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BY EMAIL

January 4, 2012

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, Suite 2700
Toronto ON M4P 1E4

Dear Ms. Walli:

Re: Guelph Hydro Electric Systems Inc.
Application for Rates
Board File Number EB-2011-0123

Pursuant to Procedural Order No.2, please find attached the Board Staff submission on the cost of service rate application filed by Guelph Hydro Electric Systems Inc. on June 30, 2011

Please forward the attached to Guelph Hydro Electric Systems Inc. and parties to this proceeding.

Yours truly,

Original signed by

Birgit Armstrong
Advisor, Applications & Regulatory Audit

2012 ELECTRICITY DISTRIBUTION RATES

Guelph Hydro Electric Systems Inc.

EB-2011-0123

STAFF SUBMISSION

January 4, 2012

INTRODUCTION

Guelph Hydro Electric Systems Inc. ("Guelph Hydro") is a licensed electricity distributor serving approximately 50,000 customers in the City of Guelph and the Village of Rockwood. Guelph Hydro filed its 2012 rebasing application (the "Application") on June 30, 2011. Guelph Hydro requested approval of its proposed distribution rates and other charges effective January 1, 2012. The Application was based on a future test year cost of service methodology.

The Vulnerable Energy Consumers' Coalition ("VECC"), the School Energy Coalition ("SEC"), and Energy Probe Research Foundation ("Energy Probe") were granted intervenor status and cost award eligibility. No letters of comment were received.[1]

Pursuant to Procedural Order No. 2, a Settlement Conference was convened on November 15, 2011 and continued on November 16, 2011. In that Procedural Order, the Board determined that Issue 12.1 relating to Guelph Hydro's Green Energy Act Plan ("GEA Plan"), including the Smart Grid component of the plan, as contained in the Final Issues List was not eligible for settlement. The Board further determined that Issues 6.1 and 6.2 were also not eligible for settlement, as the smart meter deployment costs appeared to be beyond minimum functionality related to Smart Grid development.

A complete settlement on all other issues was reached between Guelph Hydro and VECC, SEC and Energy Probe. A Settlement Proposal was filed with the Board on December 2, 2011. The Board approved the Settlement Proposal at the commencement of the oral hearing, which was held on December 5, 2011 to hear the issues ineligible for settlement.

This submission reflects observations and concerns which arise from Board staff's review of the record of the proceeding and the oral hearing, and is intended to assist the Board in deciding Guelph Hydro's application with respect to the unsettled issues and in setting just and reasonable rates.

[1] Response to Board staff IR #1.

Board staff notes that there have been a number of updates to the evidence in the course of this proceeding. This submission is based on the status of the record as of Guelph Hydro's argument-in-chief ("AIC").

Board staff's submission addresses the following issues:

1. Smart Meter Cost Recovery
    a. Revenue Requirement and Smart Meter Disposition Rider
    b. Functionality beyond minimum functionality as per O.Reg. 425/06

2. GEA Plan
    a. GEA funding adders
    b. Eligibility and quanta of GEA Plan expenditures for approval and recovery including:
        i. Enabling Renewable Embedded Generation Connection
        ii. In-home Display Messaging Project
        iii. Electric Vehicle Project
        iv. Smart Grid High School Education Project
        v. Smart Grid – Smart Home Demonstration Project
        vi. Additional Technical Staffing Resources

THE APPLICATION

Smart Meter Cost Recovery

Revenue Requirement and Smart Meter Disposition Rider

Background

In its application, Guelph Hydro is seeking approval for the disposition and recovery of capital and operating expenses for smart meters installed for all Residential and GS < 50 kW customers.

The recovery of capital and operating expenses in 2012 and going forward means that installed smart meters and associated capital assets will be included in rate base, and that the recovery of capital-related costs and operating

expenses will be factored into the revenue requirement and recovered in base distribution rates like other distribution assets (e.g. poles, wires, transformers, vehicles) and costs. Guelph Hydro applied for a total capital and operating expense claim of $9,942,320 which translated into a 2012 revenue requirement of $1.61 million. Guelph Hydro's average cost per smart meter is $190.28. As part of the settlement proposal, accepted by the Board on December 5, 2011, the parties assumed this amount as a placeholder, with the understanding that any adjustments made by the Board to this amount would either be captured in a variance account, or would be factored into the revenue requirement included in the settlement agreement[2].

Guelph Hydro also sought a Smart Meter Disposition Rider ("SMDR") to dispose of the residual deferred revenue requirement for the historic period leading up to the test year. Throughout the discovery process, there were a number of updates to the original total deferred revenue requirement and the Smart Meter model. The most recent update indicates that Guelph Hydro is seeking approval of a credit amount of $84,936 for the SMDR.

In response to Board staff's technical conference question No. 19c, Guelph Hydro showed the results of allocating the deferred revenue requirement based on the following methodology:

- The return and amortization was allocated using the allocation of Account 1860 in the cost allocation model;
- OM&A was allocated based on the number of meters installed for each class; and
- PILs was allocated based on the revenue requirement allocated to each class before PILs.

Board staff notes that a similar cost allocation methodology was approved by the Board in the Board's Decision and Order in respect of PowerStream (EB-2010-0209)[3].

The following table shows the results of this cost allocation methodology:

[2] Settlement Agreement, filed December 2, 2011, accepted by the Board as filed on December 5, 2011.
[3] Decision and Order,[EB-2010-0209], November 19, 2010

			Total	Residential	General Service Less than 50 kW	General Service 50 to 999 kW	General Service Greater 1,000 to 4,999 kW	Large User
$2,335,949.75			$2,335,949.75	$1,839,594.58	$307,911.03	$169,079.20	$15,327.14	$4,037.79
Percentage of costs allocated to customer classes_Board Staff TCQ 19 b			100.00%	78.75%	13.18%	7.24%	0.66%	0.17%
$2,420,885.78								
-$84,936.03								
Allocated per Class_Board Staff TCQ 19 d				-$66,888.37	-$11,195.76	-$6,147.78	-$557.30	-$146.82
Number of Metered Customers				47,848	3,788	569	44	4
t Meter Disposition Rate Rider_Board Staff TCQ 19 e				-$0.12	-$0.25	-$0.90	-$1.07	-$3.06

Discussion and Submission

Board staff notes that Guelph Hydro's average cost of $190.28 per smart meter installed is comparable to other distributors serving urban and suburban areas. Therefore Board staff has no issues with the prudence of costs incurred for smart meter installations. This statement does not apply to the cost of the Zigbee chip which is discussed in the next section of this submission.

