a change could increase the IESO's exposure.

Changing the calculation of MNE to remove quantities traded under PBCs would not noticeably increase the risk of a default, especially if it is restricted to buyers with good credit ratings, and would reduce the cost of the prudential support system. It therefore passes the reasonableness test.

### **7.3 Recommendation**

The Daily Withdrawal of Energy should be adjusted for market participants with a credit rating BBB or better who are buying electricity under a PBC. This will result in lower PSO for these participants.

For all other market participants, the IESO will continue to adjust actual exposure for quantities purchased under PBCs.

These recommendations will require a market rule change regarding PSO calculation and PBC adjustments for investment grade market participants. The changes will be to the calculation of minimum trading limit and default protection amount in Chapter 2 of the Market Rules, Sections 5.2.4.1 and 5.3.8.1. The rules should also require that such market participants notify the IESO of the duration of their PBCs and of any extension or cancellation.

### **7.4 Future Considerations**

If the volume of trading under PBCs increases to the point that some suppliers are no longer net creditors of the IESO, the IESO will consider requiring them to post prudential support to protect against losses that could be caused by their failure to generate under their PBCs.

## **8. ADJUSTING ACTUAL EXPOSURE FOR PLANNED OUTAGES**

### **8.1 Definition and alternatives considered**

For non-dispatchable metered market participants, a component of the actual exposure is calculated according to pre-defined energy quantities (as specified in IMO-FORM-1044) or estimated quantities, as opposed to actual quantities withdrawn. Six calendar days after a given trade day, the pre-defined or estimated quantities will be replaced with amounts that reflect actual meter readings. Therefore, the actual exposure calculation contains a moving six day component based on pre-defined or estimated quantities of energy.

### **8.2 Issue**

Where possible, the actual exposure should be adjusted to better reflect the actual operation of a facility.

### **8.3 Discussion and Analysis**

Reducing the calculated actual exposure when a customer has a planned outage will better match the prudential support required to the effective exposure. The current inconsistency between the pre-defined and actual quantities leads to unwarranted margin calls during outages.

The actual exposure calculation should be an accurate reflection of actual operation. Where changes in the non-dispatchable metered participant's consumption patterns are known in advance, i.e. planned outages, the IESO should adjust the pre-defined energy quantities to reflect the changes.

This change should not increase the risk of a default levy, because it matches the prudential support required better to the exposure that the customer actually has, while it would reduce the cost of the prudential support system. It therefore passes the reasonableness test. However, at issue is the feasibility of the change and the number of operational issues around the implementation of this change at a time when many planned outages do not occur and plans for outages are often changed with little notice. These issues result in some significant implementation challenges and risk management associated with the uncertainties.

### **8.4 Recommendation**

It is recommended that the IESO explore the feasibility of change to the market rules that would allow a consumer market participant to notify the IESO of an upcoming planned outage of all or part of its facility and the IESO to reduce that market participant's actual exposure by the amount of load to be taken out of service. Feasibility issues will include whether the change would be burdensome because it would require excessive additional manual processes.

## **9. ACCEPTABLE FINANCIAL INSTITUTIONS**

### **9.1 Definition and Alternatives Considered**

The Market Rules accept commercial letters of credit from banks listed under a Schedule of the *Bank Act*, S.C. 1991, c.46. This definition excludes credit unions and includes all such scheduled banks, regardless of their degree of financial stability. At issue is whether there should be some other definition of acceptable issuers of commercial letters of credit. Some market participants expressed a desire to have the IESO accept letters of credit from credit unions and some others recommended that the IESO set criteria for financial stability of the acceptable financial institutions.

The alternatives considered were to accept or not accept letters of credit from credit unions, and if so under what conditions; and whether to set some criteria for financial stability of the issuer of a commercial letter of credit to be accepted as collateral.

## **9.2 Discussion and Analysis**

During the stakeholder discussions it became apparent that the main concern of both the stakeholders and the IESO was the quality of the collateral, not the source of the collateral. It would be acceptable if a credit union could issue a letter of credit that has a high degree of certainty that it will be honoured when needed. On the other hand, it would not be acceptable if a bank's letter of credit stood too high a chance of not being honoured due to the issuer's financial instability.

The IESO does not wish to undertake any assessment of the financial stability of the institutions providing collateral for market participants; in any cases, large financial institutions like banks already have credit ratings from recognized agencies. Credit unions may not have such ratings, but without them the IESO will not be able to rely sufficiently on the quality of the collateral.

Ensuring that institutions issuing the letters of credit are financially stable will decrease the probability of a default levy by increasing the probability that the IESO can recover from the posted collateral. It should not add cost to the system, and therefore passes the reasonableness test.

## **9.3 Recommendation**

Amend the market rules to define acceptable institutions as "a bank named in a Schedule to the Bank Act, S.C. 1991, c.46 or a credit union licensed by FSCO having a minimum long-term credit rating of S&P "A" or the equivalent by Moody's, DBRS".

# **10. UNSECURED CREDIT BASED ON SHORT-TERM CREDIT RATINGS**

## **10.1 Definition and Alternatives Considered**

Long-term bond ratings, on which unsecured credit is based, measure the overall financial stability of the company and its ability to meet its obligations in the long term. Short-term credit ratings are opinions on the ability of issuers to honour short-term financial obligations with an original maturity generally no longer than thirteen months. Short term credit ratings are essentially based only on corporate liquidity.

