EB-2011-0123

ONTARIO ENERGY BOARD

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

AND IN THE MATTER OF an application by Guelph Hydro Electric Systems Inc. for an order approving just and reasonable rates and other charges for electricity distribution to be effective January 1, 2012.

BOARD STAFF

CROSS-EXAMINATION COMPENDIUM
BASIC GREEN ENERGY PLAN

DECEMBER 5, 2011

#90	**Smart Grid projects, in particular EV pilot**	
Undertaking JTC 1.14	**EV pilot project**	**44 - 47**
Filing Requirements DSP	**Filing Requirement for Smart Grid demonstration projects**	**48 - 49**
TC transcript p. 56 - 57	**Exchange between Mr. Weninger and Ms. Armstrong on Guelph Hydro's participation in Climate Control conference through Smart Home**	**50 – 51**
THESL Annual Report, p. 2 and 20	**Description of THESL's EV pilot project**	**52 – 53**
Updated Smart Grid Adder calculation	**Smart Grid Funding Adder calculation**	**54 – 58**
Updated RG Adder Calculation	**Renewable Generation Adder calculation**	**59**
Report of the Board on – Determining Direct Befits EB-2009-0349	**O-Reg 330/09 on determining direct benefits and provincial rate protection**	**60**
Bd. Staff TCQ # 33	**Renewable Gener59ation Project 10 MW**	**61 – 62**
Updated E2/T4/S6, Appendix D	**GEA Plan Summary and Renewable Generation project table, p. 3 and p. 14 of the GEA plan**	**63 – 64**
Bd. Staff TCQ #35	**Renewable Generation evidence**	**65 – 67**
Bd. Staff TCQ #44	**Usage of IHD system**	**68 – 69**

Appendix D of this Exhibit). Having in mind its customers' bill impact consideration, Guelph Hydro is proposing a recovery period of 4 years to coincide with the IRM period (sunset date December 31, 2015)

Functionality in Excess of Minimum Functionality Adopted in O. Reg. 425/06.

Guelph Hydro's smart meters and associated back-office systems meet the minimum specifications set out by O. Reg. 425/06. The meters exceed the specification in one specific area with respect to the inclusion of a communications chip based on the Zigbee standard. This communication chip will enable Guelph Hydro, through the smart meter, to communicate with in-home devices such as displays, thermostats, and Zigbee-equipped smart appliances. There are several advanced applications that can be enabled with this wireless technology including real time price signaling, home area automation, and demand response capability. Inclusion of this technology in the meter will provide a tool to customers to better educate customers on efficient energy use, and better manage their energy consumption, which in turn will help Guelph Hydro achieve its mandated conservation targets.

Guelph Hydro believed that it was prudent to include the communication chip in the smart meters on the basis that the incremental cost to do so was minor ($12.25/meter) in comparison to the alternative of having to replace large volumes of meters before their end of useful life (15 years). In addition, Guelph Hydro believes that substantial customer and electric system benefits would be missed if the chip was not included

Costs Associated with Replication of Smart Metering Entity (SME) Functions

Guelph Hydro does not expect to incur costs associated with functions for which the SME has the exclusive authority to carry out pursuant to O. Reg. 393/07, but costs will be incurred in association with integrating the AMI master station, the provincial MDM/R, and the Guelph Hydro CIS system.

MR. GARNER: I'm wondering if I could jump in since we're on this topic.

My name is Mark Garner, and I'm with VECC.

I'd like to ask just a few questions about the ZigBee chip while we're on the topic, if you don't mind, and then I can eliminate that question.

Just to confirm as we're going through this, there was a modest incremental investment for that. I recall something around $12 per meter. Does that sound about right?

MR. WENINGER: Yeah, that's correct. It's a little more than $12 per meter.

MR. GARNER: And the overall cost was -- do you recall? Was it $60,000, somewhere in that range?

MR. WENINGER: No, if I recall, it's closer to $600,000.

MR. GARNER: 600,000, sorry. I left out a zero there. Do you know of any other utilities that have installed a similar device in their smart meters?

MR. WENINGER: We're not aware that any utility in Ontario installed the ZigBee chip at the time. We are aware that there are a number of utilities that are now sort of kicking themselves and looking at what needs to happen to include a ZigBee chip in support of some of the conservation programs.

There are some utilities that are considering, for example, for an in-home display that's provided as part of the OPA residential demand response program, doing a meter

62

swap-out with a shiny new meter that does have a ZigBee chip.