With respect to the allocation of the SMDR, Board staff notes that Guelph Hydro allocated, as did PowerStream in the EB-2010-0209 proceeding, the net of the residual deferred revenue requirement and the smart meter funding adder collected from all metered customer rate classes. Board staff also notes that Guelph Hydro allocated costs to all metered customer rate classes which departs from the EB-2010-0209 proceeding where the net costs were allocated to the classes that were part of the smart meter program.

Board staff further notes that in a subsequent decision in PowerStream's final smart meter application (EB-2011-0128), the Board approved a cost allocation methodology based on a class specific revenue requirement offset by class specific smart meter funding, based on full cost causality, as proposed by VECC. For those metered customer rate classes that contributed to the funding of the smart meter program but were not part of the program, the Board directed the distributor to allocate evenly the collected smart meter funding adder amounts to the residential and GS < 50kW when calculating the allocated SMDR amount.

Board staff invites Guelph Hydro to comment in its reply submission on any impediment to implementing the methodology approved by the Board in the EB-2011-0128 proceeding and to provide the results of using this approach.

Zigbee Chip – Functionality beyond minimum functionality adopted in O.Reg. 425/06

Background

In its application Guelph Hydro stated that its Smart Meters exceed minimum functionality as set out in Ontario Regulation 425/06 by the inclusion of a communication chip based on the Zigbee standard. As noted by Guelph Hydro, the Zigbee chip will enable two-way communications and communications with similarly enabled-devices in the consumer's home or office. Guelph Hydro made a decision that this chip would be included in all installed smart meters. Guelph Hydro has documented that the incremental capital cost of the Zigbee chip is $12.25 per meter[4], or approximately $600,000 for all installed smart meters[5].

To the best of Board staff's knowledge, Guelph Hydro is the only Ontario distributor that has so far adopted this standard and included the Zigbee chip in installed smart meters and Guelph Hydro has acknowledged the same.[6]

Board staff notes that the Zigbee chip is not needed for the basic interval meter reading of smart meters for time-of-use ("TOU") pricing. A number of other distributors have already deployed smart meters and implemented TOU pricing even though their smart meters do not have the Zigbee chip or similar functionality. On cross-examination during the oral hearing Guelph Hydro's witness agreed with this conclusion.[7]

Discussion and Submission

According to the evidence set forth by Guelph Hydro, the Zigbee chip enables enhanced services including the provision of more information to energy

[4] E9/T3/S1/page 6.
[5] AIC, Appendix C, November 23, 2011
[6] Oral Hearing Transcript., Vol. 1 (December 5, 2011), page 15, ll. 17-26, and page 23, ll. 24-28
[7] Oral Hearing Transcript., Vol. 1 (December 5, 2011), page 27, ll. 12-17

consumers for managing their energy consumption. It may facilitate increased load shifting and conservation, when paired with devices such as in-home displays, to provide energy data to the end-users. Arguably, the Zigbee chip could be categorized as a "smart grid" rather than "smart meter" feature since on its own, the Zigbee chip does not provide any added smart meter functionality.

Board staff is of the view that the issue is whether the Zigbee chip costs should be recoverable from ratepayers and if so, whether they should be part of smart meters or re-categorized as part of smart grid costs.

Board staff notes that in a previous decision[8] the Board determined, "that to be prudent, a decision must have been reasonable under the circumstances that were known or ought to have been known to the utility at the time the decision was made, and that hindsight should not be used in determining prudence, although consideration of the outcome of the decision may legitimately be used to overcome the presumption of prudence." Furthermore, the Board found that prudence must be determined in a retrospective factual inquiry, in that the evidence must be concerned with the time the decision was made and must be based on facts about the elements that could or did enter into the decision at the time"[9].

Board staff is of the view that Guelph Hydro has been an innovator in adopting this technology notwithstanding that the distributor's use of this technology may have been, in hindsight, premature. Board staff however notes that Guelph Hydro indicated that it is less expensive to include the chip at the time of manufacturing and installation of smart meters than to subsequently retro-fit the meters or other infrastructure. Board staff is of the view that it was not unreasonable to plan for the enabling of smart grid technology such as in-home displays and other equipment that can be controlled by or otherwise take advantage of communications devices in the near future. Board staff agrees with Guelph Hydro's argument made during the oral hearing that Guelph Hydro "believed that ordering the smart meters without a Zigbee chip would limit our future ability to offer conversation programs and/or services in support of building

[8] Decision with Reasons, [RP-2001-0032/EB-2001-0367], Enbridge Gas Distribution Inc. issued December 13, 2002
[9] Ibid, p. 60

a conservation culture, or would result in much greater cost in the future to replace with other meters that did have this functionality"[10]. While Board staff agrees that this technology has not been standardized at this time, Guelph Hydro demonstrated that benefits could be realized in the future as a result of the installation of this device at the outset of smart meter deployment.

Board staff is not opposing the recovery of the costs for the Zigbee chips as part of smart meter costs in this application. As noted above, while it can be argued that Guelph Hydro may have been premature in adopting this technology, there is no clear evidence that it was imprudent in doing so. Furthermore, while the inclusion of the Zigbee chip has increased the costs of the smart meters, analysis of the costs documented for smart meter and related infrastructure deployment do not indicate that Guelph Hydro's costs are inflated relative to other utilities for which the Board has reviewed costs. In fact, based on Guelph Hydro's evidence, Board staff observes that the average capital costs for smart meters for Guelph Hydro is $190.28[11], including the Zigbee chip. As previously stated, Board staff considers this amount to be comparable to what the Board has observed for a number of distributors serving urban and suburban utilities.

