



**EB-2007-0063**

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15, (Schedule B);

**AND IN THE MATTER OF** applications by electricity distribution companies for approval of a smart meter rate adder;

**AND IN THE MATTER OF** a combined proceeding initiated by the Ontario Energy Board pursuant to sections 19(4), 21(1), 21(5) and 78(3.03) of the *Ontario Energy Board Act, 1998* to determine issues related to the recovery of costs incurred by distributors and associated with authorized discretionary metering activities.

**BEFORE:** Gordon Kaiser  
Vice Chair, Presiding Member

Ken Quesnelle  
Member

Cathy Spoel  
Member

**DECISION WITH REASONS**

August 8, 2007

This combined proceeding was initiated to review costs incurred by thirteen electricity distributors for certain smart metering activities. For the reasons stated below the Board finds that the costs were prudently incurred and allows recovery of the costs. These costs are set out in Appendix "A" to this decision. Not all of the applicants have requested rate increases at this time.

This proceeding serves not only to determine cost recovery, but also to provide guidance to other Ontario utilities that will be installing smart meters in the near future. For reasons of confidentiality discussed later in this Decision, not all costs are itemized. The Board believes that aggregate costs offer sufficient disclosure. The costs allowed are based upon the actual costs incurred year-to-date, notwithstanding the fact that some utilities requested recovery of forecasted costs.

## Background

**The Combined Proceeding:** In January of 2007, twelve licensed distributors authorized by Ontario Regulation 427/06 to conduct discretionary metering activities filed applications pursuant to section 78 of the *Ontario Energy Board Act, 1998* for the approval of distribution rates. These applications included a smart metering rate adder to be effective as of May 1, 2007.

The twelve distributors are Chatham-Kent Hydro Inc., Enersource Hydro Mississauga Inc., Horizon Utilities Corporation, Hydro One Brampton Networks Inc., Hydro One Networks Inc., Hydro Ottawa Limited, Middlesex Power Distribution Corporation, Milton Hydro Distribution Inc., PowerStream Inc., Tay Hydro Electric Distribution Co. Inc., Toronto Hydro-Electric System Limited, and Veridian Connections Inc.

On March 26, 2007, the Board received an application from Toronto Hydro-Electric System Limited pursuant to section 78 of the Act for rate adjustments related to smart metering activities and Conservation and Demand Management ("CDM") programs. The Board has decided to consider Toronto's smart metering costs in this Combined Proceeding. The Board issued a Notice of Combined Proceeding establishing this proceeding to determine the prudence and recovery of costs associated with smart

metering activities for the twelve licensed distributors referred to above, and a thirteenth licensed distributor, Newmarket Hydro Limited, that has been authorized by regulation to conduct discretionary metering activities. These thirteen licensed distributors are deemed to be applicants in this Combined Proceeding.

On June 1, 2007 the Board heard submissions from the parties on contested issues and proposed minimum filing requirements. The Board issued its oral Decision with respect to these matters on June 1, 2007<sup>1</sup>. On June 5, 2007 the Board issued Procedural Order No. 3 which set out the final Issues List, the Minimum Filing Requirements and the Exhibit List. Procedural Order No. 4 issued on June 11, 2007 granted parties an opportunity to object to the applicants' requests for confidentiality with respect to certain evidence. The Board also gave the applicants an opportunity to reply to any such objections and attached a timetable for the examination of witness panels.

On July 10, 2007 the Board issued Procedural Order No. 5 calling for oral submissions on the issue of confidentiality and oral reply submissions by the applicants.

**The Smart Metering Initiative:** Before proceeding to consider the relief sought by the thirteen applicants, it is important to put the smart metering initiative ("SMI") in context. This is a Government mandated program. The Ontario Government has committed to install 800,000 smart meters in homes and small businesses by 2007 and throughout Ontario by 2010. The Government's policy, as evidenced through recent legislative amendment and regulatory initiative has clearly been to use electricity distributors to deploy smart meters in Ontario.

The evidence submitted by the thirteen utilities in support of their cost recovery requests indicates that over one million smart meters will be installed by the end of 2007. The number for each utility is set out in Appendix "B".

Ten utilities<sup>2</sup> included specific expenditures on smart meters in their 2006 electricity distribution rate ("EDR") applications. The spending was over and above the spending

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<sup>1</sup> Transcript Volume: Issues Day, page 57 line 28 to page 58 line 6

<sup>2</sup> These are: Bluewater Power Distribution, ELK Energy, Enersource Hydro Mississauga, Essex Powerlines, Festival Hydro, Horizon, Kingston Electricity Distribution, Hydro Ottawa, Toronto Hydro, and Veridian Connections. A further 11 utilities who are not named as applicants in this proceeding have also submitted smart meter plans with their 2006 rate applications.

on pilot programs previously approved as part of the CDM 3<sup>rd</sup> tranche initiatives<sup>3</sup>. Of these 10 utilities, four also requested variance accounts to track any differences between planned and actual spending on smart meters.

In its Decision of March 21, 2006<sup>4</sup>, the Board determined that utilities that had installed meters and requested rate relief should be allowed \$3.50 per meter for each month during the rate year that the meter was installed (that is, \$3.50 per meter per installed month).

The Board also ruled that utilities that had not proposed any expenditures for smart meters in 2006 should include the amount of \$0.30 per residential customer per month in their 2006 rates. The Board concluded that given the increased need for electricity and the importance of conservation, specific funding should be included in 2006 rates for all Ontario utilities, stating that this would be an important step in the development of smart metering technology and would increase the effort and commitment by both utilities and technology suppliers.

Subsequently, the Government enacted regulations under the *Electricity Act, 1998* to prescribe the class of consumers and criteria for the smart meters, to authorize specific distributors to conduct discretionary metering activities, and to identify priority installations. Regulations were also made under the *Ontario Energy Board Act, 1998* prescribing conditions for cost recovery.

In January 2007, the Board provided filing information for smart meter funding to be included in 2007 electricity distribution rates. The Board also approved the continuation in 2007 rates of \$0.30 per residential customer per month for utilities not authorized to conduct smart metering activities in 2007. For those 13 utilities authorized by regulation to incur expenditures for smart meters in 2007, the Board approved 12 applications for a rate adder equal to the returns that would be earned on an equivalent fixed asset if that

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<sup>3</sup> In previous individual Decisions for 2005 rates, the Board approved spending on CDM programs that was linked to each distributor's third installment (or tranche) of the allowed Market Based Rate of Return.

<sup>4</sup> EB-2005-0529, March 21, 2006

asset were, in fact, added to rate base<sup>5</sup>. The rate orders indicated that the Board would hold a combined proceeding to consider appropriate recovery of smart meter costs.

As a result of the funding through 2006 and 2007 rates, a number of utilities in this proceeding will not require rate increases to cover smart meter costs incurred to date. In such cases, the costs have been effectively “pre-funded” through Orders for 2006 and 2007 rates. The funding received to date broken down by utility is set out in Appendix “C”. The Board has received requests for rate increases by only three utilities, Toronto Hydro, Chatham-Kent and Middlesex.

## Confidentiality

At the beginning of this hearing the Board heard motions on the need to maintain confidentiality on the prices paid for smart meters, as well as deployment costs. A similar request was made regarding the contractual provisions. The requests were made by the major suppliers to the thirteen utilities, Elster Metering, a Division of Canadian Metering Co. Inc. (“Elster”), Ozz Corporation and Trilliant Networks Canada Inc. (“Ozz/Trilliant”), Sensus Metering Systems Inc. (“Sensus”) and Tantalus Systems Corp. (“Tantalus”). Submissions were also made by some of the suppliers that were not successful in securing orders for equipment or services from the thirteen applicant utilities.

To a large degree the utilities supported the requests of their suppliers. Many of them admitted, however, that their contracts provided that such information would be released if required by a Board Order.

As a general rule, the Board is reluctant to receive information on a confidential basis, particularly where the prudence of large capital expenditures is involved. It is significant however, that the request for confidentiality was not opposed by the intervenors. In order to proceed in an efficient fashion, at the outset of the proceeding after hearing all parties’ submissions on the issue of confidentiality, the Board ruled that it would hear all of the evidence *in camera* and make a decision after hearing all of the evidence as to

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<sup>5</sup> All utilities except Newmarket applied for a smart metering rate adder in accordance with the Addendum for Smart Metering Rates to the Report of the Board on 2<sup>nd</sup> Generation Incentive Regulation for Ontario’s Electricity Distributors dated January 29, 2007

what information should be disclosed publicly. The Board specifically excluded vendors of smart meter systems and all utilities other than the thirteen applicants. All other parties were eligible to attend the *in camera* proceeding and have access to confidential transcripts, provided that they signed the Board's standard form of Declaration and Undertaking for maintaining confidentiality.