MR. GARNER: Thank you. And I'm following up on, by the way, just so you know, at the Technical Conference IR No. 10 that you did for us, and it was our original IR No. 26.

And in that IR, what we were trying to get at was whether there were any incremental revenues, specific incremental revenues, that you had developed a plan to try and recoup this investment of $600,000.

And I just want to be clear. The answer, I believe, reading the whole interrogatory, and that is there is no plan to derive incremental revenues in this; is that correct?

MR. WENINGER: That is correct.

MR. GARNER: And can I ask another question? Has any consideration given by Guelph, in lieu of an incremental revenue stream, to create a rebate or other program for -- for instance, my client is very interested in low-income consumers who might want to install some sort of home device to help them lower their bill? Has any thought been given to that at Guelph?

MR. WENINGER: We haven't given that any specific thought, because we have to be really careful that we do not encroach on the conservation programs that are funded by the OPA. There is some very specific language around duplicative efforts and duplicity, and that can be interpreted very broadly.

42) Ref: IRR 86a)/pp.25 -27, IRR87a)/p.30, and Exh. 2/Tab 4/Sch. 6 (Appendix D)/p.20 & p.21(Table)

For the basic IHD minimum functionality of displaying basic energy consumption and pricing information, please indicate whether or not this can be accomplished without the installation of the back-office support installation that is estimated to cost $479,000 in 2011 as shown in the second reference.

Guelph Hydro's Response:

This is to confirm that the basic IHD minimum functionality can be accomplished without the installation of the additional back-office hardware and software. The existing smart metering AMI system has the ability to manage the pairing of smart meters and the IHD using a manual process, which Guelph Hydro believes will be functional for managing a small number of devices. For larger volumes of devices (IHDs), Guelph Hydro believes a system with better automation and device management tools will be required. The existing AMI has limited messaging capability and is not capable of delivering the IHD Messaging project as described in Guelph Hydro's GEA Plan.

a) Does the IHD system need to be integrated to interface with Guelph AMI in order to yield the desirable results (i.e., Energy consumption and pricing info. Display) that the CDM program schedule recognizes?

Guelph Hydro's Response:

It is unclear which IHD system is being referred to in the question. As noted in the response above, the basic OPA CDM energy and price information can be accomplished without the additional back-office hardware and software. However, the IHD Messaging project requires a separate hardware and software system in addition to the smart meter AMI system. The additional IHD Messaging system must be interfaced to the existing smart metering AMI to access the smart meter database and wireless field communications network.

b) If the answer is no, can additional subsequent upgrades be done to (fully take advantage of all of the IHD functionalities) allow interface with Guelph's AMI? If feasible, what are the costs of upgrades? Would these costs of upgrade far outweigh those of immediate installation?

Guelph Hydro's Response:

As noted in the response to 42a, the smart metering AMI and IHD Messaging system are two separate systems. There is no upgrade path of Guelph's AMI that incorporates the additional functionality.

c) Based on above answers, if applicable, please revise CAPEX at reference 2.

Guelph Hydro's Response:

Not applicable, refer to response 42b.

41) Ref. Board staff IRR 86a)/pp.25 -28, IRR87a)/p.30, Exh. 2/Tab 4/Sch. 6 (Appendix D)/p.20 & p.21(Table), and Filing Requirements: Distribution System Plans – Filing Under Deemed Conditions of Licence, March 25, 2010

In the first reference, in response to question a), Guelph Hydro indicated that the minimum functionality the IHD must have is displaying basic energy consumption and pricing information, and Guelph Hydro's intention is to take advantage of the existing smart meter infrastructure to expand the use of the IHD beyond the basic customer energy consumption, and stated in part that:

> Our intentions are to take advantage of the existing smart meter infrastructure, including LDC to meter communications channel, along with the Zigbee chip included in all of our smart meters, to expand the use of the IHD beyond the basic customer energy consumption and pricing information required for the CDM initiative as described above. We view this element of the program to be related to smart grid development and not strictly a CDM activity, although we acknowledge that the IHD messaging would be used to support CDM programs, whether electric or water.

Guelph Hydro in the first reference also stated in part that:

> As previously mentioned, Guelph Hydro has invested in smart meters containing a ZigBee chip. ZigBee is a two-way communications protocol similar to Bluetooth. A variety of devices will be able to use the ZigBee protocol in the home, potentially including smart appliances, electric vehicle charging systems, lighting controls, heating and cooling systems and sources of renewable energy. Guelph Hydro would like to leverage the ZigBee chip investment to enable customers to use their in-home display for a variety of different purposes including activities that are more "smart grid" related that we expect would not be funded through the OPA CDM programs:

In the third reference, the Filing Requirements on page 18 states in part 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."