With respect to the issue of whether these costs should be classified as smart meter or smart grid related, Board staff is of the view that in principle, the Zigbee chip should be considered part of smart grid costs in that the Zigbee chip itself has no benefit other than enabling smart grid technologies. Guelph Hydro acknowledged that this technology requires a downstream application in order to take advantage of the technology[12]. However, Board staff notes that the embedding of the Zigbee chip within the network communications card inside the smart meter was part of Guelph Hydro's smart meter procurement. Thus, Board staff does not object to Guelph Hydro's proposal to recover the costs for the Zigbee technology under its smart meter program. If these costs are deemed to be recoverable by the Board, this classification also offers the advantage of simplifying the ratemaking process by means of avoiding the creation of a "Zigbee chip disposition rider" that would deal with residual deferred revenue requirement for the historic period leading up to the test year.

[10] Oral hearing transcript, Vol. 1 (December 5, 2011), p. 13, l. 23-28
[11] AIC, page 6, para. 22
[12] Ibid, p. 28, l. 13-16

Green Energy Act Plan

Overview

On November 23, 2011, Guelph Hydro re-filed its updated GEA Plan[13] and included the following capital expenditures and operating expenses:

Table 1: Project / Investment - Capital Summary

	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
Renewable Generator Connection Upgrades	$0	$0	$500	$50	$50	$600
In-Home Display Messaging Project	$0	$479	$0	$0	$0	$479
Electric Vehicle Pilot	$0	$50	$0	$0	$0	$50
Smart Grid High School Education	$0	$0	$0	$0	$0	$0
Demonstration "Smart Grid-Smart Home"	$0	$0	$0	$0	$0	$0
Additional Technical Staffing Resources	$0	$0	$0	$0	$0	$0
Total	$0	$529	$500	$50	$50	$1,129

Table 2: Project / Investment - OM&A Summary

	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
Renewable Generator Connection Upgrades	$0	$0	$0	$0	$0	$0
In-Home Display Messaging Project	$0	$92	$92	$92	$92	$368
Electric Vehicle Pilot	$0	$200	$290	$30	$20	$540
Smart Grid High School Education	$0	$75	$35	$35	$20	$165
Demonstration "Smart Grid-Smart Home"	$0	$45	$130	$55	$10	$240
Additional Technical Staffing Resources	$0	$174	$174	$174	$174	$696
Total	$0	$586	$721	$386	$316	$2,009

Table 3: Total Capital and OM&A Expenditures Summary

	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
Capital	$0	$529	$500	$50	$50	$1,129
OM&A	$0	$586	$721	$386	$316	$2,009
Total	$0	$1,115	$1,221	$436	$366	$3,138

On December 12, 2011, in response to undertakings given during the oral hearing, Guelph Hydro provided the following update to table 2, Project/Investment – OM&A Summary:

[13] E2/T4/S6, Appendix D – Green Energy Act Plan, updated November 23, 2011.

Revised Table 2:

Revised Table 2: Project / Investment - OM&A Summary						
	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
"Connections OM&A" - Additional Technical Staffing Resources	$0	$65	$83	$91	$104	$344
In-Home Display Messaging Project	$0	$92	$92	$92	$92	$368
Electric Vehicle Pilot	$0	$200	$290	$30	$20	$540
Smart Grid High School Education	$0	$75	$35	$35	$20	$165
Demonstration "Smart Grid-Smart Home"	$0	$45	$130	$55	$10	$240
"SmartGrid OM&A" - Additional Technical Staffing Resources	$0	$109	$91	$83	$70	$352
Total	$0	$586	$721	$386	$316	$2,009

Guelph Hydro proposed the establishment of two different funding adders separating renewable generation and smart grid funding[14] to provide funding for its GEA plan. The nature of the expenditures in the GEA Plan include: renewable embedded generation connection and smart grid projects, including an in-home display messaging project, electric vehicle pilot project, smart grid high school education project and a smart grid – smart home demonstration project.

The following section summarizes and provides Board staff's view on proposed funding for the GEA plan.

GEA Funding Adders

Background

On November 23, 2011 Guelph Hydro updated its GEA Plan and requested funding through two distinct and separate funding adders, namely the Renewable Connection Rate Adder and the Smart Grid Rate Adder**.** Board staff notes that the Renewable Connection Rate Adder was determined based on a direct benefit calculation to Guelph Hydro's rate payers.

[14] GEA Funding Adder calculations, filed November 8, 2011 and updated to a Renewable Generation Funding adder and a Smart Grid Funding Adder calculation, filed November 23 and 24, 2011 respectively.

Table 5

	2012 $	2013 $	2014 $	2015 $
Renewable Connection Rate Adder – Direct Benefit	0.10	0.13	0.15	0.17
Smart Grid Rate Adder	0.83	1.02	0.47	0.34

Guelph Hydro also provided a calculation for provincial rate protection for the remaining costs of its Renewable Connection activities, specifically for the Renewable Embedded Generation Connection project.

Discussion und Submission

As part of the *Filing Requirements on Distribution System Plans* (EB-2009-0397) (the "DSP Filing Requirements") the Board outlined mechanisms to address funding for expenditures proposed in a GEA Plan.

The DSP Filing Requirements state that the Board recognizes that distributors may need additional funding for expenditures proposed in a GEA Plan between cost of service applications, and will consider applications for a suitable funding mechanism. The nature of the mechanism used will depend on whether the Board is able to properly assess the prudence of the proposed expenditures based on the evidence filed in the application.

The two mechanisms available are generally a combination of a rate rider and variance account, or a funding adder and deferral account. The Board indicated that an account to track variances from budget may be established in conjunction with a rider, but did not assign a specific account number in its report. However, the Board established a series of accounts of Capital and OM&A Deferral Accounts for the purposes of administering an adder and deferral account recovery mechanism[15].