The Board heard further submissions on confidentiality on July 12<sup>th</sup>, the final day for arguments. The general consensus was that the public interest could be met by bundling smart meter costs on a cost per installation basis and publicly disclosing only these bundled costs.

While disclosure on the public record was limited during the proceeding, the Board notes that there was a wide ranging examination by a number of intervenor groups on smart meter costs throughout the hearing. Four customer groups were involved in the hearing.

It is rare for an entire proceeding to be held *in camera*, but this proceeding faces unusual circumstances. As this Decision indicates, the purchase of smart meters by the thirteen utilities involved a complicated competitive tendering process. The Board was advised that a similar competitive tendering process will likely be employed by the rest of the Ontario utilities. This process may, of course, be expedited by the experience gained with the first thirteen utilities. However, the Board heard that the competitive positions of the suppliers would be eroded if the prices charged to the thirteen utilities were disclosed. The Board accepts this position. It is important that the tendering and bidding processes continue to be competitive. The Board also recognized that none of the intervenors opposed maintaining confidentiality for the evidence and that intervenors representing four major consumer groups had access to all of the information. The Board finds that it is in the public interest that the prices charged to the applicants, including unit prices, installation costs and the contractual terms, be kept confidential. However, the aggregated per unit installed prices will be part of the Decision.

## **The Issues**

On June 1, 2007, the Board issued a Decision defining the issues in this case. Those issues are set out in Appendix "A" to the Procedural Order of June 5, 2007 and include

cost recovery related to Minimum Functionality pursuant to Ontario Regulation 426/06, including the cost recovery timeline. The other issues include the prudence of costs incurred, the mechanism for resetting rates to recover costs found to be prudent and the regulatory treatment of stranded meter costs. These issues also included certain accounting procedures such as the mechanism for clearing variance accounts and the mechanism for resetting smart meter costs on a go-forward basis.

This Decision also deals with the mechanism for dealing with certain costs that are not otherwise part of this combined proceeding, such as the prudence of Toronto Hydro's costs associated with smart meter deployment for certain mid-size commercial customers. This last issue was unique to Toronto Hydro and arose from a separate application that the utility filed with the Board. That application, as previously indicated, was combined in this proceeding.

## **Relief Requested**

All of the applicants in this proceeding requested orders approving:

1. The Applicants' interpretation of Minimum Functionality.
2. The Applicants' prudence in the purchasing of smart meters.
3. The Applicants' proposed methodology for dealing with stranded smart meter costs.
4. The Applicants' proposed methodology for recovering smart meter costs through rates.
5. The Applicants' proposed accounting procedures related to the smart meter costs.

Each of these matters is dealt with in turn in this Decision. Certain other issues unique to certain utilities are dealt with later in the Decision.

## Minimum Functionality

On August 10, 2006 the Government of Ontario issued Ontario Regulation 425/06 (Criteria and Requirements for Meters and Metering Equipment, Systems and Technology) made under the *Electricity Act, 1998* which sets out the minimum functionality for advanced metering infrastructure (“AMI”) in the Province of Ontario for residential and small general service customers. With one exception (as noted above), the consideration of cost recovery for the SMI in this proceeding was limited to the recovery of smart meter costs relating to functionality that does not exceed the minimum functionality adopted in Ontario Regulation 425/06.

In the case of capital costs, the Board has determined that there are fourteen cost categories in relation to smart meter minimum functionality. These are set out in Appendix “A” to this Decision. The evidence provided to the Board in this proceeding shows that the majority of the costs relating to smart metering are capital costs. There was also evidence, however, of some operation, maintenance and administration (“OM&A”) costs. The categories of OM&A costs are also identified in Appendix “A” to this Decision.

As indicated, this proceeding relates only to the recovery of smart meter costs associated with minimum functionality. Costs in addition to minimum functionality can be recovered as part of distribution rates in an individual utility’s next rate case. Those costs may include web presentment, the Customer Information System integration with the Meter Data Management/Meter Data Repository, consumer education, re-engineering business practices and integration with retailers. A diagram which was provided in evidence in this proceeding that describes the Ontario Smart Metering System is set out in Appendix “D” to this Decision. The Board heard from several parties that the area within the box titled “Advanced Metering Infrastructure (AMI)” defines minimum functionality. The Board agrees.



## The Procurement Process

A number of utilities were asked by intervenors if they had conducted a cost benefit study regarding their smart meter installation. In all cases utilities responded that they had not because this is a Government mandated program. The Board accepts that response.

The Board is required however, to perform a prudence analysis regarding the expenditures incurred. The Board conducted a combined hearing in part to allow the Board to examine the different technologies deployed by different utilities, as well as the different cost implications. At a high level the Board found that the evidence provided by the utilities demonstrates that they acted in a professional manner and exercised the necessary due diligence in their smart meter purchasing decisions. The evidence provided shows that in many cases the utilities have maximized buying economies through buying groups and in all cases where buying groups were used, the members of the buying group received the same price, regardless of their size.

A prudence analysis relates not only to the price paid for goods and services purchased, but also to the procurement process itself.

The procurement process with respect to the purchase of smart meters and related equipment and services in this Province has been unique. The Government was extensively involved. A number of regulations were enacted circumscribing the activities of the utilities including Ontario Regulations 425/06, 426/06 and 427/06. Among other things, these regulations identify the thirteen utilities authorized to undertake smart metering activities in the Province as well as the minimum functionality of the smart meter system.

The thirteen distributors authorized to purchase smart meters in the first phase of the Government's initiative ultimately formed four different buying groups as set out in Appendix "B". The four successful suppliers were Elster, OZZ/Trilliant, Sensus and Tantalus. Appendix "B" also describes the smart meter technology offered by each of these suppliers.

The largest of the buying groups was formed by the members of the Coalition of Large Distributors (“CLD”) consisting of Toronto Hydro, Hydro Ottawa, Horizon, PowerStream, Veridian and Enersource.

The procurement process followed by each of the buying groups as provided in the evidence is identified in the following sub-sections. The Board accepts this evidence.

**The CLD Group:** The CLD Group stated that the Government, through the Ministry of Energy, was heavily involved in the procurement process. The Ministry of Energy had representation at CLD meetings and retained final approval before the release of any procurement specifications. The Government determined by Regulation that each of the CLD members was authorized to conduct its smart meter program pursuant to this procurement process.

Each CLD member assigned a metering representative to develop the technical requirements of a document that came to be called the Request for Pre-qualification (“RFPQ”). The Ministry recommended a procurement specialist (Partnering and Procurement Inc. or “PPI”) to assist the CLD and Ministry with the development of the RFPQ. The primary objective of this exercise was to develop a procurement process that would be fair and transparent to potential vendors and allow for comprehensive review of all potential technical options. The PPI, with input from the CLD and Ministry, developed the score sheets that were used to conduct the evaluations of the various bidders into the process.

Enersource took the lead in developing the RFPQ document and the CLD and PPI continued to review the requirements established by the Ministry and to identify their own implementation requirements. This work continued through April, 2006, with the PPI and the Ministry participating on a regular basis culminating in a draft RFPQ document at the end of April.

The CLD agreed with the Ministry request to have a Fairness Commissioner review the RFPQ and retained Knowles Consultancy Services for this purpose. This company was already under retainer to the Province of Ontario. The role of the Fairness Commissioner was to ensure that the AMI proponents disclose all actual or potential conflicts of interest, and that the RFPQ process was managed and completed in an

open, fair and transparent manner. The CLD developed a Code of Conduct to be signed by all potential vendors to address these considerations.

On May 2, 2006 the RFPQ document was released and posted on the MERX website (a website designed to invite bids on public sector competitive procurement processes). In total, 22 submissions were received by the CLD. The other members of the core CLD team reviewed the submissions for compliance and some vendors were rejected as non-compliant. The Elster smart meter system was ultimately chosen by five of the six CLD members.

As noted above, PowerStream, as a CLD member, participated fully in the RFPQ process. PowerStream testified that it then entered into negotiations with three of the qualified suppliers to satisfy its individual requirements and secure the best pricing. PowerStream ultimately selected Sensus as most closely matching all of its requirements for both technology and price.