Guelph Hydro has indicated that the IHD falls within the Demand Response program schedule of the OPA (2011-2014). Some DR activities fall clearly within demand management while others display more Smart Grid/Infrastructure attributes (IRR 86a).

a) Please file a copy of the OPA program schedule for the Demand Response ("DR") program that includes the use of an IHD.

Guelph Hydro's Response:
Attached please find the schedule for the DR program: "Initiative Schedule B-3 (Residential and Small Commercial Demand Response Initiative 2011-2014), supplied as Appendix Guelph_BoardStaff_TCQ_#41_a_DR_Program.

b) To clarify the boundary between CDM and Smart Grid activities please point to and file relevant documentation (OPA or other) that helps define DR/CDM vs. DR/Smart Grid.

Guelph Hydro's Response:

Guelph Hydro is unaware of relevant documentation that clearly defines the DR/CDM vs. DR/Smart Grid, but provides the following observations:

1) LDCs including Guelph Hydro have aggressive conservation targets to achieve over the 2011-2014 period;
2) The majority, or all, of the conservation savings are expected to be achieved through delivery of the province-wide OPA (Tier 1) conservation programs;
3) Any other proposed conservation programs that are potentially "duplicative" of the OPA Tier 1 programs require dialogue with the OPA and the OEB and approvals prior to commitment to the program;
4) The OPA has recently published the updated Residential Demand Response (RDR) program (previously known as "peaksaver^{TM}"), which includes the supply and installation of an In-Home Display (IHD) as part of program delivery – this is in lieu of a $25 incentive previously provided to the customer enrolling in the program;
5) The IHD is supplementary to the primary focus of the RDR program, which encourages enrollment of central air conditioning units, electric hot water heaters, and pool pumps;
6) It is unclear whether energy/demand savings will be attributed to the installation of an IHD towards an LDC's conservation target – anecdotally Guelph Hydro has heard that around 3% of a household's energy consumption savings may be attributed to these devices by virtue of the installation of the device, but at this time Guelph Hydro has no knowledge as to whether this, or any, level of energy savings has been statistically verified, or will even be acknowledged as part of the CDM program delivery;

7) The IHD can leverage the Zigbee communications chip embedded within Guelph Hydro Smart Meters, to provide near real-time energy consumption information without the need for other external communications tool;
8) Guelph Hydro's smart metering communications infrastructure investment may be further leveraged as a mechanism to provide messaging to the customer, with little incremental communications infrastructure investment, as Guelph Hydro already has a requirement for highly reliable daily smart metering transmissions (greater than 98%);
9) The Smart Metering and related communications infrastructure elements of this configuration are clearly Smart Grid related, and conceived and installed per Ontario regulation before the terminology "SmartGrid" became more prevalent;
10) The IHD on its own does not drive the DR activity required of the OPA CDM programs;
11) The IHD may be acting as a bridge between the Smart Grid and CDM worlds if there is a CDM contribution / allocation by virtue of the installation of the IHD. If this is the case, then all LDCs, including Guelph Hydro, will need to ensure that the installation of any IHD, whether through an OPA Tier1 province-wide program, a custom Tier2 or Tier 3 program, or a proposed GEA Smart Grid plan does result in proper allocation of CDM results towards the aggressive 2011-2014 CDM targets, otherwise the initiative would not be supported by the LDCs, as it does not assist in achieving the LDC's conservation goals;
12) Guelph Hydro notes that other forms of DR for business, commercial and industrial customers are covered by other OPA CDM program schedules, which is clearly in the realm of CDM;
13) Guelph Hydro notes that there are many definitions of "SmartGrid", and all definitions are not aligned. Guelph Hydro also notes that many LDCs have been undertaking activities and implementing technologies for many years on the distribution system (ie Supervisory Control and Data Acquisition System, Outage Management System, Distribution Automation, etc.) that in today's environment may be categorized as "SmartGrid", but is simply an extension or evolution of activities that have been occurring for many years. Guelph Hydro also notes that customers have the potential to implement elements of "SmartGrid" on their own through the installation of Home Automation, timers, and other more sophisticated management and control devices, so that the delineation of CDM and SmartGrid is not necessarily a clear one.

c) Please expand on the above and indicate whether the OPA program schedule for DR makes provisions for the use of devices with attributes and functionalities similar to Guelph's longer term plans for in-home display.