Board staff notes that in the course of the discovery process, Guelph Hydro proposed to fund its GEA Plan related costs through a funding adder, including

[15] Filing Requirements: Distribution System Plans Filing under Deemed Conditions of Licence (EB-2009-0397), p.22-25

costs incurred in 2012. Board staff submits that although Guelph Hydro is seeking approval of its GEA plan[16], Board staff is of the view that a funding mechanism through a funding adder does not require a prudence review. Board staff is of the view that due to the uncertainty and premature nature of some demonstration projects included in the GEA Plan, advance funding with a subsequent prudence review at a later point is appropriate. Board staff agrees with Guelph Hydro's approach to fund its GEA Plan, including 2012 costs, through a funding adder mechanism. As such, Board staff submits that a determination on a final approval of the GEA plan is premature.

Board staff submissions with respect to the eligibility and quanta of the GEA Plan expenditures for interim funding for costs related to Guelph Hydro's GEA Plan are set out below.

Eligibility and quanta of Green Energy Plan expenditures for approval and recovery

Enable Renewable Embedded Generation Connection

Background

On November 23, 2011 Guelph Hydro updated its GEA plan to include the following capital and operating expenses:

Table 7

	2012 $	2013 $	2014 $	2015 $	Total $
CapEx	0	500,000	50,000	50,000	600,000
OM&A	65,000	83,000	91,000	104,000	344,000

In response to Board counsel during cross examination[17] Guelph Hydro provided updates to the number of projects in Undertakings No. J1.1 and J1.5. In

[16] IRR #84 c)

[17] Transcript, Oral Hearing, December 5, 2011, pages 65 - 66 and 70 - 71

Undertaking No. J1.1[18], Guelph Hydro revised the forecast number of FIT projects from 7 to 24 in 2012 followed by a forecast level of 7 projects per year until 2015.

The microFIT project forecast was also revised upward to 50 projects in 2012 followed by a forecast of 40 microFit projects per year until 2015.

Despite these changes, Guelph Hydro's forecasted capital expenditures for connection of Fit and microFit projects remained unchanged. The capital investment is summarized in table 1 in Guelph Hydro's GEA plan[19] (see below), and when related to another table (Table 8) in that same GEA plan[20], it shows that the $500,000 amount in 2013 is for connection of a 10 MW project, the amount of $50,000 in 2014 is for a 3 MW project, and the amount of $50,000 in 2015 is for 1.14 MW project.

Renewable Generator Connection Request System Upgrades

	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
Capital	$0	$0	$500	$50	$50	$600

As shown in table 2, Guelph Hydro also updated its OM&A related to the Renewable Generator Connection Upgrades project, to include a new hire, dedicated mainly for connection activities related to Fit and microFit generation projects.

Revised Table 2:

Revised Table 2: Project / Investment - OM&A Summary

	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
"Connections OM&A" - Additional Technical Staffing Resources	$0	$66	$83	$91	$104	$344

Guelph Hydro provided the following breakdown of one of these technical resources in response to Board staff interrogatory No. 94.

[18] Guelph Hydro, Undertaking Responses, December 12, 2011, pages 1-2

[19] Exh. 2/Tab 4/Sch. 6/Appenix D (GEA Plan), March 25, 2011/p. 18/Table titled "Renewable Generation Connection Request System Upgrades"

[20] Exh. 2/Tab 4/Sch. 6/Appenix D (GEA Plan), March 25, 2011/p. 16/Table 8/Mid Size Generation

Resource No.2 (to be hired in 2012)	Percentage of Time Dedicated				
Green Energy Plan Project/Investment	2011	2012	2013	2014	2015
Renewable Generator Connection Upgrades	0%	75%	95%	100%	100%
In-Home Display Messaging Project	0%	0%	0%	0%	0%
Electric Vehicle Pilot	0%	25%	5%	0%	0%
Smart Grid High School Education	0%	0%	0%	0%	0%
Demonstration "Smart Grid-Smart Home"	0%	0%	0%	0%	0%
Total should add to 100 %	0%	100%	100%	100%	100%

Discussion and Submission

Board staff is satisfied with Guelph Hydro's explanation[21] that the increase in the forecast for 2012 is based on projects currently in the queue for connection in both the FIT and microFIT categories in 2011 and 2012, but maintained the previous forecast in both categories for the remaining period 2013 to 2015. The revised Table 7 of the GEA Plan summarizes the revised forecast, and is shown below:

Revised TABLE 7: NUMBER OF ANTICIPATED RENEWABLE GENERATION CONNECTIONS [MICROFIT/FIT]

Number of Renewables by Year	*Prior to 2011*	*2011*	*2012*	*2013*	*2014*	*2015*	*Total*
Micro Generation (<= 10 kW)	29	56	50	40	40	40	***255***
Small Generation (<= 250 kW)	0	5	24	7	7	7	***50***
Small Generation (> 250 kW,<= 500 kW)	0	0	1	0	0	0	***1***
Mid-Size Generation (> 500 kW, <= 10 MW)	0	0	0	1	1	1	***3***
Total	***29***	***61***	***75***	***48***	***48***	***48***	***309***

of the 56 Micro Generation projects (< =10 kW)forcasted for 2011, 46 projects have been connected YTD in 2011
of the 5 small Generation projects (<= 250 kW) forcasted for 2011, 2 projects have been connected YTD in 2011

Board staff is of the view that the proposed cost estimate of $500,000 for connecting the 10 MW solar project in 2013 is reasonable. In Undertaking J1.4[22], Guelph Hydro provided an updated cost estimate of $524,000 (within a tolerance of +/- 15%), instead of $500,000 of which $253,000 is categorized under "contracting". This is consistent with larger than 5 MW projects requiring upgrades to protection systems at the relevant transformer station to safeguard the distribution system as well as the connecting generating facility.

Board staff is also satisfied that the capital costs of $50,000 for each of the two projects anticipated in 2014 (3 MW) and in 2015 (1.4 MW) are reasonable.