Short-term credit ratings are typically cheaper to maintain and some market participants could have short-term credit ratings but not long-term ones. Some stakeholders expressed an interest in having the IESO consider allowing unsecured credit based on short-term credit ratings. The alternatives are to offer unsecured credit based on short-term credit ratings or not to offer such unsecured credit.

## **10.2 Discussion and Analysis**

Short-term credit ratings do not address the overall financial stability of the market participant. A market participant may have sufficient liquidity to meet short-term obligations but still face underlying financial pressures that could surface and impair the company and its short-term credit rating. By the time such problems surface, the company could be too weak to increase its collateral as required. The IESO's exposure to a market participant extends beyond the short-term time frame, so only a long-term rating would give an accurate indication of longer term creditworthiness.

For some stakeholders the cost savings from their allowable unsecured credit is less than the cost of maintaining a long-term credit rating. The recommendations from this study addresses this in part by increasing the value to the market participant of its long-term credit rating.

As part of this analysis, the IESO examined how many market participants might have short-term, but not long-term, credit ratings. It found that only one market participant has a short-term, but not a long-term, credit rating.

## **10.3 Recommendation**

The recommendation is that the IESO not offer unsecured credit based on short-term credit ratings.

# **11. NO MARGIN CALL OPTION**

## **11.1 Definition and Alternatives Considered**

Using the no margin call option, market participants can, subject to IESO approval, be assured of avoiding margin calls by posting collateral equivalent to 70 days of normal trading activity. No unsecured credit is allowed as part of the collateral for this option.

Some market participants indicated that they would be more likely to use this option if the requirement were reduced. Alternatives considered were to leave the calculation period unchanged at 70 days or to reduce it by four to 66 days.

## **11.2 Discussion and Analysis**

Market participants are invoiced monthly and the invoices are due by the middle of the following month. So at the time that an invoice is due, the market participant would owe the IESO for one month of invoiced charges and fees plus 15 days of charges and fees that have not yet been invoiced, for a total of 45 days. When the Default Protection Amount period of 21 days is then added, the total is 66 days, which was rounded up to 70 days. If the collateral requirement for the no margin call option is to be reduced, therefore, the logical reduction would be four days.

Such a reduction would reduce the required collateral by approximately five per cent. Market participants indicated informally that a relatively small reduction would be unlikely to change their decisions not to use the no margin call option.

Further, the increases in unsecured credit recommended in this Review would reduce the cost to most market participants of any level of credit support they choose when they determine their trading limit. Those concerned about margin calls therefore would have a less expensive way to protect themselves from a margin call; they can simply raise their trading limit.

Reducing the number of days for the no margin call option would marginally increase the probability of a default levy but would not significantly decrease the cost of the prudential support system. It does not pass the reasonableness test.

### **11.3 Recommendation**

Maintain the no margin call option at its current 70 day reference term.

## **12. ACCEPTABLE COLLATERAL**

### **12.1 Definition and Alternatives Considered**

Bank guarantees are among the acceptable forms of collateral for prudential support listed in the market rules for the Ontario Electricity Market, Chapter 2, Section 5.7.2. The IESO has questioned whether these constitute a sufficiently high quality of collateral. Alternatives considered with respect to the acceptance of bank guarantees would be to leave them on the list of acceptable collateral as it stands, to modify the list to set some standards for the form and issuer of the bank guarantee, or to take them off the list.

Some market participants raised issues of acceptance of other forms of collateral, but these issues were not carried forward to this stage.

### **12.2 Discussion and Analysis**

Realization on a bank guarantee in the event of a default could be much more difficult than realization on a letter of credit or other acceptable forms of collateral. This is due to the fact that bank guarantees may have some conditionality on their payment; that is, some event triggers the payout. This event could be subject to litigation, or in any case to question that could delay payment. Any such conditionality raises the possibility that the collateral will not be available immediately and without question. Most market participants agreed that they would prefer that the IESO rely only on the most secure forms of collateral, which would exclude those potentially subject to litigation.

This issue of security of the collateral could be resolved by developing language for the issuer that would preclude any delay or uncertainty in the payout of the guarantee. Without

such language, accepting lower quality collateral would increase the risk of a default levy while reducing the cost for only a few participants, so it does not pass the reasonableness test.

### **12.3 Recommendation**

Amend the market rules to give the IESO discretion over the terms of a bank guarantee offered as collateral. The specific recommendation would be to add “in a form acceptable to IESO” to Chapter 2, s5.7.2.1 of the market rules; similar to the wording that is used in Section 5.7.

## **13. CONTRACTUAL PRE-PAYMENT OPTIONS**

### **13.1 Definition and Alternatives Considered**

Market participants are free to pay the IESO at any time, whether their usage has been billed or not. The payments will be credited to the market participant and could prevent a margin call. The prepayment will not reduce the market participant’s PSO. However, some ISOs allow market participants to reduce their PSO by agreeing contractually to pay in advance of billing. Some market participants have expressed interest in this option; the only change would be that the contractual prepayment would reduce the amount of collateral that the market participant would be required to post.

The issue is whether to reduce a market participant’s PSO if it agrees to make pre-payments on a contractual basis.