**Newmarket and Tay:** Newmarket and Tay were not directly involved with the CLD's RFPQ process, but adopted that process once the five suppliers were qualified. Like PowerStream, Newmarket and Tay entered into negotiations with three of the qualified suppliers. Newmarket and Tay also ultimately selected Sensus as the preferred technology. Although PowerStream and Newmarket and Tay did not formally combine to negotiate with Sensus, they were able to achieve a commitment from the supplier to offer each utility the same price based on the combined volumes for PowerStream, Newmarket and Tay. Newmarket and Tay met with the Ministry of Energy staff to discuss their ability to rapidly deploy smart metering technology and were subsequently named as priority installations in Ontario Regulation 428/06. Their deployment plans were filed with the Minister on June 26, 2006. Ontario Regulation 427/06 authorized Newmarket and Tay to undertake smart meter deployment. They filed their smart meter deployment plans with the Minister of Energy.

**Hydro One Networks Inc. and Hydro One Brampton Networks Inc.:** Hydro One Networks' procurement process began with a request for proposal ("RFP") issued in March 2005. Hydro One's RFP requested proposals for the provision of smart meters for all or a part of Hydro One's smart meter deployment. Hydro One evaluated the responses to the RFP based on the following criteria: quality of the solution, capability of

the proponent, qualification of the vendor personnel and pricing. Hydro One indicated that Ozz/Trilliant achieved the highest overall evaluation score of all suppliers.

Ontario Regulation 427/06 authorized Hydro One to conduct a smart meter program as long as it did so in accordance with the March 2005 RFP. The regulation also authorized Hydro One Brampton to conduct smart metering activities. Both companies followed the March 2005 RFP process as required.

**Milton:** Milton began installing smart meters on all new residential building in 2003 using the only technology approved by Measurement Canada at the time. That technology is now provided by Ozz/Trilliant. Milton reviewed additional technologies as they received Measurement Canada approval, but chose to remain with Ozz/Trilliant. Milton indicated that they were able to obtain the same volume discount pricing Ozz/Trilliant offered to Hydro One.

Milton testified that it will also buy meter reading services from Ozz/Trilliant rather than buying the meter reading software purchased by Hydro One. Milton was named as a priority installation in Ontario Regulation 428/06, and filed its deployment plans with the Minister in June 2006. Ontario Regulation 427/06 authorized Milton to undertake smart meter deployment in accordance with the plan filed with the Ministry.

**Chatham-Kent and Middlesex:** Chatham-Kent and Middlesex, like Milton, Newmarket and Tay, are priority installations named in Ontario Regulation 428/06. Like Milton, Chatham-Kent began to assess smart meter technologies in 2004 prior to the Government's pronouncements with respect to the SMI. Chatham-Kent testified that it assessed four technologies before selecting Tantalus as the technology supplier for a pilot project. As part of its evidence, Chatham-Kent provided a study by Deloitte Inc. that reviewed the costs and benefits of the pilot, and calculated the cost estimates for full implementation. The results of this analysis were provided to the Ministry of Energy to demonstrate Chatham-Kent's ability to rapidly deploy the full complement of smart meters in its service areas. The deployment plans were provided to the Minister in August 2006. Chatham-Kent indicated that it negotiated a high volume discount with Tantalus to achieve significant price reductions from the pilot project pricing for both Chatham-Kent and Middlesex.

## The Costs

The central issue before the Board in this proceeding relates to an examination of the costs that the thirteen utilities incurred for the acquisition and installation of smart meters and related equipment. As indicated, the Board has found that the procurement processes undertaken by the thirteen utilities met a very high standard. The Government has authorized these thirteen utilities to install smart meters on the basis of these procurement processes.

Some intervenor groups claim that the prudence analysis conducted by the Board at this time should be preliminary and the matter should be revisited in a subsequent proceeding. The Board does not believe that this is desirable. This combined proceeding has resulted in adequate evidence and a careful examination of all relevant factors. Although this Panel is aware that it is not making any determinations on prudence of future spending on smart meters by utilities, this Decision can and should provide guidance to utilities making future purchasing decisions on smart meters in the remaining areas of the province.

The actual cost per installation for each of the applicant utilities is set out in Appendix "A". The Board heard evidence that the per unit installation costs can vary depending on the geographical nature of the service area and the extent to which meters have been deployed. This makes cost comparisons difficult.

The Board accepts that it is more expensive to install smart meters in a rural area than an urban area. The Board also accepts the evidence that it is more expensive to install meters in areas characterized by older construction as opposed to new subdivisions. In fact, a number of utilities have chosen to focus on new subdivisions for their initial deployment. As a result, their initial cost per installation may well be lower than the average for the entire system once full deployment is completed.

Other factors can materially impact per unit installation costs such as the number of meters installed to date and the degree of upfront costs. Hydro One's costs, for example, are high compared to others. Hydro One testified that this reflects the rural nature of their territory, high upfront costs and the fact that Hydro One has installed relatively few meters. This means that the installation cost in the first phase of this initiative is relatively high. The Board agrees that there is reason to believe that once

the Hydro One program is completed the average cost per installation will be substantially lower.

The Board feels that a special comment is warranted with respect to the Hydro One expenditures on the Capgemini contract for project management. Regarding the price of that contract, Counsel for the School Energy Coalition says “this is so far out of whack with all the other applicants to warrant special scrutiny”. SEC added that Hydro One has substantial internal management resources and is likely the most experienced utility in dealing with big projects. Accordingly, it is hard to understand why the Company had to retain Capgemini at such a large fee. SEC suggests that the costs should be deferred and Hydro One should be required to come back to the Board in its 2008 rate application with further and better evidence.

The Board has some sympathy with the submissions of the School Energy Coalition on this issue. The Capgemini contract represents a substantial cost. The Board recognizes that this is an up-front cost, but that is also true of project management costs for most utilities.

Hydro One will only install half the number of meters that Toronto Hydro is required to install. Toronto Hydro will, by the end of 2007, install 400,000 smart meters, one-half the entire Provincial target. But the Hydro One up-front project management costs are three times the project management costs of Toronto Hydro.

The Board will allow half of Hydro One’s project management costs incurred to date with an invitation to Hydro One to apply for the remaining amount with further and better evidence to justify the prudence of this cost at the time of its 2008 rate application.

In the case of all the utilities the Board finds that the external costs incurred were the result of a vigorous, successful and detailed procurement program. We also find that the internal costs were assigned in a manner consistent with standard rate making procedures.

There were a number of questions on internal utility costs related to smart meters, including suggestions that the utilities were double counting. That is, that internal personnel used for smart meter installations were existing employees whose costs were already included in rates. The utilities explained that these costs were capitalized and

assigned to different projects and that the treatment used for the smart meter capital program is no different than any other capital program. In other words, to the extent the costs were being allocated to the smart meter program they were removed from other programs. The Board accepts the utility evidence that costs have not been double counted.

A related concern was the “mark up” that some utilities apply to the procurement of goods and services from third parties, including management overheads and inventory costs. The utilities’ evidence was that these were standard procedures in their capital programs. None appear to be unique to the smart meter program and the Board has accepted these markups in previous proceedings.

There were also concerns regarding installation costs and particularly whether the utilities had compared the cost of outsourcing this service as opposed to using internal resources. The majority of utilities did conduct a tender for installation services, even if they ultimately chose not to outsource the installation. The utilities that did not contract out argued that it was better to use internal personnel because they were highly experienced meter installers. Other utilities cited contract limitations in their labour agreements. And still other utilities stated that a combination of internal and external resources provided the preferred installation method.

It appears at first glance that the costs incurred by the utilities that out-source were less than the costs of those using internal resources. However, the Board has considered each individual utility’s circumstances and accepts that each utility acted prudently in determining whether to install the meters using third party contractors or internal resources. The Board is also satisfied that the costs incurred to date for installation were prudently incurred.

Subject to the qualification regarding Hydro One’s project management costs, the Board concludes that the costs incurred by the thirteen utilities as set out in Appendix “A” to this Decision are prudent. We find that the purchasing decisions were conducted with the necessary due diligence and that the best possible prices were obtained through volume buying groups.

In accepting the costs outlined in Appendix “A” for the thirteen utilities the Board has relied on a number of findings. First, the purchasing process itself was carried out in a

professional and diligent manner. Second, the costs allowed in all cases meet the definition of minimum functionality. Third, the costs allowed relate to meters installed (i.e., the costs incurred) as opposed to forecasted costs.