[21] Ibid, page 2, paragraphs. 2 and 3
[22] [22] Guelph Hydro, Undertaking Responses, December 12, 2011, page 5 (Table)

Undertaking J1.3[23] shows the cost estimates for four projects ranging in size between a 100 kW solar project costing $6,000 and a 1.395 MW cogeneration project costing $62,000.

Board staff is of the view that the amounts for OM&A expenditures in the updated Table 2 reflect the salary of the additional staff member dedicated to renewable generation connection. It is noted in the revised Table 2 that the amounts shown for the "Connections OM&A" start at $66,000 in 2012 and gradually rise to $104,000 in 2015, which approximately corresponds to the previously noted table showing the percentage of time dedicated to "Renewable Generator Connection Upgrades".

The treatment of the operational expenses in relation to both Smart Grid Technicians and the overall impact on the GEA Plan will be dealt with subsequently in this submission.

Eligibility and quanta of Green Energy Plan expenditures

In-home Display Messaging Project

Background

In its AIC, Guelph Hydro stated that smart grid related projects include an in-home display ("IHD") messaging project, which will leverage the AMI network, as well as the Zigbee chip (discussed above), and will provide a mechanism for consumer behavioral change.

In the updated GEA Plan of November 23, 2011, Guelph Hydro requested capital and operating expenditures for the IHD messaging project as set out in the table below:

Table 8

	2012 $	**2013 $**	**2014 $**	**2015 $**	**Total $**
CapEX	479,000	0	0	0	479,000
OM&A	92,000	92,000	92,000	92,000	368,000

[23] Guelph Hydro, Undertaking Responses, December 12, 2011, page 4 (Table)

The nature of the expenditures include: costs for the design, acquisition, installation, system integration, commissioning and training for a back-office hardware and software solution that will manage the community's IHD inventory, smart meter – IHD pairing and device security, as well as provide a tool for creating and managing messaging[24]. Also included in the project are OM&A costs for annual software licensing fees and system operational support.

As noted earlier in this submission, in its application[25] Guelph Hydro stated that the Applicant has exceeded the smart meter minimum functionality specification by the inclusion of the Zigbee chip, which will permit communications with devices inside the home through a non-proprietary communications protocol. Guelph Hydro stated that by developing the IHD project Guelph Hydro wishes to leverage the investment in the Zigbee chip technology[26].

Board staff has several issues with respect to the IHD messaging project. The first concern is with the demarcation point between this project as a CDM measure versus a smart grid initiative and the ensuing cost recovery mechanism. Secondly, Board staff questions the distributor's role as a provider of behind-the-meter services, a matter currently under review by the Board. Thirdly, Guelph Hydro's role as a provider of a messaging service, available to third parties, falls outside of Guelph Hydro's electricity distribution core business.

Demarcation between CDM versus smart grid

In its application Guelph Hydro stated that "a critical element of this project is the anticipated inclusion of IHDs in the future Tier 1 OPA Conversation program expected to replace the *peaksaver*^{TM} residential demand response program[27].

Parties sought clarification on the demarcation point between CDM and Smart Grid through interrogatories and in cross-examination. As set out in the Minister's Directive to the Board, dated March 31, 2010, only savings from OPA or Board approved CDM programs are eligible to towards a CDM target. When

[24] E1/T4S6, Appendix D, updated November 23, 2011, 8.3
[25], Ibid, 8.0
[26] Ibid.
[27] Ibid, 8.2

questioned during the technical conference, Guelph Hydro was not able to identify a demarcation point for the IHD project.[28] Guelph Hydro stated that though it is unclear whether energy and demand savings will be associated with the IHD, Guelph Hydro cannot afford to have this contribution not reflected towards Guelph Hydro's CDM targets.

A distributor's role in behind-the-meter services

When cross-examined on Guelph Hydro's view whether behind-the-meter activities should be funded as a distribution activity, Guelph Hydro stated that:

> MR. MILES: We believe that what we've applied for in the Green Energy Act plan should be funded as a pilot, as a test, to see where this is going to go.
>
> We ultimately don't know what the business model is that makes sense, but we have to start somewhere. And, ultimately, the model could be funded by other application service providers, energy service providers. We're prepared to open up our network for a fee, if that, you know, makes sense.
>
> But at this point, we have to get started with this pilot project, if you will, to better understand what the ultimate business model is going to be.

Board staff notes that the question of whether behind-the-meter services should fall within the regulated monopoly rate base or should be a competitive activity has not yet been addressed by the Board. The Renewed Regulatory Framework consultation, currently underway, includes a *Staff Discussion Paper In regard to the Establishment, Implementation and Promotion of a Smart Grid in Ontario*.

[28] Technical Conference p. 66, l. 10 – p. 67, l. 1

The question of the treatment of behind-the-meter services, like an IHD project, is being posed for discussion with stakeholders.

Third Party Messaging Services

During the discovery process[29] and cross-examination[30], Guelph Hydro stated that the "messaging component of the IHD project is seen as an element to encourage consumers to have an IHD installed in their home, to get used to referring to and taking advantage of them for various different purposes, not all of the CDM-related"[31].

Guelph Hydro further stated that it expects the technology to advance at a fast rate and that Guelph Hydro's needs to begin with a basic messaging project in order to test the technology and provide a foundation on which to build more sophisticated two-way communications that will provide more "smart grid" functionality.

During cross examination Board staff questioned Guelph Hydro's on a breakdown of the messaging service related to its core distribution business, consumer energy management services and third party messaging. In response, Guelph Hydro stated that at this time, it is too early to provide a clear breakdown. Guelph Hydro noted that it has "experimented with in-home displays, bench tested in the meter shop, and because Guelph Hydro doesn't have the ability to send messages, it is difficult to understand restrictions, capabilities, and what mechanisms Guelph Hydro has to go through to create the message and push it out"[32].