### **13.2 Analysis and Discussion**

The ISOs which offer this option do not have a system of self-assessed trading limits. The contractual pre-payment gives the market participant a similar, though less flexible, right to reduce its prudential support obligation. Given that all market participants in Ontario effectively already have this right, a contractual pre payment option does not add much value.

### **13.3 Recommendation**

The recommendation is that the IESO not offer a contractual prepayment option.

# Appendix

## Appendix A      METHODOLOGY FOR ANALYSIS OF PRUDENTIAL SUPPORT

This appendix documents the methodology used in the quantitative analysis of the current prudential support system and the proposed changes to the prudential support requirements. It also examines the implications of a complete elimination of prudential support requirements.

### 1    GENERAL APPROACH{ TC "GENERAL APPROACH" \F C\L "2" }

The intent of this analysis was to estimate how much market participants will pay under each option to (1) meet their prudential support requirements and (2) pay default levies, if any. Although individual participant information was used in the analysis, this report contains only aggregate results to maintain confidentiality. The approach taken is to estimate, for each market participant:

- Their prudential support obligation and the estimated direct financial cost of meeting this obligation;
- How likely they are to default on their electricity bill to the IESO (based on actual or assumed credit ratings and their associated probabilities of default) and the likely amount of this default;
- How much of this default is likely to be covered by the prudential support they have posted, and how much will need to be recovered through a default levy; this will vary between the options; and,
- The total default levy created by all market participants in an average year, and how much of this each market participant would pay.

Although individual participant information was used in the analysis, this report contains only the aggregate results to maintain confidentiality. The calculation is done in two separate ways. In the “probability” approach, amounts are multiplied by probabilities to estimate expected values. In the “Monte Carlo” approach, events (such as whether or not each market participant defaults) either happen or don’t happen, based on random number generation; the calculations are repeated many times and averages are calculated. The two approaches give very similar results. The Monte Carlo approach has the advantage of allowing the calculation of probability distributions (how often certain results occur) rather than only averages.

It should be noted that there are some costs that this analysis does not address. One of these is the cost to the IESO of administering the prudential support system, which may vary among the options. Another is the “opportunity cost” of the prudential support amounts, which is the net profit which the market participants could earn if they were not obliged to post prudential support. For example, if a market participant posts a letter of credit, its

borrowing capacity is correspondingly reduced. Without this obligation, it could, at least in theory, borrow that amount to invest in its business, potentially earning more than the cost of borrowing. No attempt is made to estimate these costs.

## 2 ASSUMPTIONS AND CALCULATIONS{ TC "ASSUMPTIONS AND CALCULATIONS" \f C \L "2" }

### 2.1. Market Participant Data{ TC "Market Participant Data" \f C \l "3" }

The following data for each market participant was used:

- Type (rated, unrated, or guaranteed; LDC or direct customer, where direct customers include wholesale consumers, retailers and marketers)
- Credit rating or good payment history
- June 2006 invoice amount (due in July)
- Maximum Net Exposure
- Discounts for credit rating and good payment history under the current system

### 2.2. Systems Considered{ TC "Systems Considered" \f C \l "3" }

Three prudential support systems were analysed:

- The current system with changes to the price basis
- A proposed variation of the current system, with the new price basis
- A system in which all prudential requirements are eliminated

In the first two systems, a market participant's prudential support requirement is based on its "Maximum Net Exposure", less a discount based on credit rating or good payment

<b>Table A1</b>						
<b>Rated Market Participants (based on Credit Rating*)</b>						
<b>Greater of % or \$ amount</b>						
	<b>Current System</b>		<b>Proposed System</b>		<b>No Prudential Support</b>	
<b>LDCs</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
AAA- or better	100%	n/a	100%	n/a	100%	n/a
AA-, AA, AA+	85%	\$25,000,000	100%	n/a	100%	n/a
A-, A, A+	75%	\$12,500,000	90%	\$30,000,000	100%	n/a
BBB-, BBB, BBB+	50%	\$5,000,000	75%	\$15,000,000	100%	n/a
BB-, BB, BB+	0%	\$0	50%	\$5,000,000	100%	n/a
Below BB-	0%	\$0	0%	\$0	100%	n/a
<b>Direct Customers</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
AAA- or better	100%	n/a	100%	n/a	100%	n/a
AA-, AA, AA+	85%	\$25,000,000	100%	n/a	100%	n/a
A-, A, A+	75%	\$12,500,000	85%	\$25,000,000	100%	n/a
BBB-, BBB, BBB+	50%	\$5,000,000	60%	\$10,000,000	100%	n/a
BB-, BB, BB+	0%	\$0	25%	\$3,000,000	100%	n/a
Below BB-	0%	\$0	0%	\$0	100%	n/a
<b>Unrated Market Participants (based on Good Payment History)</b>						
<b>Lesser of % or \$ amount</b>						
	<b>Current System</b>		<b>Proposed System</b>		<b>No Prudential Support</b>	
<b>LDCs</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
>=6 years	50%	\$5,000,000	70%	\$7,000,000	100%	n/a
>=5 years	50%	\$5,000,000	60%	\$6,000,000	100%	n/a
>=4, <5 years	40%	\$4,000,000	40%	\$5,000,000	100%	n/a
>=3, <4 years	30%	\$3,000,000	30%	\$4,000,000	100%	n/a
>=2, <3 years	20%	\$2,000,000	20%	\$3,000,000	100%	n/a
<2 years	0%	\$0	0%	\$0	100%	n/a
<b>Direct Customers</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>	<b>\$</b>
>=6 years	25%	\$5,000,000	40%	\$6,000,000	100%	n/a
>=5 years	25%	\$5,000,000	25%	\$5,000,000	100%	n/a
>=4, <5 years	20%	\$4,000,000	20%	\$4,000,000	100%	n/a
>=3, <4 years	15%	\$3,000,000	15%	\$3,000,000	100%	n/a
>=2, <3 years	10%	\$2,000,000	10%	\$2,000,000	100%	n/a