Restricting cost recovery to installed meters is consistent with the Board's Decision on the methodology to recover costs in rates. This Decision allows the utilities to incorporate the capital costs for installed smart meters in rate base, and to calculate the revenue requirement on that basis. It is true as pointed out by some that even installed meters are not necessarily operational in the sense that they are not integrated with the network and that utilities are not calculating bills on the basis of time-of-use pricing. However, they are installed as opposed to sitting in inventory, and they are being used to calculate bills. In the circumstances, the Board believes this to be an appropriate approach.

It is also worth noting that none of the costs include any costs recovered through CDM activities (i.e., third tranche CDM funding authorized by the Board). The costs of pilots, initially claimed by several of the utilities, have also been removed in response to Board requests.

## **Stranded Costs**

Considerable time in this hearing was devoted to the issue of stranded costs. There is no question that in the majority of cases, the installation of smart meters means that older meters will have to be retired earlier than planned. In other words the costs of the older meters will not be fully depreciated.

The degree of stranded costs will vary from utility to utility, but it can be significant. The utilities have indicated that they want assurance from this Board that they can recover the stranded costs and rely upon the statements of the former Minister of Energy to that effect<sup>6</sup>. The Board also accepts that stranded costs, properly calculated, are recoverable. The question is when this exercise should be undertaken.

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<sup>6</sup> Exhibit A12, Tab M (Letter dated December 1, 2005 from D. Cansfield to H. McCallion)



The evidence indicates that stranded costs can vary significantly between different utilities. Some utilities operate in areas dominated by new construction while others are in more mature markets. Many of the utilities suggested that at the present time, the stranded costs associated with existing meters should stay in rate base. The Board accepts this proposition.

Utilities can, if they choose, bring forward applications for the recovery of stranded costs in their 2008 rates. However, there are several reasons why the Board is deferring the decision at this time. First, the roll-out of smart meters will occur over four years. Second, the undepreciated amounts are unknown. Finally, the cost savings are unknown, as are the rate impacts.

Once each of the thirteen utilities reaches full smart meter deployment, the Board and the parties will have better information on the offsetting benefits such as the reduced meter reading costs. The preliminary evidence in this proceeding suggests that these may be substantial and may go a large way to offsetting stranded meter costs.

The Board also heard evidence regarding the Hydro One depreciation study that found that Hydro One had in fact been over depreciating certain assets and under depreciating others. Hydro One testified that it was able to use this information to offset over depreciated assets against other assets to the significant benefit of ratepayers.

The Board also heard evidence on the timing of stranded costs recovery. In particular, Hydro Ottawa testified that the appropriate timing for any rate adder to recover stranded costs was April 2008, at which time its rate adder relating to regulatory assets will cease. Hydro Ottawa indicated that any rate adder related to stranded costs, will likely be less than the rate adder currently in place with respect to regulatory assets. It was suggested that if the stranded cost recovery is linked to the rate adder for regulatory assets there may, in fact, be no need for a rate increase.

The Board has determined that all utilities should continue to track the costs associated with stranded meters. Enersource was the only utility in this proceeding asking for recovery of stranded costs. For the reasons stated above, the Board is not granting this request at this time.

## Replacement and Repair Costs

There was considerable discussion in the hearing on replacement or repair costs of customer owned equipment and whether those costs should form part of the cost recovery in this proceeding. There is evidence that the repair and replacement of customer owned equipment may have increased as a result of the installation of smart meters. On the other hand, this type of expense is not unusual and to a degree occurs in situations where smart meters are not installed.

Some of the utilities wish to treat repair and replacement cost as being part of smart meter costs. Others such as Newmarket argued that these costs are part of normal distribution costs. SEC argued that the costs are relatively minor and should be included in the SMI.

The Board believes that a common approach to the accounting treatment of these costs is appropriate. Many of the applicants sought direction from the Board in this regard. On balance, the Board believes that while these costs may have been accelerated by the smart meter program, they should not be part of minimum functionality. These costs therefore have been removed from the allowable cost categories described in Appendix "A" to this Decision.

The Board considers that the costs of repairing or replacing the meter base extend the useful life of the service asset. Therefore all labour and associated costs incurred, with the exception of material and parts costs for customer owned equipment, shall be capitalized and tracked in a sub-account of the Smart Meter Capital and Recovery Offset Variance Account 1555. The actual material costs to repair or replace any customer owned equipment shall be expensed and also tracked separately in a different sub-account of the Smart Meter OM&A Variance Account 1556 until disposition is ordered by the Board. As the meter base will remain the property of the customer, it would not be appropriate to have it form part of the utility's rate base. Since there are cost allocation considerations, the capitalized costs of repairs, replacements and labour etc. should be recorded by customer rate class just as the smart meter costs will be recorded by customer rate class.

This direction on accounting procedures should not be considered a direction by the Board to perform this work. The Board expects individual distributors to consider their

particular circumstances and to deal with their customers in a cost effective and prudent manner. This direction simply provides distributors with a common accounting approach to similar work. Disposition of the account at a later date will be accompanied by a prudence review of the nature of the expenses as well as the manner in which they were incurred.

## **The Rate Increase Methodology**

The Board has in Appendix “A” to this Decision calculated the amount of costs to be recovered by each of the thirteen utilities for their smart meter installation. The question remains, what rate methodology should be employed?

Only three utilities, Toronto Hydro, Chatham-Kent and Middlesex are asking for recovery through rates at this time. The others propose to defer the matter until the next rate case.

The Board will allow each utility to recover its costs as set out Appendix “A” by including those costs in rate base for the 2006 and 2007 rate years and calculating a revenue requirement on that investment in the manner set out in Appendix “E”. Before calculating a rate increase from this revenue requirement, however, the utility must first deduct the amount of money previously collected in rate adders pursuant to the Orders of March 21, 2006.

Toronto Hydro, Chatham-Kent and Middlesex are directed to file with the Board a draft rate Order based upon these financial calculations. Both Toronto Hydro and Chatham-Kent are requesting that rate increases be implemented in the six month period November 1, 2007 to April 30, 2008. The Board grants that request.

Draft orders reflecting the Board’s decision are to be filed with the Board within 15 days of the Decision being issued. All parties to the *in camera* proceeding shall have 10 days in which to make submissions on the draft orders. Applicants shall have five days in which to file any reply submissions. The Board will issue the orders once it has reviewed the submissions of the parties.

Utilities that are not requesting rate increases may, however, wish to draw down funds previously collected through the smart metering rate adders. They are authorized to do so in order to meet costs approved in this Decision, and will file draft orders with the Board to that effect.

A number of the applicants also requested guidance from the Board in terms of future rate making with respect to the SMI. Six of the applicants<sup>7</sup> are part of the first tranche of cost of service rate applications for 2008 rates. These applicants can apply to recover their smart meter costs for the balance of 2007 and 2008 in those proceedings.

For those applicants that are not part of the first tranche of cost of service applications, the incentive rate mechanism process will recognize the costs approved in this Decision. This will allow distributors to include costs related to minimum functionality, as approved in this Decision, in their incentive rate adjustment.

### **Toronto Hydro Claims for General Service Meters**

None of the utilities with the exception of Toronto Hydro have made any claims for costs relating to additional optional features beyond the minimum functionality requirements adopted in Ontario Regulation 425/06.

Toronto Hydro is however claiming costs associated with 560 smart meters that it has installed for general service and immediate customers and states:

“It would be completely inefficient to replace these meters with conventional mechanical meters only to replace them again with smart meters a short while later. The most efficiently cost effective approach was to replace these meters with smart meters at the time of a customer resealing or when one of these customers was requesting a new service.”

There are those who oppose the Toronto Hydro claim on the basis that it exceeds the regulation in terms of minimum functionality. No one, including Toronto Hydro questions that proposition. The Board however has some sympathy with the Toronto Hydro

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<sup>7</sup> Horizon Utilities, Hydro One Networks, Hydro Ottawa, Enersource, Toronto Hydro, Newmarket Tay Power

request for several reasons. First there is some logic to the argument that Toronto advances. It would seem unreasonable for the Board to sanction wasteful practices. More importantly however, this Board in a previous order granted a rate adder to Toronto Hydro to cover costs relating to these types of meters. Toronto was entitled to infer from that Order authorization to proceed and install the meters and it did so.

Finally, Ontario Regulation 425/06 was enacted relatively late in 2006. Toronto Hydro is claiming expenses relating to the entire calendar year. For the reasons expressed, the Board will allow Toronto Hydro to calculate a revenue requirement relating to the 560 meters on the same basis as the residential meters. The Board is explicitly not finding that the costs associated with these meters fall into the minimum functionality costs. The Board approval of these costs is ancillary to the smart meter decision.