As stated above, during the oral hearing Guelph Hydro stated that currently no viable business model for the provision of a messaging service exists. During cross-examination Guelph Hydro reiterated that messaging services, such as community messaging, would be available on a not-for-profit basis during the pilot project stage[33]. Board staff noted that a not-for-profit approach in making

[29] Board staff IR # 86 a)
[30] Oral hearing transcript, Vol. 1 (December 5, 2011), p. 38 – 43
[31] Board staff IR # 86 a)
[32] Oral Hearing transcript, Vol. 1 (December 5, 2011), p. 33-34
[33] Ibid, p. 38, l. 7-9

these services available to third parties, even on a pilot basis may, in Board staff's view, may violate the Affiliate Relationships Code[34]. In response to Board staff's question as to when Guelph Hydro intends to charge for messaging services provided to its shareholders or other third party, Guelph Hydro stated that "it's a little bit premature to determine that right now. We need to understand what the interest level is for these devices and what the uptake is. That could take a year to 18 month probably".[35]

Discussion and Submission

Board staff notes that the capital costs of $479,000, shown in table 8, pertain to the back office system and that those costs would support a full rollout as well as a pilot project. Guelph Hydro noted that this expense could not be scaled back to a pilot size since it is an "all-or-nothing expenditure"[36].

Although Board staff recognizes the value of the learning that could be gained from the IHD project, Board staff is of the view that this project is premature at this point in time. Board staff is of the view that this project raises the question of a distributor's role in behind the meter services. The involvement of distributors in behind-the-meter services is currently a "grey area" with regard to the role of distributors. While distributors are *de facto* involved in CDM programs that are of a behind-the-meter nature, the broader consideration of which behind-the-meter activities should be treated as competitive and which are part of the regulated monopoly service has not yet been determined by the Board. Nevertheless, Board staff submits that given Guelph Hydro's Zigbee-enabled smart meter deployment, Guelph Hydro could consider re-submitting this or a similar project after further smart grid guidance has been issued by the Board.

In addition, Board staff has concerns regarding the classification of the IHD project. Throughout the discovery process, and during cross-examination, Guelph Hydro stated that there is no clear demarcation point between CDM versus Smart Grid initiatives. Given that the IHD portion of the project is funded through an OPA CDM program while the back office system is being positioned

[34] Ibid, p. 38, l. 16-22
[35] Oral Hearing transcript, Vol. 1 (December 5, 2011), p. 39, l. 1-6
[36] Oral Hearing transcript, Vol. 1 (December 5, 2011), p. 33, l. 4

as a smart grid project, Board staff is unclear on how potential savings should be allocated.

Guelph Hydro's approach to classify the initiative according to results expected at a later date, (an example is a determination by the OPA whether or not to apply any energy/demand savings against Guelph Hydro's CDM targets) just amplifies the premature nature of this project. Board staff is of the view that an IHD project should be delineated as either a CDM project or a Smart Grid project. In the first case, Board staff submits that Guelph Hydro has the option of applying for cost recovery of the IHD project as a CDM initiative to the OPA or to the Board for approval. As for the second case, as noted above, Board staff is of the view that this project is premature as a Green Energy Plan initiative.

Board staff submits that should Guelph Hydro re-submit an IHD project at a later point; such a proposal should be accompanied by a full business case. At that point Board staff would expect the business case to include a cost allocation methodology that also provides a cost recovery mechanism for third party services like community related messaging in compliance with the Affiliate Relationship Code. Board staff submits that no third party should have access to the messaging service without a user fee. This is critical to ensure that ratepayers are not footing the bill for the benefit of third parties.

Electric Vehicle Pilot

Background

As part of its GEA plan, Guelph Hydro submitted an electric vehicle ("EV") pilot project with the following amounts:

Table 9

	2012 $	**2013 $**	**2014 $**	**2015 $**	**Total $**
CapEX	50,000	0	0	0	50,000
OM&A	200,000	290,000	30,000	20,000	540,000

In its application Guelph Hydro stated that Guelph Hydro's plan includes the provision to purchase an electric vehicle. The pilot project will include partnering

with the City of Guelph and other local agencies and businesses, to install well signed and well branded electric vehicle charging stations in a number of high-visibility locations in the community. In addition to the high visibility locations, Guelph Hydro also wishes to install a small number of charging stations at strategic residential locations in order to record and analyze consumption patterns, and better understand and encourage off-peak charging[37].

In its AIC, Guelph Hydro submitted that the EV project is intended to educate residents on electric vehicles and charging systems, so that when the time comes for them to purchase an electric vehicle, they are informed consumers and will be able to understand the impact of charging at different times of the day and to understand the different rate plans. Guelph Hydro further stated that this project includes the use of a customized cube van that can serve as a model for fleet owner/operators. As part of this project, Guelph Hydro hopes to leverage the Zigbee chip by exploring EV charging stations that are also equipped with Zigbee technology, and by understanding how these systems could read time-of-use rate buckets and adjust consumption according to consumer-selected criteria.[38]

During the oral hearing Board staff introduced Toronto Hydro's 2010 Annual Report, in which Toronto Hydro describes an EV project that was introduced in 2010 under the title "Toronto Hydro Smart Experience" during which Toronto Hydro sought to gain information about the impact that typical commuter electric vehicles will have on its distribution system[39]. When cross-examined on the potential duplication of Toronto Hydro's project with Guelph Hydro's project, Guelph Hydro stated that the objectives of the two projects differ. While Toronto Hydro is testing the impact of EV on its distribution system, Guelph Hydro seeks to learn about consumer behavior and the implication on different rate plans in the future[40]. Guelph Hydro also noted that the driving habits between the two cities are different and stated that the short commute, typical for Guelph Hydro's residences, would lend itself to an EV pilot project.

[37] E2/T4/S6, Appendix D, updated November 23, 2011
[38] Argument-in-Chief, p. 8
[39] Oral hearing transcript, December 5, 2011, p. 56-57
[40] Ibid, p. 58-60

Guelph Hydro also stated that another portion of its EV pilot project would be research on behalf of the province into various different rate plans[41]. Guelph Hydro noted that this differentiates its projects from other EV pilot projects, like Toronto Hydro's. Moreover, Guelph Hydro noted its intention to take the lead in being a model for fleets, doing some research around electric vehicles that include vans, and highlighting the applicability of EV in commercial fleets[42].