history. These discounts are shown in Table A1. A discount of 100% means that the participant is not required to post any prudential support.

The third system (elimination) is analyzed in order to put the costs of the other two options into perspective; it is not being proposed as a recommended change at this time.

### 2.3. Cost of Maintaining Prudential Support

When a market participant posts a letter of credit to meet its prudential support obligation, its bank charges an annual fee, which varies with the participant’s creditworthiness. The fee is a percentage of the amount of the Letter of Credit. These fees were estimated based on discussions with market participants; the estimates are shown in Table A2.

If a market participant meets its prudential support obligation in part through a guarantee, no fee is paid to a bank; however, there is an economic cost, since the guarantee reduces the borrowing capacity of the entity providing it. It is assumed that this cost would be approximately equivalent to the cost of a letter of credit. Guarantors must have a credit rating of at least “BBB-”, and some have higher ratings. It was therefore assumed that their average rating was “A” and the average cost of providing the guarantee was 0.40%. Guarantees make up 28% of the prudential support currently posted, and account for approximately 15% of the total cost. Cash and T-bills make up only 1% of the prudential support posted, and were treated like other forms of prudential support.

<b>Rating</b>	<b>Annual Fee</b>
AAA- or better	0.10%
AA-, AA, AA+	0.35%
A-, A, A+	0.40%
BBB-, BBB, BBB+	0.80%
BB-, BB, BB+	1.50%
Below BB-	2.00%

Many market participants do not have credit ratings. To complete the analysis, credit ratings were estimated for a sample of 11 unrated direct customers, based on their publicly available financial statements. Of the 11, one was estimated to have a credit rating of “A”, three “BBB”, four “BB”, and three “B”. Assuming this is a representative sample of all unrated direct customers, the weighted average cost of maintaining prudential support for all such customers was estimated to be 1.35% (i.e., between “BBB” and “BB”).

LDCs are subject to regulatory oversight, which provides an additional level of security compared to direct customers. Unrated LDCs were therefore assumed to have an average rating of “BBB”, slightly higher than unrated direct customers, and to pay a fee of 0.80%.

The cost of meeting prudential support obligations was based on the amount of the obligation, even though many market participants post higher amounts. The convenience of avoiding margin calls is assumed to offset the additional cost of posting higher amounts.

### 2.4. Probability of Default

The annual probability of default was estimated for each market participant, based on data on annual rates of financial default by U.S. corporate bond issuers between 1989 and 2005, as

reported in “Moody’s Special Comment”. The historical data on U.S. companies was used, because it was based on a much larger number of companies than the data on Canadian companies, and therefore is believed to provide more accurate estimates of the long-term probability of default.

Unrated LDCs were treated as having a “BBB” rating and therefore a probability of default of 0.19% per year. Unrated direct customers with guarantors were also treated as having a “BBB” rating. For unrated direct customers without guarantors, the probability of default was calculated as the weighted average of the probabilities for rated companies, with the weights based on the estimated ratings of 11 direct customers. The result was 2.14%, implying a weighted average rating of between “BB” and “B”.

<b>Table A3 Probabilities of Default</b>	
<b>Credit Rating</b>	<b>Annual Probability</b>
AAA- or better	0.00%
AA-, AA, AA+	0.00%
A-, A, A+	0.04%
BBB-, BBB, BBB+	0.19%
BB-, BB, BB+	1.19%
Below BB-	6.05%
Guaranteed	0.19%
Unrated LDCs	0.19%
Unrated Direct Customers	2.14%

The probabilities of default are shown in Table A3. Based on these probabilities, and the number of market participants in each category, one

would expect to see 1.8 defaults per year on average among the approximately 180 market participants. The actual number of defaults has been much lower: a total of two over the past four years. Part of this discrepancy can be explained by the fact that the economic climate in the last four years has been somewhat better than usual. For example, the average annual default among U.S. companies with a “B” rating has been 2.35% over the past four years, compared to 6.05% over the past 17 years. If the default rates for U.S. companies for the last four years had been used instead of those for the past 17 years, the expected number of defaults among market participants would drop to an average of 1.1 per year, or slightly more than four over a four-year period – substantially more defaults than have actually occurred.

Because of the importance of the default probability assumptions, a sensitivity case was run with all default probabilities reduced by 50%. The expected number of defaults was 0.9 per year, or 3.5 over four years, still higher than, but much closer to, the actual number of defaults.