Guelph Hydro's Response:

As noted in a previous interrogatory response, at this time the OPA program explicitly includes the supply and installation of a demand response device (ie switch to control central air conditioning or pool pump) as well as an In-home Display to provide the customer electricity consumption information and rate information as part of the CDM program. The IHD does not provide DR functionality. Although the OPA has indicated that it will consider funding a Demand Response Thermostat (DRT) with display capability as being eligible in the DR program as both the DR device and IHD, Guelph Hydro's focus for the proposed Messaging project is designed around a stand-alone IHD without DR capability. In either scenario, the OPA CDM program clearly does not support the concept of messaging to the home as proposed in Guelph Hydro's GEA Plan.

d) Focusing your answers on the IHD functionality (ies), please outline what Guelph views as:
- Strictly CDM
- Strictly Smart Grid
- Potentially Smart Grid

Guelph Hydro's Response:

The definition of CDM for an LDC with mandated conservation targets would be driven around any activity funded by the OPA or customer rate base that results in conservation, electricity efficiency improvements or demand response that will be attributed to the LDC's share of the province-wide conservation targets. This could mean any number of potential programs, including the implementation of so-called "SmartGrid" technologies that meet the requirements for CDM attribution as outlined by the regulating authority of the day. These requirements may change as program definitions are modified over time, as new elements are added and others are removed (for example, the introduction of IHDs in the new RDR program). This may be best illustrated in examples as outlined below:

Examples of Potential IHD Messaging Functionality	"CDM" vs "SmartGrid"

Local community messaging (ie water conservation)	SmartGrid
LDC billing reminders and notifications (ie delinquency)	SmartGrid
CDM program promotion and messaging	CDM
Display basic electricity consumption	CDM as this is funded by the OPA towards LDC CDM targets
Display basic Electric Vehicle charging station information	SmartGrid, but could potentially become a CDM activity should customers be incented to discharge EV batteries into the grid at system peak

e) When does Guelph plan to expand the capabilities beyond basic energy consumption and pricing information display? (yr 3, yr 4, yr 5 of the GEA Plan?)

Guelph Hydro's Response:

Guelph Hydro's high level project plans for rolling out the IHD and messaging are as follows:

1. Survey of Guelph residents / potential IHD users to better understand how they would use the display to ensure the appropriate technology is deployed within the constraints of the OPA CDM IHD funding;
2. Procurement of IHDs, selection of OPA RDR service provider;
3. Explore IHD – Smart Meter pairing requirements and security issues, and develop procedures for field installation, commissioning, troubleshooting, and Customer Information System integration, as well as developing internal protocols for regular pricing updates to the IHD;
4. Implementation of IHD back-office hardware and software solution;
5. Testing with new back-office system to understand messaging communications requirements and limitations, including any potential impact on smart metering communications system;
6. Developing protocols for basic messaging beyond consumption/pricing;
7. Implement basic messaging for LDC and potentially City of Guelph use;
8. Work with software developer to design and develop IHD custom messaging application(s);

Guelph Hydro will complete Items 1-3 as quickly as possible to ensure early roll-out of the RDR CDM program. We expect the hardware/software implementation (Item 4) in Q1-Q2 2012, ideally with the ability to complete items 5, 6 and 7 later in 2012. Custom application development and roll-out would likely not occur until 2013 at the earliest.

f) When does Guelph plan to expand the project beyond those customers participating in the OPA Demand Response program? (yr 3, yr 4, yr 5 of the GEA Plan?)

Guelph Hydro's Response:

As noted in previous interrogatory response OEB #86g, Guelph Hydro proposes to expand the project to beyond those customers participating in the OPA Demand Response program after discussions have taken place with the OPA and OEB to understand the implications of the wider roll-out of IHDs that are not delivered through the OPA Tier 1 CDM program. Should there be an energy/demand reduction attributed directly to IHD's, we cannot afford to not have this contribution be reflected towards Guelph Hydro's CDM targets. We also need to have an understanding of how IHDs can be funded outside of the OPA Tier 1 RDR CDM program.

38) Ref: IRR 85, filed on September 30, 2011/page 140, Appendix Guelph_IRR_#85_GEA Rate Adder calculation

In the second reference, the spread sheet titled "Incremental Revenue Requirement Calculation" is basing the calculations on Net Fixed Assets as follows:

YEAR	NFA
2012	$245,000
2013	$504,500
2014	$532,000

In the second reference, the spread sheet titled "Weighted Average Direct Benefits" the Net Fixed Assets are shown as follows:

YEAR	NFA
2013	$245,000
2014	$504,500
2015	$532,000

a) Please prepare a revised evaluation of the spread sheet titled "Incremental Revenue Requirement Calculation" of the second reference (Appendix A) to reflect the correct amounts of the Net Fixed Assets.