## Summary

In summary, the Board finds that the purchasing decisions of the thirteen utilities involved in this proceeding have been implemented with the necessary due diligence. The terms of contracts each has concluded with suppliers, including the pricing, are prudent.

The evidence also discloses that all thirteen utilities are likely to meet their goals with respect to installed smart meters by the end of 2007. The Board believes that the cost comparisons outlined in Appendix "A" to this Decision will provide sufficient guidance to other utilities when they make their purchasing decisions with respect to smart meters. This table is provided in both confidential and non-confidential format. The confidential format is available only to those that parties that have signed the Board approved Declaration and Undertaking as identified in Appendix "F".

The Board wishes to take this opportunity to thank the utilities and the intervenor groups that participated in this process, all of which are listed at Appendix "G". The analysis was detailed. The Board recognizes that this was an unusual proceeding and the workload resulting from the real time undertakings from the Board and the other parties was extensive. The results of this procurement process are impressive. The Local Distribution Company community has fully supported the Government's initiative in accomplishing an important conservation goal. The smart meter deployments

undertaken by the thirteen utilities considered in this proceeding will result in the installation of over one million meters by the end of 2007, well beyond the 800,000 target set by the Province for this initiative.

## **Cost Awards**

A decision regarding cost awards will be issued at a later date. Parties that were found eligible for an award of costs in this proceeding shall submit their cost claims by August 22, 2007. Two copies of the cost claim must be filed with the Board Secretary and one copy is to be served on the Applicants. The cost claims must be done in accordance with section 10 of the Board's *Practice Direction on Cost Awards*.

Applicants shall have until September 5, 2007 to object to any aspect of the costs claimed. Again two copies of the objection must be filed with the Board Secretary and one copy must be served on the party against whose claim the objection is being made.

The party whose cost claim was objected to will have until September 19, 2007 to make a reply submission as to why its cost claim should be allowed. Again, two copies of the submission must be filed with the Board Secretary and one copy is to be served on each of the Applicants.

The Applicants shall pay the Board's costs of the proceeding immediately upon receipt of the Board's invoice.

All filings with the Board must be in the form of two hard copies and received by the Board by 4:45 p.m. on the stated date. The Board requires all correspondence to be in electronic form as well as paper. Therefore, all parties must also e-mail an electronic copy of their filings preferably in searchable PDF format to the Board Secretary at [Boardsec@oeb.gov.on.ca](mailto:Boardsec@oeb.gov.on.ca).

**DATED** at Toronto, August 8, 2007

*Original signed by*

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Gordon Kaiser  
Presiding Member and Vice Chair

*Original signed by*

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Ken Quesnelle  
Member

*Original signed by*

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Cathy Spoel  
Member

**APPENDIX A**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**



**Recovery of Costs Incurred for Installed Units (Minimum Functionality)  
Cost Breakdown of Functional Specification for an Advanced Metering Infrastructure**

CAD \$ MILLIONS	TORONTO HYDRO		HYDRO ONE NETWORKS		HYDRO ONE BRAMPTON	
	\$	Qty	\$	Qty	\$	Qty
<b>CAPITAL COSTS</b>						
<b>ADVANCED METERING COMMUNICATION DEVICE (AMCD)</b>						
1. Smart Meter						
2. Installation Cost						
3. Workforce Automation						
<b>ADVANCED METERING REGIONAL COLLECTOR (AMRC) (includes LAN)</b>						
4. Collectors						
5. Repeaters						
6. Installation						
<b>ADVANCED METERING CONTROL COMPUTER (AMCC)</b>						
7. Computer Hardware						
8. Computer Software						
9. Computer Software Licence & Installation						
<b>WIDE AREA NETWORK (WAN)</b>						
10. Activation Fees						
<b>OTHER AMI CAPITAL COSTS RELATED TO MINIMUM FUNCTIONALITY</b>						
11. AMI Interface to CIS						
12. Professional Fees						
13. Integration						
14. Program Management			*			
<b>TOTAL CAPITAL COST (CAD \$ Millions)</b>	<b>23.896</b>	<b>192,294</b>	<b>21.799</b>	<b>62,914</b>	<b>0.940</b>	<b>6,401</b>
<b>TOTAL OM&amp;A COST (CAD \$ Millions)</b> <sup>see NOTE</sup>	<b>0.398</b>		<b>8.366</b>		<b>0.008</b>	
<b>TOTAL COST (CAD \$ Millions)</b>	<b>24.294</b>		<b>30.165</b>		<b>0.948</b>	
<b>Total Cost per Unit \$</b> (Total Cost / Quantity of Smart Meters)		<b>\$126.34</b>		<b>\$479.47</b>		<b>\$148.04</b>
Costs Incurred to:	31-Dec-06		31-May-07		31-May-07	
Source:	Ex A12 Tab G adjusted		Ex A5 adjusted		Ex A4 adjusted	
Commitment re Quantity of Units Installed by December 31, 2007	400,000		240,000		35,000	

NOTE: **OM&A Costs include the following:**  
 AMCD Maintenance  
 AMRC/LAN Maintenance  
 AMCC Hardware and Software Maintenance  
 WAN  
 Other (Business Process Redesign/Customer Communication/Program Management/Change Management)

\*The Board will allow half of the program management costs that are included in the total capital

**Recovery of Costs Incurred for Installed Units (Minimum Functionali  
Cost Breakdown of Functional Specification for an Advanced Meteri**

CAD \$ MILLIONS	HYDRO OTTAWA		HORIZON		POWERSTREAM	
CAPITAL COSTS						
	\$	Qty	\$	Qty	\$	Qty
<b>ADVANCED METERING COMMUNICATION DEVICE (AMCD)</b>						
1. Smart Meter						
2. Installation Cost						
3. Workforce Automation						
<b>ADVANCED METERING REGIONAL COLLECTOR (AMRC) (includes LAN)</b>						
4. Collectors						
5. Repeaters						
6. Installation						
<b>ADVANCED METERING CONTROL COMPUTER (AMCC)</b>						
7. Computer Hardware						
8. Computer Software						
9. Computer Software Licence & Installation						
<b>WIDE AREA NETWORK (WAN)</b>						
10. Activation Fees						
<b>OTHER AMI CAPITAL COSTS RELATED TO MINIMUM FUNCTIONALITY</b>						
11. AMI Interface to CIS						
12. Professional Fees						
13. Integration						
14. Program Management						
<b>TOTAL CAPITAL COST (CAD \$ Millions)</b>	<b>15.293</b>	<b>114,432</b>	<b>0.816</b>	<b>0</b>	<b>0.074</b>	<b>0</b>
<b>TOTAL OM&amp;A COST (CAD \$ Millions)</b> <sup>see NOTE</sup>	<b>0.221</b>		<b>0.239</b>		<b>0</b>	
<b>TOTAL COST (CAD \$ Millions)</b>	<b>15.514</b>		<b>1.055</b>		<b>0.074</b>	
<b>Total Cost per Unit \$</b> (Total Cost / Quantity of Smart Meters)		<b>\$135.58</b>		<b>n/a</b>		<b>n/a</b>
Costs Incurred to:	30-Apr-07		30-Apr-07		31-Dec-06	
Source:	Ex A6 adjusted		Ex A3 adjusted		Ex A10	
Commitment re Quantity of Units Installed by December 31, 2007	175,000		50,000		80,000	

NOTE: **OM&A Costs include the following:**  
 AMCD Maintenance  
 AMRC/LAN Maintenance  
 AMCC Hardware and Software Maintenance  
 WAN  
 Other (Business Process Redesign/Customer Communication/Program Manage

**Recovery of Costs Incurred for Installed Units (Minimum Functionali  
Cost Breakdown of Functional Specification for an Advanced Meteri**