## **2.5. Loss in Case of Default**

If a market participant defaults, the loss to the other market participants will be the difference between the unpaid electricity bill and the prudential support posted by the defaulting participant. Unpaid amounts were estimated based on actual invoices for June 2006 usage (payable in July). The “best case” loss was assumed to be half of one month’s invoice amount. This might occur if a customer ceased operations and declared bankruptcy at the end of a calendar month (having paid the previous month’s invoice), and the IESO was

subsequently able to recover half of the amount owed from the customer's assets. The "worst case" loss was assumed to be 2.5 months of electricity usage. This might occur, for example, if the customer missed one bill payment, and it took an additional four weeks before the customer could either be physically disconnected or forced into bankruptcy, with none of the amount owing recovered from the customer's assets. For both the probability and Monte Carlo calculations, the unpaid amount was assumed to be evenly distributed between the best case and worst case amounts. The average loss is thus equivalent to 1.5 months of electricity usage.

In case of default, the IESO attempts to recover the loss from the prudential support posted by the defaulting participant, but there is a chance that it would not be able to do so. If prudential support is posted in the form of a guarantee, there is a small chance that the guarantor company would mount a legal challenge to the payment obligation. Where prudential support takes the form of a letter of credit, a successful legal challenge is far less likely, but not impossible. To reflect these uncertainties, the probability of the IESO collecting the prudential support was assumed to be 99% for letters of credit, and 95% for other types of security (cash, T-bills and guarantees).

Some market participants post prudential support in more than one form, for example a guarantee supplemented by a letter of credit. For these, the probability of collection was calculated as a weighted average based on how much of each type of prudential support they are currently posting. The resulting probabilities were assumed to have a binomial distribution: either the prudential support was collected in full, or none of it was collected. It should be noted that the amount of prudential support posted was assumed to equal the prudential support obligation, even though many market participants currently post more than their obligation in order to avoid margin calls.

## **2.6. Payment of Default Levy**

The expected value of the default amount for a single market participant in one year is:

$$\text{(Probability of Default for that market participant)} \times \text{(Loss in Case of Default for that market participant)}$$

This is this market participant's expected contribution to the creation of default levies. The total of these amounts for all market participants is the expected average annual loss to be recovered through default levies.

Default levies are paid by all non-defaulting market participants, including both consumers (those who owe money to the IESO) and suppliers (those who are owed money), based on the absolute value of their invoices. For the purposes of this analysis, suppliers and consumers are each assumed to pay exactly half of any default levy. So for each consumer, the expected average annual cost of paying default levies is:

$$\frac{\text{Typical Invoice Amount for Individual Consumer}}{\text{Total of Invoices for All Consumers}} \times \text{Expected Default Levy} \times 50\%$$

If prudential support obligations were eliminated, with no change in the payment of default levies, then consumers would tend to pay much less (since their cost of meeting prudential support obligations would be eliminated) while suppliers would pay significantly more (since without prudential support, default levies would be larger and more frequent). Since this inequity would certainly be unacceptable to suppliers, another scenario is run in which prudential support obligations are eliminated *and* the default levy policy is changed so that only consumers pay levies.

### **3 RESULTS**

#### **3.1. Current System**

The simulation results for the current prudential support system are shown in Table A4. The direct financial cost of meeting prudential support obligations is estimated to be \$5.3 million per year. As noted above, the expected number of defaults each year is 1.8. These defaults result in default levies worth, on average, \$800,000 per year, but this amount varies greatly from year to year. It is estimated that there will be no default levy 54% of the time (i.e., approximately 1 year out of 2), either because there are no defaults, or because the amount of the default is recovered in full from the prudential support posted. Another 27% of the time, there will be a default but it will be very small (less than \$1 million), and another 16% of the time it will be small (between \$1 million and \$5 million). A significant default levy (more than \$5 million, which is approximately 0.3% of one month's total debit and credit invoices) is expected only 3% of the time (i.e., approximately once every 36 years).

<b>Table A4 Cost of Current Prudential Support System</b>							
	<b>Current Prudential Support Obligation</b>	<b>Current Prudential Support Posted</b>	<b>Estimated Current Annual PSO Cost</b>	<b>Estimated Annual Cost of Maintaining PSOs</b>	<b>Loss to Market / Contribution to Creation of Default Levy</b>	<b>Loss to Participant / Contribution to Payment of Default Levy</b>	<b>Total Cost (PSO plus Levy)</b>
	<b>(\$ million)</b>	<b>(\$ million)</b>	<b>(%)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
<b>LDCs</b>							
Rated	\$188.1	\$192.3	0.40%	\$752,393	\$154,435	\$208,684	\$961,077
Guarantor Rated	\$92.2	\$154.6	0.40%	\$368,947	\$26,312	\$28,103	\$397,050
Unrated	\$242.9	\$265.0	0.51%	\$1,237,585	\$140,751	\$92,352	\$1,329,937
<b>Total LDCs</b>	<b>\$523.2</b>	<b>\$611.8</b>	<b>0.45%</b>	<b>\$2,358,925</b>	<b>\$321,498</b>	<b>\$329,139</b>	<b>\$2,688,064</b>
<b>Direct Customers</b>							
Rated	\$72.29	\$72.1	1.22%	\$882,705	\$67,991	\$29,109	\$911,814
Guarantor Rated	\$78.0	\$80.3	0.40%	\$311,885	\$1,737	\$6,630	\$318,515
Unrated	\$128.7	\$130.1	1.35%	\$1,731,663	\$400,759	\$31,114	\$1,762,778
<b>Total Directs</b>	<b>\$278.9</b>	<b>\$282.5</b>	<b>1.05%</b>	<b>\$2,926,254</b>	<b>\$470,486</b>	<b>\$66,853</b>	<b>\$2,993,107</b>
<b>All Consumers</b>	<b>\$802.1</b>	<b>\$894.3</b>	<b>0.65%</b>	<b>\$5,285,179</b>	<b>\$791,984</b>	<b>\$395,992</b>	<b>\$5,681,171</b>
<b>All Sources</b>						<b>\$395,992</b>	<b>\$395,992</b>
<b>Probability that Cost will be in Range</b>							
None					54.3%		0.0%
Up to \$1 million					26.7%		0.0%
\$1-5 million					16.2%		0.0%
\$5-10 million					2.2%		96.8%
\$10-50 million					0.55%		3.12%
> \$50 million					0.10%		0.10%