Guelph Hydro's Response:

Guelph Hydro has revised the tab titled "Incremental revenue Requirement Calculation to reflect the correct amounts of the Net Fixed Assets:

YEAR	NFA
2013	$245,000
2014	$504,500
2015	$532,000

EB-2011-0123
Guelph Hydro Electric Systems Inc.
TCQs_ Responses to the Board Staff Interrogatories
Delivered October 26, 2011

Incremental Revenue Requirement Calculation

	2011		2012		2013		2014		2015	
Net Fixed Assets		$ -		$ -		$ 245,000		$504,500		$532,500
OM&A	$ 477,000		$721,000		$ 391,000		$ 341,000		$ 306,000	
WCA	13.5%	$ 64,395	13.5%	$ 97,335	13.5%	$ 52,785	13.5%	$ 46,035	13.5%	$ 41,310
Rate Base		$ 64,395		$ 97,335		$ 297,785		$550,535		$573,810
Deemed ST Debt	4%	$ 2,576	4%	$ 3,893	4%	$ 11,911	4%	$ 22,021	4%	$ 22,952
Deemed LT Debt	56%	$ 36,061	56%	$ 54,508	56%	$ 166,760	56%	$308,300	56%	$321,334
Deemed Equity	40%	$ 25,758	40%	$ 38,934	40%	$ 119,114	40%	$220,214	40%	$229,524
ST Interest	2.46%	$ 63	2.46%	$ 96	2.46%	$ 293	2.46%	$ 542	2.46%	$ 565
LT Interest	5.26%	$ 1,898	5.26%	$ 2,869	5.26%	$ 8,778	5.26%	$ 16,229	5.26%	$ 16,915
ROE	9.58%	$ 2,468	9.58%	$ 3,730	9.58%	$ 11,411	9.58%	$ 21,097	9.58%	$ 21,988
		$ 4,429		$ 6,695		$ 20,482		$ 37,867		$ 39,468
OM&A		**$ 477,000**		**$721,000**		**$ 391,000**		**$341,000**		**$306,000**
Amortization		$ -		$ 10,000		$ 21,000		$ 25		$ -
Grossed-up PILs		$ 972		-$ 2,232		-$ 2,734		$ 7,338		$ -
Revenue Requirement		$ 482,401		$735,463		$ 429,748		$386,230		$345,468

Direct Benefit	2011	2012	2011 + 2012	2013	2014	2015
OM&A	$ 477,000	$721,000		$ 391,000	$341,000	$306,000
Capital	$ 5,401	$ 14,463		$ 38,748	$ 45,230	$ 39,468
Direct Benefit % on capital	0.00%	6.00%		6.00%	6.00%	6.00%
Direct Benefit on capital	$ -	$ 868		$ 2,325	$ 2,714	$ 2,368
Total Direct Benefit	$ 477,000	$721,868	$1,198,868	$ 393,325	$343,714	$308,368
Total # of Customers (excl connections)	52,253	52,253	52,253	52,253	52,253	52,253
GEA Rate Adder	$ 0.7607	$ 1.1512	$ 1.9120	$ 0.6273	$ 0.5482	$ 0.4918
Provincial Rate Protection	$ 5,401	$ 13,595	$ 18,996	$ 36,423	$ 42,516	$ 37,100
Monthly Adder Amount Paid by IESO	$ 450	$ 1,133	$ 1,583.02	$ 3,035	$ 3,543	$ 3,092

But I'm still not clear from this list exactly when --when customers with in-home display would actually start receiving those messages that are beyond the basic consumption and pricing information that would be part of the OPA's CDM program. Is that step 7?

MR. WENINGER: Step 7 is where we start. We anticipate we have a tool set that's functional, that can go beyond just the basic messaging for the CDM program.

Step 7 likely wouldn't happen before the end of 2012, probably early into 2013, from a sort of high-level time frame point of view.

MS. CAZALET: And just one final question. And this is in relation to Board Staff Question 44, where we were asking about different parties that might have access to this infrastructure and be able to provide messaging.

And you listed, you know, the City of Guelph and the school boards, and you indicated that access would be provided using sort of a not-for-profit model.