CAD \$ MILLIONS	VERIDIAN		ENERSOURCE		CHATHAM-KENT		MIDDLESEX	
	\$	Qty	\$	Qty	\$	Qty	\$	Qty
<b>CAPITAL COSTS</b>								
<b>ADVANCED METERING COMMUNICATION DEVICE (AMCD)</b>								
1. Smart Meter								
2. Installation Cost								
3. Workforce Automation								
<b>ADVANCED METERING REGIONAL COLLECTOR (AMRC) (includes LAN)</b>								
4. Collectors								
5. Repeaters								
6. Installation								
<b>ADVANCED METERING CONTROL COMPUTER (AMCC)</b>								
7. Computer Hardware								
8. Computer Software								
9. Computer Software Licence & Installation								
<b>WIDE AREA NETWORK (WAN)</b>								
10. Activation Fees								
<b>OTHER AMI CAPITAL COSTS RELATED TO MINIMUM FUNCTIONALITY</b>								
11. AMI Interface to CIS								
12. Professional Fees								
13. Integration								
14. Program Management								
<b>TOTAL CAPITAL COST (CAD \$ Millions)</b>	<b>0.043</b>	<b>0</b>	<b>1.514</b>	<b>12,528</b>	<b>2.862</b>	<b>17,052</b>	<b>0.557</b>	<b>3,063</b>
<b>TOTAL OM&amp;A COST (CAD \$ Millions)</b> <sup>see NOTE</sup>	<b>0</b>		<b>0.293</b>		<b>0.367</b>		<b>0.025</b>	
<b>TOTAL COST (CAD \$ Millions)</b>	<b>0.043</b>		<b>1.807</b>		<b>3.229</b>		<b>0.582</b>	
<b>Total Cost per Unit \$</b> (Total Cost / Quantity of Smart Meters)		<b>n/a</b>		<b>\$144.20</b>		<b>\$189.34</b>		<b>\$189.96</b>
Costs Incurred to:	31-Dec-06		30-Apr-07		30-Apr-07		30-Apr-07	
Source:	Ex A13 Tab B		Ex A2 Updated Adj		K7.2 and Ex A1		K7.2 and Ex A1	
Commitment re Quantity of Units Installed by December 31, 2007	40,000		60,000		28,000		6,000	

NOTE: **OM&A Costs include the following:**  
 AMCD Maintenance  
 AMRC/LAN Maintenance  
 AMCC Hardware and Software Maintenance  
 WAN  
 Other (Business Process Redesign/Customer Communication/Program Manage

**Recovery of Costs Incurred for Installed Units (Minimum Functionali  
Cost Breakdown of Functional Specification for an Advanced Meteri**

CAD \$ MILLIONS	MILTON		NEWMARKET		TAY	
	\$	Qty	\$	Qty	\$	Qty
<b>CAPITAL COSTS</b>						
<b>ADVANCED METERING COMMUNICATION DEVICE (AMCD)</b>						
1. Smart Meter						
2. Installation Cost						
3. Workforce Automation						
<b>ADVANCED METERING REGIONAL COLLECTOR (AMRC) (includes LAN)</b>						
4. Collectors						
5. Repeaters						
6. Installation						
<b>ADVANCED METERING CONTROL COMPUTER (AMCC)</b>						
7. Computer Hardware						
8. Computer Software						
9. Computer Software Licence & Installation						
<b>WIDE AREA NETWORK (WAN)</b>						
10. Activation Fees						
<b>OTHER AMI CAPITAL COSTS RELATED TO MINIMUM FUNCTIONALITY</b>						
11. AMI Interface to CIS						
12. Professional Fees						
13. Integration						
14. Program Management						
<b>TOTAL CAPITAL COST (CAD \$ Millions)</b>	<b>0.697</b>	<b>5,494</b>	<b>2.111</b>	<b>19,000</b>	<b>0</b>	<b>0</b>
<b>TOTAL OM&amp;A COST (CAD \$ Millions)</b> <sup>see NOTE</sup>	<b>0</b>		<b>0.237</b>		<b>0</b>	
<b>TOTAL COST (CAD \$ Millions)</b>	<b>0.697</b>		<b>2.348</b>		<b>0</b>	
<b>Total Cost per Unit \$</b> (Total Cost / Quantity of Smart Meters)		<b>\$126.83</b>		<b>\$123.59</b>		<b>n/a</b>
Costs Incurred to:	30-Apr-07		08-Jun-07		08-Jun-07	
Source:	Ex A8		Ex A9 Confidential		Ex A11 Confidential	
Commitment re Quantity of Units Installed by December 31, 2007	16,000		26,000		4,000	

NOTE: **OM&A Costs include the following:**  
 AMCD Maintenance  
 AMRC/LAN Maintenance  
 AMCC Hardware and Software Maintenance  
 WAN  
 Other (Business Process Redesign/Customer Communication/Program Manage

**APPENDIX B**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**

**Appendix "B"**

**Advanced Metering Infrastructure Technologies**

Supplier <sup>(1)</sup>	Buying Group	Quantity Installed 2007	
		Actual (YTD)	Planned
Elster	Enersource	12,528	60,000
	Horizon	0	50,000
	Ottawa	114,432	175,000
	Toronto	192,914	400,000
	Veridian	0	40,000
Ozz/Trilliant	Hydro One Brampton	6,401	35,000
	Hydro One Networks	62,914	240,000
	Milton	5,494	15,000
Sensus	Newmarket	19,000	26,000
	PowerStream	0	80,000
	Tay	0	4,000
Tantalus	Chatham-Kent	17,052	28,000
	Middlesex	3,063	6,000
<b>TOTALS</b>		<b>433,798</b>	<b>1,160,000</b>

(1) Description of the technologies attached.

## Description of the Technologies

### **(a) Elster EnergyAxis® AMI**

The Elster EnergyAxis® AMI system is a controlled mesh network consisting of three main components:

- Elster EnergyAxis® Metering Automation Server (MAS) is the advanced metering control computer (AMCC) component of the system for data collection and system management.
- Elster A3 ALPHA Meter/Collectors are the advanced metering regional collectors (AMRCs) for local RF (Radio Frequency) LAN management and data collection. These communicate to the MAS system via commercial WAN networks. In addition to being a collector, the A3 ALPHA is also a residential or commercial meter.
- Elster REX and A3 ALPHA meters with unlicensed spread spectrum, two-way 900 MHz RF LAN communications are the advanced metering communication devices (AMCDs).

The system uses a multi-level network. At the first level, communications between the A3 ALPHA collectors and the MAS are via a commercial WAN. At the second level, a repeating peer-to-peer unlicensed 900 MHz LAN is used for communications between the A3 ALPHA collectors and nearby electric meters located on residential and commercial facilities. Elster's 900 MHz technology allows each RF network meter to be a repeater, with up to eight communications 'hops' possible. Data from any meter or meters can be retrieved by the MAS data collection system either from the collector or directly from a meter.

In the Elster EnergyAxis® system, normal consumption data and meter statuses are stored in the electronic registers in each meter. The A3 ALPHA Meter/Collectors automatically set up their local RF networks and poll each meter six times daily. The incoming data from the individual meters is stored in the Meter/Collector. Elster's LAN technology also supports both broadcast outbound and inbound capabilities as required for realtime meter reads or remote reprogramming.

The MAS server provides central system management to support both scheduled and on-request meter readings. Data from the reads is output in industry-standard XML file formats for import into enterprise or MDM/R applications.

This technology is being deployed by Enersource Hydro, Horizon Utilities, Hydro Ottawa, Toronto Hydro-Electric and Veridian Connections. It has been deployed in the following jurisdictions:

- Alaska Village Electric Cooperative;
- Salt River Project; and
- Empresa Nacional de Energia Electrica (Honduras).