Under the current system, the total cost of the prudential support system, including both the cost of meeting prudential support obligations and the cost of paying default levies if any, will almost always (97% of the time) be between \$5 million and \$10 million. It will exceed \$10 million only 3% of the time. This would occur only when there is a default by a large market participant, probably one of the largest LDCs, with an excellent credit rating (and therefore little or no prudential support obligation). The current system thus provides market participants with very predictable costs.

### 3.2. Current System with Revised Price Basis

One of the recommendations of this study is to revise the base prices used to calculate prudential support obligations. The new prices are \$55/MWh for LDCs, and \$58.95/MWh for direct customers the impact of which are shown in Table A5. IESO staff estimated that using the new base prices would increase the Maximum Net Exposure of LDCs by approximately 7%, and decrease the MNEs of direct customers by approximately 3%. The net impact is to

increase overall prudential support obligations by \$33 million (4%), and to increase the cost of maintaining PSOs by \$110,000/year (2%). The increase in the LDCs' PSO's more than offset the decrease in the direct customers' PSOs. However, there is almost no change in the expected average annual default amount, because the LDCs tend to have lower default rates than direct customers. There is also no significant change in the statistical distribution of total costs.

	Prudential Support Obligation	Prudential Support Posted	Estimated Annual PSO Cost	Estimated Annual Cost of Maintaining PSOs	Loss to Market / Contribution to Creation of Default Levy	Loss to Participant / Contribution to Payment of Default Levy	Total Cost (PSO plus Levy)
<b>LDCs</b>	<b>(\$ million)</b>	<b>(\$ million)</b>	<b>(%)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
Rated	\$202.0	\$192.3	0.40%	\$807,959	\$149,622	\$209,462	\$1,017,421
Guarantor Rated	\$99.0	\$154.6	0.40%	\$396,173	\$21,572	\$28,207	\$424,381
Unrated	\$263.9	\$265.0	0.51%	\$1,356,812	\$121,179	\$92,696	\$1,449,508
<b>Total LDCs</b>	<b>\$565.0</b>	<b>\$611.8</b>	<b>0.45%</b>	<b>\$2,560,944</b>	<b>\$292,372</b>	<b>\$330,366</b>	<b>\$2,891,309</b>
<b>Direct Customers</b>	<b>(\$ million)</b>	<b>(\$ million)</b>	<b>(%)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
Rated	\$69.9	\$72.1	1.22%	\$855,024	\$75,378	\$29,218	\$884,242
Guarantor Rated	\$75.6	\$80.3	0.40%	\$302,529	\$1,746	\$6,654	\$309,183
Unrated	\$124.9	\$130.1	1.35%	\$1,679,935	\$425,438	\$31,230	\$1,711,165
<b>Total Directs</b>	<b>\$270.4</b>	<b>\$282.5</b>	<b>1.05%</b>	<b>\$2,837,488</b>	<b>\$502,563</b>	<b>\$67,102</b>	<b>\$2,904,590</b>
<b>All Consumers</b>	<b>\$835.4</b>	<b>\$894.3</b>	<b>0.65%</b>	<b>\$5,398,432</b>	<b>\$794,936</b>	<b>\$397,468</b>	<b>\$5,795,900</b>
<b>All Sources</b>						<b>\$397,468</b>	<b>\$397,468</b>
<b>Probability that Cost will be in Range</b>							
None					53.0%		0.0%
Up to \$1 million					27.2%		0.0%
\$1-5 million					17.0%		0.0%
\$5-10 million					2.1%		96.7%
\$10-50 million					0.57%		3.19%
> \$50 million					0.11%		0.13%

### 3.3. Proposed System with Revised Price Basis

The proposed system would eliminate prudential support obligations for the most creditworthy market participants, and reduce them for most of the others. The effect of this change would be to reduce the cost to the consumers of meeting their prudential support obligations and increase the frequency, size and cost of default levies. The simulation results for this option are shown in Table A6. The cost of meeting prudential support obligations would be reduced by \$1.3 million (25%), to \$4.1 million per year, relative to the current

system with the revised price basis, while the expected annual default levy would increase by \$300,000 (39%). There would be fewer years with no default levy (44%, instead of 53%) and more years with a default levy of more than \$5 million (4.6%, or one year out of 22, instead of 2.8%). However, the total cost (the cost of maintaining prudential support plus the cost of the default levies) in an average year would be reduced by \$1,000,000 (17%), and the chance of the total cost exceeding \$10 million would be almost exactly the same (3.3%). This system would also provide market participants with very predictable costs.