Discussion and Submission

Board staff notes that this project was filed under Guelph Hydro's GEA plan as a Smart Grid demonstration project and is subject to the DSP Filing Requirements. Board staff is of the view that Guelph Hydro's EV pilot project is sufficiently different in its learning objectives to justify the capital and operating expenses requested by Guelph Hydro for this project. Board staff agrees with Guelph Hydro that short commuting distances provide a favourable environment for an EV pilot project.

Nevertheless, Board staff notes that Guelph Hydro failed to produce a clear business case or to demonstrate how they will avoid duplication[43].

During the oral hearing Guelph Hydro stated that it plans to leverage the Zigbee chip by exploring electric vehicle charging stations that are also equipped with Zigbee chips and understanding how these systems could read Time-of-Use buckets and adjust consumption according to consumer-selected criteria; for example , only charging during off-peak times[44].

Board staff agrees that the lessons gained from this project would be of benefit to the province as a whole and submits that a reporting requirement should be established to ensure that the experience from this pilot project is widely available for other distributors. In response to undertaking JTC1.14 Guelph Hydro stated that formal evaluation of the EV demonstration project will be conducted using data collected from the charging stations. Guelph Hydro stated that this data will provide information on a variety of points including:

[41] Oral hearing transcript, Vol. 1 (December 5, 2011), p. 59, l. 7-16
[42] Ibid, p. 59, l. 17-23
[43] Technical conference transcript, (October 27, 2011), p. 56 -57
[44] Oral hearing transcript, p. 18-19

- frequency of use
- most used locations
- when residents are likely to charge
- average duration of a charge
- maintenance stats

Board staff is satisfied with the above mentioned data points and submits that a report providing this data should be submitted to the Board annually.

Smart Grid High School Education

Background

In its application Guelph Hydro requested the following operational expenses for a high school education program:

Table 10

	2012 $	**2013 $**	**2014 $**	**2015 $**	**Total $**
CapEx	0	0	0	0	0
OM&A	75,000	35,000	35,000	20,000	165,000

In its application Guelph Hydro proposed the development and implantation of a high school smart grid education component, delivered through the local school boards. The program included two units: benefits of a smart grid and careers in the smart grid industry[45].

The DSP Filing Requirements state that "at the present time, smart grid development activities and expenditures should be limited to smart grid demonstration projects, smart grid studies or planning exercises and smart grid education and training"[46]. Under the third point, smart grid education and training, the DSP Filing Requirements require a distributor to provide the following information:

[45] E2/T4/S6, Appendix D – updated November 23, 2011, section 10.0
[46] *Distribution System Plans Filing Requirements, EB-2009-0397*, p. 18

- a statement of the nature and purpose of the staff education or training that clearly indicates how the activity will aid in smart grid development; and
- a discussion of how participation in smart grid training or education programs such as conferences, workshops or forums will further the distributor's understanding of smart grid development or otherwise aid in developing a smart grid.

Discussion and Submission

Board staff is of the view that this project is outside the parameters of a smart grid education and training project as defined in the DSP Filing Requirements. As noted above, the DSP Filing Requirements intend to further a distributor's understanding of smart grid development by building internal expertise that will aid a distributor in developing a smart grid.

Board staff submits that the costs for this project should not be eligible under a Smart Grid training program.

Smart Grid Demonstration Home

Background

In its GEA plan Guelph Hydro included the following operational expenses for a Smart Grid – Smart Home Demonstration Project:

Table 11

	2012 $	**2013 $**	**2014 $**	**2015 $**	**Total $**
CapEx	0	0	0	0	0
OM&A	45,000	130,000	55,000	10,000	240,000

In its application Guelph Hydro stated that it wishes to leverage the communication capability enabled by the Zigbee chip technology by this project. Guelph Hydro further stated that the average consumer does not have an understanding of what a smart grid might be and how smart grid may transform society in years to come. Guelph Hydro noted that in order for the smart grid to live up to its potential it will be necessary to expand the focus to customers and bring on board innovative, entrepreneurial companies that know how to create

products and services that customers will value[47]. The Smart Home demonstration project's main purpose would be to provide education to a variety of audiences and showcase the following technologies[48]:

- Smart meters;
- Renewable energy;
- In-home display units;
- Home energy management systems;
- Smart appliances – large and small;
- Electric car charging stations;
- Demand management systems; and
- Automated lighting controls.

In its application and throughout the discovery process, Guelph Hydro also stated that this project will be supporting the City of Guelph in hosting the Transatlantic Urban Climate Dialogue workshop/conference in 2012 and 2013. During cross-examination Guelph Hydro noted that "tagging this [project] on to the transatlantic conference was an add-on". Guelph Hydro stated that "this is not the main purpose in doing it, and that the main purpose is to educate the consumers in our local"[49]. Guelph Hydro elaborated on this statement by describing the project and its expected learning value for the average consumers. Ms. Manners under cross-examination described the project as "a science centre on a small scale, where you are teaching people what the new technology is going to look like, and allowing them to touch and feel it"[50].

Board staff notes that the DSP Filing Requirements make provisions for smart grid demonstration projects, smart grid studies or planning exercises and smart grid education and training.

Discussion and Submission

Board staff agrees with Guelph Hydro that Guelph Hydro's Zigbee-enabled smart meter network will showcase the capabilities of this two-way communication as well as enhance the learning experience of a smart home, including the home

[47] E2/T4/S6, Appendix D – updated November 23, 2011, section 11.1
[48] Ibid, section 11.2
[49] Oral hearing transcript, Vol 1 (December 5, 2011), p. 45, l. 15-19
[50] Ibid, p. 47-48

energy management systems, smart appliances, demand management systems and the automated lighting controls. Board staff notes that the in-home display units and the electric car charging stations do provide some overlap with other smart grid projects brought forward by Guelph Hydro.

Board staff further notes, that this project features mainly behind-the-meter technology. As noted earlier in this submission, the appropriate demarcation point between the monopoly distribution service and a regulatory approach towards a likely competitive behind-the-meter market is currently under review.