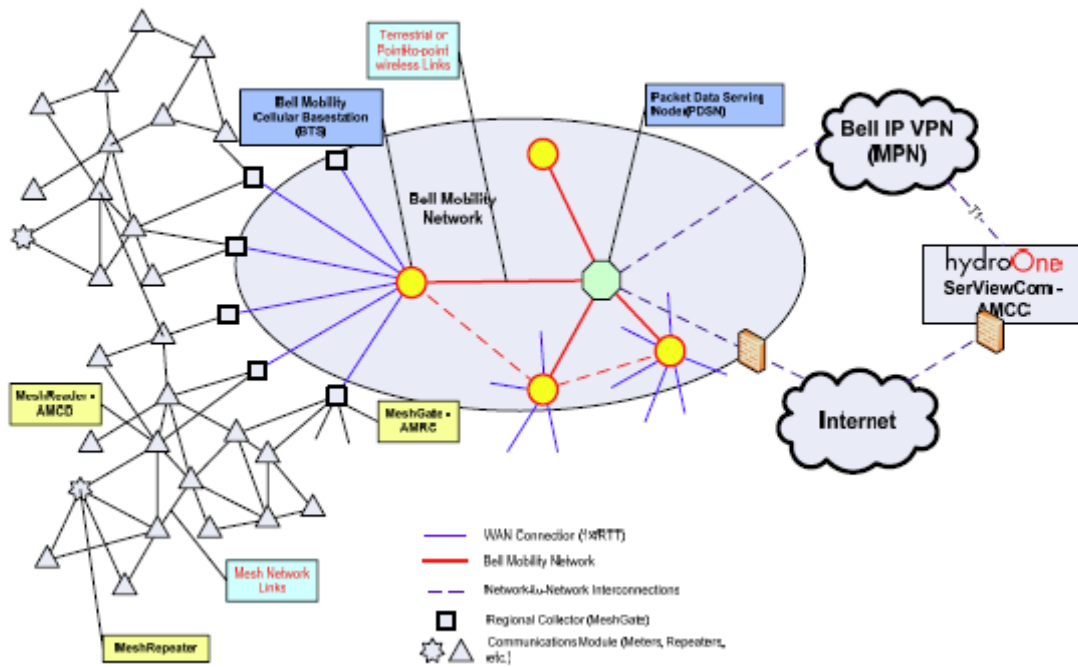
**(b) Ozz/Trilliant AMI**

The Ozz/Trilliant solution is based on controlled mesh technology in which meters (MeshReader or Advanced Metering Communication Device [AMCD]) cluster together and talk to or through other meters and repeaters (MeshRepeater) to find their way to a takeout point in the mesh cluster, known as collector (MeshGate or Advanced Metering Regional Collector [AMRC]). From the collector, using cellular technology, data is backhauled (Wide Area Network or WAN) to the facility hosting the Advanced Metering Control Computer (AMCC).

If a communication path is lost, the meter will try to re-establish the communication path, and if unsuccessful will immediately begin searching for a new path. The endpoints have approximately 10.5 months (300 days) of interval storage, and there is approximately 60 days of storage in the MeshGate AMRC.

The AMCD is a standards-based product (ANSI and IEEE) using open (IP) protocols supporting full two way communications and over-the-air firmware upgrade capability.

**Overall Mesh Network Smart Metering Architecture**



10

This technology is being deployed by Hydro One Brampton, Hydro One Networks and Milton Hydro. It is also deployed in the following jurisdiction:

- o Louisville Gas and Electric.



### **(c) Sensus Metering Systems AMI**

Sensus is a point-to-point long range radio system utilizing towers as the Advanced Metering Regional Collectors (AMRCs). The number of towers needed is dictated by topography, the density of deployment, and the frequency of transmission from the meter to the towers. One tower can cover from 75 to 300 square miles. The tower-based, long range licensed radio system makes Sensus technology well suited to collecting data in utilities that have a combination of urban and rural territories.

Sensus is a fixed network system where radio frequency (RF) modules in meters communicate directly to receivers installed at towers; it is a single tier system. From the tower receiver, the data goes directly back to the utility, not a remote collection facility. The system operates on a mass deployed utility system on primary-use Industry Canada protected radio spectrum.

The data collection network is made up of two parts; the local RF network and the regional network operating centre. The operating centre contains the utility information platform software that manages the meter reading data received from the network.

The RF network consists of radio transmitters and transceivers located at each meter and a network of Tower Gateway Basestations. The transmitters and transceivers transmit the meter consumption and status information at regular intervals. These transmissions are then received by one or more basestations. The basestation forwards the data to the operating centre, and also stores the information locally in the event of operating centre communications path interruption.

This technology is being deployed by Newmarket Tay Power and PowerStream. It has been deployed in the following jurisdictions:

- Alabama Power;
- Potomac Electric Power Company (PEPCO);
- Southern Company; and
- Hawaiian Electric.

#### **(d) Tantalus Systems AMI**

The Tantalus product (TUNet® technology) is a Hybrid Wireless communication system that operates on a variety of meter manufacturers device types that capture the various functions that the meter provides and transmits the information back to a central server Advanced Metering Control Computer (AMCC).

The Tantalus module is an Advanced Metering Communications Device (AMCD) that allows the utility to retrofit existing electromechanical meters that still have a useable un-depreciated life. These modules fit under the glass of the meter and collect hourly cumulative energy usage to 1/100th of a KWh with the storage capacity of 21 days.

The data is communicated in a self healing mesh-network configuration using unlicensed 900MHz spread-spectrum frequencies with an Effective Radiated Power of 0.5 watts. Each device has a unique frequency identifier, unique utility assigned device identifier, a system assigned business identifier which along with the channel hopping nature of spread-spectrum provides several layers of security from the meter register.

The Local Area Network (LAN) is comprised of the actual modules in the meters at the customers' properties. The meters in the LAN can use each other to hop back to the source meter at the Wide Area Network (WAN) portal and the LAN has the routing depth capability of 16 devices that will lead to solid communication in sparsely populated areas rural areas. The LAN devices communicate back to a source meter on a WAN portal which is installed as part of the meter base.

The WAN portal does not store any data; it acts as a gateway to pass the data through a licensed 220MHz frequency, back to the central network controller which eliminates the possibility of any data overlapping. This frequency range is desirable as it is not heavily utilized and it has very good propagation characteristics, wide area of coverage, to follow the earth terrain and penetrate buildings as well as the wide coverage footprints. This enables the user to minimize the amount of infrastructure and antennas that are required to communicate over a wide area. The WAN is managed by the Network Controller that acts as a single regional collector or Advanced Metering Regional Collector (AMRC).

This system is being deployed by Chatham-Kent and Middlesex. It has been deployed in the following jurisdictions:

- Northeastern Rural Electric Membership Corp.;
- Saint John Energy;
- Anaheim Public Utilities Department; and
- Appalachian Electric Cooperative.

**APPENDIX C**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**

## Appendix "C"

### Funds Collected Through Smart Meter Rate Adder

Utility	Revenue (CAD \$000)
Toronto Hydro <sup>1</sup>	2,966
Hydro One Networks <sup>2</sup>	4,830
Hydro One Brampton <sup>3</sup>	431
Hydro Ottawa <sup>4</sup>	1,011
Horizon Utilities <sup>5</sup>	1,056
PowerStream <sup>6</sup>	700
Veridian Connections <sup>7</sup>	401
Enersource Hydro <sup>8</sup>	676
Chatham-Kent <sup>9</sup>	145
Middlesex <sup>10</sup>	31
Milton <sup>11</sup>	70
Newmarket <sup>12</sup>	0
Tay <sup>13</sup>	22

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<sup>1</sup> Tab K, Ex 4, pg 8 of 12

<sup>2</sup> K5.7

<sup>3</sup> K6.4

<sup>4</sup> Ex A6, pg 26 of 44

<sup>5</sup> K7.14

<sup>6</sup> Vol June 26, p 43, I 1-5

<sup>7</sup> K8.14

<sup>8</sup> K7.7

<sup>9</sup> A1 Reply Arg Updated Rev Req't

<sup>10</sup> A7 Reply Arg Updated Rev Req't

<sup>11</sup> 21575 customers at \$0.27/month for 12 months

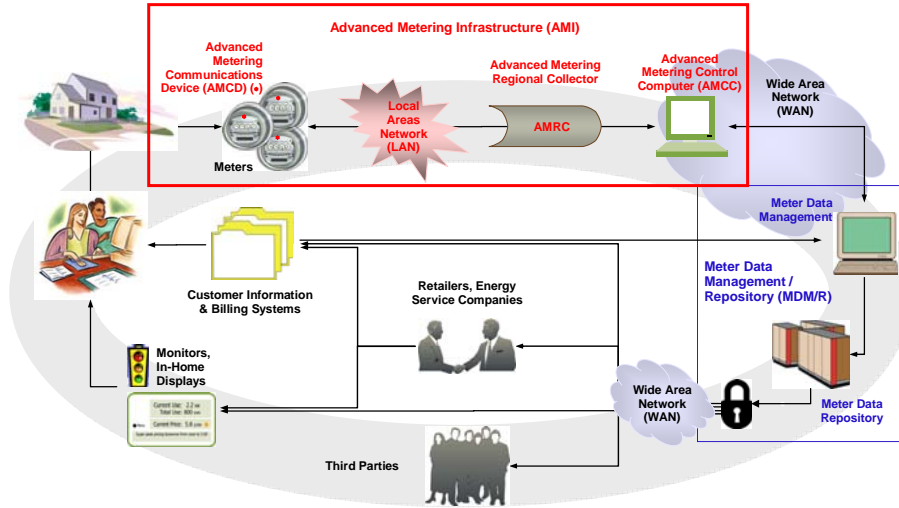
<sup>12</sup> has not made an application for a smart metering rate adder