**Table A6 – Proposed System with Revised Price Basis**

	Revised Prudential Support Obligation	Estimated Annual Cost of Maintaining PSOs	Savings in Annual Costs	Loss to Market / Contribution to Creation of Default Levy	Increase in Creation of Default Levy	Loss to Participant / Contribution to Payment of Default Levy	Total Cost (PSO plus Levy)
<b>LDCs</b>	(\$ million)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Rated	\$78.4	\$313,723	\$494,235	\$192,740	\$43,119	\$290,207	\$603,930
Guarantor Rated	\$95.9	\$383,552	\$12,621	\$23,855	\$2,283	\$39,081	\$422,633
Unrated	\$215.3	\$967,438	\$389,374	\$185,633	\$64,454	\$128,429	\$1,095,867
<b>Total LDCs</b>	<b>\$389.6</b>	<b>\$1,664,713</b>	<b>\$896,231</b>	<b>\$402,228</b>	<b>\$109,855</b>	<b>\$457,717</b>	<b>\$2,122,430</b>
<b>Direct Customers</b>	(\$ million)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Rated	\$48.3	\$582,145	\$272,879	\$165,510	\$90,131	\$40,480	\$622,625
Guarantor Rated	\$72.4	\$289,574	\$12,955	\$1,857	\$111	\$9,220	\$298,794
Unrated	\$113.7	\$1,529,337	\$150,598	\$531,777	\$106,339	\$43,269	\$1,572,606
<b>Total Directs</b>	<b>\$234.4</b>	<b>\$2,401,056</b>	<b>\$436,432</b>	<b>\$699,145</b>	<b>\$196,581</b>	<b>\$92,969</b>	<b>\$2,494,025</b>
<b>All Consumers</b>	<b>\$623.9</b>	<b>\$4,065,768</b>	<b>\$1,332,663</b>	<b>\$1,101,373</b>	<b>\$306,437</b>	<b>\$550,686</b>	<b>\$4,616,455</b>
<b>All Sources</b>						<b>\$550,686</b>	<b>\$550,686</b>
<b>Probability that Cost is in Range</b>							
None				44.2%			0.0%
Up to \$1 million				29.7%			0.0%
\$1-5 million				21.5%			73.0%
\$5-10 million				3.6%			23.7%
\$10-50 million				0.83%			3.17%
> \$50 million				0.15%			0.16%

Almost all consumers would see their total average cost reduced, relative to the current system with revised base prices, with rated LDCs experiencing the greatest reduction in percentage terms (approximately 40%). Unrated market participants with guarantees, on the other hand, would see little or no change in their total average cost. However, the share of default levies paid by suppliers would increase by \$150,000 in an average year.

### 3.4. Elimination of Prudential Support

This option is included to put the costs of the current prudential support system, and any proposed modifications, into perspective. It is not being proposed as a recommended change at this time. The results of the simulation are shown in Table A7.

Table A7 Cost of System with No Prudential Requirements								
	Revised Prudential Support Obligation	Estimated Annual Cost of Maintaining PSOs	Savings in Annual Costs	Loss to Market / Contribution to Creation of Default Levy	Increase in Creation of Default Levy	Loss to Participant / Contribution to Payment of Default Levy	Total Cost (PSO plus Levy)	Total Cost with Only Consumers Paying Levy
<b>LDCs</b>	<b>(\$ million)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
Rated	\$0.0	\$0	\$807,959	\$220,145	\$70,523	\$954,802	\$954,802	\$1,909,605
Guarantor Rated	\$0.0	\$0	\$396,173	\$158,112	\$136,540	\$128,579	\$128,579	\$257,158
Unrated	\$0.0	\$0	\$1,356,812	\$519,594	\$398,415	\$422,542	\$422,542	\$845,085
<b>Total LDCs</b>	<b>\$0.0</b>	<b>\$0</b>	<b>\$2,560,944</b>	<b>\$897,851</b>	<b>\$605,479</b>	<b>\$1,505,924</b>	<b>\$1,505,924</b>	<b>\$3,011,848</b>
<b>Direct Customers</b>	<b>(\$ million)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
Rated	\$0.0	\$0	\$855,024	\$698,672	\$623,293	\$133,184	\$133,184	\$266,368
Guarantor Rated	\$0.0	\$0	\$302,529	\$37,300	\$35,554	\$30,333	\$30,333	\$60,666
Unrated	\$0.0	\$0	\$1,679,935	\$1,989,777	\$1,564,338	\$142,359	\$142,359	\$284,718
<b>Total Directs</b>	<b>\$0.0</b>	<b>\$0</b>	<b>\$2,837,488</b>	<b>\$2,725,749</b>	<b>\$2,223,186</b>	<b>\$305,876</b>	<b>\$305,876</b>	<b>\$611,752</b>
<b>All Consumers</b>	<b>\$0.0</b>	<b>\$0</b>	<b>\$5,398,432</b>	<b>\$3,623,600</b>	<b>\$2,828,665</b>	<b>\$1,811,800</b>	<b>\$1,811,800</b>	<b>\$3,623,600</b>
<b>All Sources</b>						<b>\$1,811,800</b>	<b>\$1,811,800</b>	<b>\$0</b>
Probability that Cost will be in Range								
None				17.0%			17.0%	17.0%
Up to \$1 million				25.3%			25.3%	25.3%
\$1-5 million				34.4%			34.4%	34.4%
\$5-10 million				14.1%			14.1%	14.1%
\$10-50 million				8.89%			8.89%	8.89%
> \$50 million				0.33%			0.33%	0.33%