Nevertheless, Board staff submits that in the absence of a Board policy on this issue, Board staff is of the view that the Smart Home project fulfills the requirements of a demonstration project as defined in the DSP Filing Requirements.

Board staff also submits that the monetary implications of the overlap between the IHD project and the EV pilot project are immaterial. Board staff is satisfied that the funding requested for this project is reasonable for the test year, and likewise for the remaining years, subject to a later prudence review.

Similarly to the reporting requirements for the EV pilot project, Board staff is of the view that the learning experience from this project should be made available to distributors. Board staff submits that Guelph Hydro should be required to provide a report to the Board detailing the learning gained from this project at the close of the project, as part of Guelph Hydro's next cost of service application, when Guelph Hydro will seek final prudence review.

Additional Technical Staffing Resources

Background

In its application, filed June 30, 2011 Guelph Hydro did not apply for cost recovery or advance funding for GEA plan related capital or operation expenses. However, Board staff noted that Guelph Hydro included two "Smart Grid" technicians in its OM&A budget under Compensation. On September 30, 2011, in response to Board staff interrogatories Guelph Hydro revised its original request of no cost recovery related to the GEA Plan. Instead, Guelph Hydro

requested a funding adder to collect GEA related funding for capital expenditures and operating expenses. Included in the calculation of the GEA funding adder was a cost for two Smart Grid technicians.

Following a technical conference, which commenced on October 27, 2011 Guelph Hydro removed the cost for the two Smart Grid Technicians, in the amount of $187,577, from its OM&A budget. This resulted in a reduction of gross revenue deficiency of $189,896[51].

In the updated GEA Plan, filed November 23, 2011, Guelph Hydro included the following operational expenditures for additional technical staffing resources:

Table 12

	2012 $	2013 $	2014 $	2015 $	Total $
CapEx	0	0	0	0	0
OM&A	174,000	174,000	174,000	174,000	696,000

In response to Board staff interrogatory No. 94 Guelph Hydro allocated the 2 FTE's on a percentage basis against the various projects as follows:

Resource No.1 (to be hired in 2011)	Percentage of Time Dedicated				
Green Energy Plan Project/Investment	2011	2012	2013	2014	2015
Renewable Generator Connection Upgrades	0%	0%	0%	5%	20%
In-Home Display Messaging Project	0%	40%	40%	40%	40%
Electric Vehicle Pilot	0%	25%	35%	35%	35%
Smart Grid High School Education	0%	10%	5%	5%	5%
Demonstration "Smart Grid-Smart Home"	0%	25%	20%	15%	0%
Total should add to 100 %	0%	100%	100%	100%	100%

[51] Technical Conference undertaking, JTC.1.12

Resource No.2 (to be hired in 2012)	Percentage of Time Dedicated				
Green Energy Plan Project/Investment	2011	2012	2013	2014	2015
Renewable Generator Connection Upgrades	0%	75%	95%	100%	100%
In-Home Display Messaging Project	0%	0%	0%	0%	0%
Electric Vehicle Pilot	0%	25%	5%	0%	0%
Smart Grid High School Education	0%	0%	0%	0%	0%
Demonstration "Smart Grid-Smart Home"	0%	0%	0%	0%	0%
Total should add to 100 %	0%	100%	100%	100%	100%

On December 12, 2011 Guelph Hydro updated the OM&A Summary table for the GEA Plan by allocating OM&A costs to the renewable Generator Connection project as follows.

Revised Table 2: Project / Investment - OM&A Summary

	2011 ($000)	2012 ($000)	2013 ($000)	2014 ($000)	2015 ($000)	Total ($000)
"Connections OM&A" - Additional Technical Staffing Resources	$0	$65	$83	$91	$104	$344
In-Home Display Messaging Project	$0	$92	$92	$92	$92	$368
Electric Vehicle Pilot	$0	$200	$290	$30	$20	$540
Smart Grid High School Education	$0	$75	$35	$35	$20	$165
Demonstration "Smart Grid-Smart Home"	$0	$45	$130	$55	$10	$240
"SmartGrid OM&A" - Additional Technical Staffing Resources	$0	$109	$91	$83	$70	$352
Total	$0	$586	$721	$386	$316	$2,009

Discussion and Submission

Board staff is satisfied with Guelph Hydro's allocation of the Smart Grid technical resource No.2, as noted earlier in this submission. Board staff is unclear as to the date of hire for this resource, since the updated GEA Plan has revised the plan elements, timing and corresponding expenditures to a 2012-2015 timeframe. Board staff invites Guelph Hydro to clarify the expected date of hire for this resource.

Board staff submits that the total cost for technical resource No. 1 should be disallowed. As discussed earlier in this submission, Board staff is of the view that the IHD project is premature. Board staff notes that in case the IHD project was denied, Guelph Hydro stated that it would need to re-evaluate as to whether it

would proceed with the projects[52]. Board staff submits that since the status of this project is undetermined at this point, the staffing resources associated with this project may be excessive.

Similarly, Board staff is of the view that staffing resources dedicated to the Smart Grid High School Education project do not qualify as a Smart Grid training and education projects as outlined in the DSP Filing Requirements.

Board staff noted that Guelph Hydro allocated 25% of each of the two technical resources to the EV pilot project. Board staff is still unclear as to the technical expertise required in this demonstration project. Furthermore, Board staff is uncertain what the new time implication in the allocation of technical resources No.1 is, since the time frames for the various projects were updated on November 23, 2011. Board staff notes that theses updates are not reflected in the resource allocation provided above.

Board staff supports the operational expense of one FTE (Smart Grid technician) in relation to the Renewable Generation Connection project as proposed by Guelph Hydro in its revised table No.2 (OM&A summary table, filed December 12, 2011), but submits that a second technical staff solely responsible for smart grid activities is excessive given the timing implications of the various demonstrations projects and Board staff's earlier submission on the premature nature of the IHD project and the incompatibility of the education project with the DSP Filing Requirements.

[52] Oral hearing transcript, Vol 1 (December 5, 2011) p. 35, l. 10-12