<sup>13</sup> K9.2

**APPENDIX D**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**

# APPENDIX "D"

## Smart Metering System



**APPENDIX E**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**

# Appendix "E"

## Smart Meter Revenue Requirement - Summary

*Name of Applicant*

Summary of Actual Costs claimed in this application	2006 Actual	2006 Plus	2007 Actual	Total Actual	Perm Adjust
<b>Capital Costs (must be installed, and used and useful)</b>					
Smart Meters					
Computer Hardware					
Computer Software					
Tools & Equipment					
Other Equipment (please specify)					
<b>Total Capital Costs</b>					
<b>O M &amp; A</b>					
2.1 Advanced metering communication device (AMCD)					
2.2 Advanced metering regional collector (AMRC) (includes LAN)					
2.3 Advanced metering control computer (AMCC)					
2.4 Wide area network (WAN)					
2.5 Other AMI OM&A costs related to minimum functionality					
<b>Total O M &amp; A Costs</b>					
<b>Summary of Revenue Requirement Calculation</b>					
<b>Net Fixed Assets</b>					
Net Fixed Assets Beginning of Year					
Net Fixed Assets End of Year					
<b>Average Net Fixed Asset Values</b>					
Working Capital Allowance					
Operation Expense					
Working Capital Allowance XX % (from approved 2006 EDR application)					
<b>Smart Meters Rate Base</b>					
<b>Return on Rate Base (from approved 2006 EDR application)</b>					
Deemed Debt XX% Times Weighted Debt Rate X.XX%					
Deemed Equity XX% Times ROE X.XX%					
<b>Return on Rate Base</b>					
<b>Operating Expenses</b>					
Incremental Operating Expenses					
Amortization Expenses (please provide details)					
<b>Total Operating Expenses</b>					
	<b>2006 Actual</b>	<b>2006 Plus</b>	<b>2007 Actual</b>	<b>Total Actual</b>	<b>Perm Adjust</b>
Revenue Requirement Before PILs					
Grossed up PILs					
<b>Revenue Requirement for Smart Meters Installed</b>					

Rate Rider to Clear Actual Expenses to MMM 200X (1)	Rate Adder	Metered Customers per 2006 EDR	No. of Mths	Amount Recovered
Revenue Requirement for Smart Meters Installed				
Carrying costs <small>The last available Board prescribed interest rate for approved accounts to be applied against deferral accounts is assumed to continue without change for the completion of recovery of actual costs.</small>				
Less Smart Meter Adder Recovery				
May 2006 to April 2007				
May 2007 to October 2007				
November 2007 to April 2008 (proposed to clear actual balance)				
<b>Rate Adder for Capital and Operating Exp April 2007 to December 2007 (2)</b>				
November 2007 to April 2008 (new deferral account)				
<b>Permanent Capital Rate Adjustment (3)</b>				
May 2008				

**1) Actual Cost Recovery Rate Rider**  
Calculate the revenue requirement for approved reporting period actual costs incurred including the revenue requirement for prior period capital assets to be recovered in current reporting period (2006 Plus) and the related carrying costs. For this calculation it is assumed that all monies recovered through the applicants' rate adder to date of adjustment will be used to offset the revenue requirement. Upon completion of collection this rate rider will expire and the applicant will close the related deferral account.

**2) Future Cost Offset Rate Adder**  
Calculate a rate adder for offsetting future costs from the first month after actual cost recovery to the end of 2007. This is similar in nature to the rate adder calculation approved in the April 12, 2007 EDR decision.

**3) Permanent Capital Rate Adjustment**  
Calculate the revenue requirement for actual capital cost that would be normally added to rate base in a cost of service application. This will be the prior and current reporting period assets to date of approval. This rate adjustment will be a permanent addition to rates and will not expire. This allows the utility to collect the ongoing revenue requirement for the capital assets employed. (Note this amount does not include any incremental operating costs)





**APPENDIX F**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**

**APPENDIX “F”**

**EB-2007-0063**

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15 (Schedule B);

AND IN THE MATTER OF applications by electricity distribution companies for approval of a smart meter rate adder;

AND IN THE MATTER OF a combined proceeding initiated by the Ontario Energy Board pursuant to sections 19(4), 21(1), 21(5) and 78(3.03) of the *Ontario Energy Board Act, 1998* to determine issues related to the recovery of costs incurred by distributors and associated with authorized discretionary metering activities.

Following is a list of individuals who have completed a Declaration and Undertaking in the above proceeding:

<b>NAME</b>	<b>DESIGNATION</b>	<b>AFFILIATION</b>
Jay Shepherd	Counsel	School Energy Coalition
Rachel Chen	Consultant	School Energy Coalition
Robert Warren	Counsel	Consumers Council of Canada
Julie Girvan	Consultant	Consumers Council of Canada
Phil Tunley	Counsel	Newmarket-Tay Power
Aaron Dantowitz	Counsel	Newmarket-Tay Power
Tom Brett	Counsel	Chatham-Kent Hydro/Middlesex Power/Milton Hydro
Tom Adams	Consultant	Energy Probe
David MacIntosh	Consultant	Energy Probe
Mark Rodger	Counsel	Toronto Hydro
Mike Buonaguro	Counsel	Vulnerable Energy Consumers' Coalition
Roger Higgin	Consultant	Vulnerable Energy Consumers' Coalition
Andrew Taylor	Counsel	Enersource Hydro/Horizon Utilities/Hydro Ottawa/PowerStream/Veridian
Patrick Moran	Counsel	Enersource Hydro/Horizon Utilities/Hydro Ottawa/PowerStream/Veridian
Michael Engelberg	Counsel	Hydro One Networks/Hydro One Brampton
Richard Stephenson	Counsel	Power Workers Union
Bayu Kidane	Consultant	Power Workers Union
Judy Kwik	Consultant	Power Workers Union
James Douglas	Consultant	PowerStream/Newmarket-Tay
Colin McLorg	Employee	Toronto Hydro
Susan Davidson	Employee	Toronto Hydro
Eduardo Bresani	Employee	Toronto Hydro
Ivano Labricciosa	Employee	Toronto Hydro
Steve MacDonald	Employee	Toronto Hydro
Lynne Anderson	Employee	Hydro Ottawa
Colin Macdonald	Employee	PowerStream
Owen Mahaffy	Employee	Hydro Ottawa
Doug Shannon	Employee	Hydro Ottawa
Jim Hogan	Employee	Chatham-Kent Hydro
Chris Buckler	Employee	Horizon Utilities
George Armstrong	Employee	Veridian Connections

<b>NAME</b>	<b>DESIGNATION</b>	<b>AFFILIATION</b>
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Kathi Litt	Employee	Enersource Hydro
Rick Stevens	Employee	Hydro One Networks
Pankaj Sardana	Employee	Toronto Hydro
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Hugh Bridgen	Employee	Chatham-Kent Hydro
Cheryl Decaire	Employee	Chatham-Kent Hydro
Don Thorne	Employee	Milton Hydro
Harvey Houle	Intervenor	none
Iain Clinton	Employee	Newmarket-Tay Power
Paul Ferguson	Employee	Newmarket-Tay Power
Cameron McKenzie	Employee	Horizon Utilities
Ruth Greey	Employee	Hydro One Networks
Ian Innis	Employee	Hydro One Networks
Laurie Stickwood	Employee	Veridian Connections
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Sarah Hughes	Employee	Horizon Utilities
Scott Miller	Employee	Hydro One Brampton
Tony Paul	Employee	Hydro One Brampton
James Macumber	Employee	Enersource Hydro
Sonja Potocnik	Employee	Enersource Hydro
Tom Wasik	Employee	Enersource Hydro
Ramona Hendry	Employee	Enersource Hydro
Frank Fabiano	Employee	Horizon Utilities
Edward Chatten	Employee	PowerStream Inc
Mary-Jo Corkum	Employee	Milton Hydro
John Banadie	Employee	Enersource Hydro

**APPENDIX G**  
**TO THE DECISION WITH REASONS**  
**DATED AUGUST 8, 2007**  
**BOARD FILE NO.**  
**EB-2007-0063**

APPENDIX "G"

EB-2007-0063  
COMBINED PROCEEDING - SMART METERS  
LIST OF NAMED PARTIES AND INTERVENORS

**NAMED PARTIES**

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- (May 25, 2007 – email change)
- AND**
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- AND**
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- AND
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Withdrawn: Rogers Cable (June 15, 2007)