If prudential support obligations were eliminated entirely, consumers would save the \$5.3 million per year that it currently costs them to meet these obligations. Default levies would become more common and more expensive, occurring almost every year, and amounting to an average of \$3.6 million per year. Average annual savings relative to the current system would amount to \$2.6 million. Savings to consumers would amount to \$4.0 million, while suppliers would pay an additional \$1.4 million.

Since such a system would be obviously unfair to suppliers, a variation was run with consumers paying 100% of the default levy. This would save suppliers the \$400,000/year on average that they would pay for their share of default levies under the current system. Most consumers would also see substantial savings in an average year: 80% savings for direct customers, and 40% savings for unrated LDCs (with and without guarantees). Rated LDCs however, would see their average annual costs almost double; their prudential support obligations and costs under the current system are fairly low, so their cost savings would be limited, and would be more than offset by their share of the (significantly increased) default levies.

The cost of defaults would be less predictable than the cost of either the current or proposed prudential support system. In most years (77%, or three years out of four) the default levy would amount to less than \$5 million – what it is currently costing market participants just to meet their prudential support obligations. 14% of the time the annual cost would be between \$5 million and \$10 million, and it would exceed \$10 million 9% of the time (approximately one year in 11). The total cost would be lower than the cost under the current system approximately 83% of the time (5 years out of 6), and higher the remaining 17% of the time (one year out of 6).

The results for the three options are summarized in Table A8. The Elimination option has the lowest overall average annual cost, and the lowest cost for all groups except the rated LDCs. It should be noted that a comparison based on average annual costs does not take into account risk tolerance, which may vary greatly between market participants. The Elimination option would result in lower total costs than the other two options in most years (around 80%), but significantly higher costs in a few years.

**Table A8 – Comparison of Systems**

<b>Table A8 – Comparison of Systems</b>							
<b>Loss to Market/Contribution to Default Levy</b>				<b>Total Cost (PSO plus Default Levy)</b>			
	<b>Current System</b>	<b>Proposed System</b>	<b>Elimination of Prudential Support</b>	<b>Current System</b>	<b>Proposed System</b>	<b>Elimination of Prudential Support</b>	<b>Elimination - Only Consumers Pay Levy</b>
<b>LDCs</b>	<b>(\$ 000's)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
Rated	\$149,622	\$192,740	\$220,145	\$1,017,421	\$603,930	\$954,802	\$1,909,605
Guarantor Rated	\$21,572	\$23,855	\$158,112	\$424,381	\$422,633	\$128,579	\$257,158
Unrated	\$121,179	\$185,633	\$519,594	\$1,449,508	\$1,095,867	\$422,542	\$845,085
<b>Total LDCs</b>	<b>\$292,372</b>	<b>\$402,228</b>	<b>\$897,851</b>	<b>\$2,891,309</b>	<b>\$2,122,430</b>	<b>\$1,505,924</b>	<b>\$3,011,848</b>
<b>Direct Customers</b>	<b>(\$ 000's)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
Rated	\$75,378	\$165,510	\$698,672	\$884,242	\$622,625	\$133,184	\$266,368
Guarantor Rated	\$1,746	\$1,857	\$37,300	\$309,183	\$298,794	\$30,333	\$60,666
Unrated	\$425,438	\$531,777	\$1,989,777	\$1,711,165	\$1,572,606	\$142,359	\$284,718
<b>Total Directs</b>	<b>\$502,563</b>	<b>\$699,145</b>	<b>\$2,725,749</b>	<b>\$2,904,590</b>	<b>\$2,494,025</b>	<b>\$305,876</b>	<b>\$611,752</b>
<b>All Consumers</b>	<b>\$794,936</b>	<b>\$1,101,373</b>	<b>\$3,623,600</b>	<b>\$5,795,900</b>	<b>\$4,616,455</b>	<b>\$1,811,800</b>	<b>\$3,623,600</b>
<b>All Sources</b>				<b>\$397,468</b>	<b>\$550,686</b>	<b>\$1,811,800</b>	<b>\$0</b>
<b>Probability that Cost will be in Range:</b>							
None	53.0%	44.2%	17.0%	0.0%	0.0%	17.0%	17.0%
Up to \$1 million	27.2%	29.7%	25.3%	0.0%	0.0%	25.3%	25.3%
\$1-5 million	17.0%	21.5%	34.4%	0.0%	73.0%	34.4%	34.4%
\$5-10 million	2.1%	3.6%	14.1%	96.7%	23.7%	14.1%	14.1%
\$10-50 million	0.57%	0.83%	8.89%	3.19%	3.17%	8.89%	8.89%
> \$50 million	0.11%	0.15%	0.33%	0.13%	0.16%	0.33%	0.33%