And I was just wondering, you know, your opinion on This in relation to the Affiliate Relationships Code and the requirements for transfer pricing when an affiliate is using -- an affiliate being the shareholder in the City of Guelph -- is using an asset or part of Guelph's system.

MR. WENINGER: We would imagine cost recovery as a minimum when we get to the point where there's multiple parties actually using the back office system for messaging.

Cost recovery, and if that requires a mark-up, 10

percent, so be it. We're a long way away from getting to that point.

MR. SHEPHERD: Can I just ask a follow-up on that? I saw "school board" and I got excited.

"Not-for-profit" means no charge at the beginning?

MR. WENINGER: Initially while we're building the system and making sure it can do what we think it can do, I don't foresee any charges to any of the participants.

Initially it would be primarily Guelph Hydro for our own internal uses, to make sure the system can actually do what we think it can ultimately do.

MR. SHEPHERD: Well, okay. So you can't charge yourself; I get that. But the City of Guelph or the two school boards, you're proposing that they are actively involved in using the system in that phase for free?

MR. WENINGER: We haven't had detailed dialogue with either of the parties to understand what they realistically might do with it. Everything that we've put into the plan are sort of concepts, visions, of what is potential.

So no, we're not at that level of detail. We definitely haven't had any of those discussions at this point in time.

MR. SHEPHERD: Sorry. I wasn't actually asking about the discussions so much as your plan -- tell me whether I'm right -- contemplates that, at least for the initial phase, to the extent that anybody else uses it, it will be for free?

MR. WENINGER: Initially, as we're debugging the

system, yes.

MR. SHEPHERD: Okay. And do you have a -- you have some ideas as to how the City and the schools will use it?

MR. WENINGER: Not specific. Again, these are just high-level concepts of what we think it could be used for.

MR. SHEPHERD: Can you tell us what that is?

MR. WENINGER: So some of the concepts, so for example, from the city point of view, if there's lawn watering ban days, that might be one form of messaging.

Another form of messaging that there might be some value in could be snow day. Schools are closed for today, for example.

Another example could be, from a City perspective, alternating weeks for take out your recyclables.

These are just examples of some of the things that we've contemplated.

MR. SHEPHERD: So you're contemplating sort of public service announcements, as opposed to advertising?

MR. WENINGER: Correct.

MR. SHEPHERD: Okay. Thanks.

MS. SEBALJ: I think that's all of the questions from Board Staff.

I did want to mark one more undertaking, which is the first, Board Staff No. 1, which was the general update to the revenue requirement work form as a result of any changes or updates. So if we could just mark that as JTC1.15.

UNDERTAKING NO. JTC1.15: TO PROVIDE GENERAL UPDATE TO

Green Energy Act Plan

Issue 12.1 Is Guelph Hydro's Green Energy Act Plan, including the Smart Grid component of the plan appropriate?

IR 86 - Ref: E2/T4/S6 Appendix D, pp.19-21

On page 20 Guelph Hydro indicates that the Zigbee communications chip in the smart meter is an enabling technology that will permit the development of a variety of opportunities including communications and messaging through an In-Home Display(IHD). The evidence also indicated that a critical element of this project is the anticipated inclusion of IHDs in the future Tier 1 OPA Conservation program expected to replace the peaksaverTM residential demand response program.]

On page 21 Guelph Hydro indicates that part of the $479,000 of capital investment in 2011 is 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.

a) Please provide an overview of Guelph Hydro's view of the demarcation point between 'smart grid' and 'CDM' initiatives. In the event that an initiative has both a smart grid and CDM component to it please provide Guelph Hydro's methodology for allocating costs and avoiding double counting of any resulting load reduction.

Guelph Hydro's Response:

The In-Home Display (IHD) component of our CDM initiative will involve only IHDs which fall within the parameters specified by the OPA program schedule. Per OPA program design, these units are offered to customers at no charge to the customer, in exchange for the customer's participation in the residential demand response program. This "gift" is an update to a $25 incentive given to customers who participated in the previous 2007-2010 version of the residential demand response program.

Under the new CDM program, the IHDs must have minimum functionality of displaying basic energy consumption and pricing information. Our thoughts are that the unit supply will fall under the category of the CDM initiative. It is unclear at this time whether the OPA will be allocating any CDM load/energy reduction results to the LDC by virtue of the IHD. It is clear that results will be allocated to the LDC through the number and type of devices enrolled for demand response under this program – the elements that will initially be offered include central air

conditioning (and air-source heat pumps), electric hot water heaters, and pool pumps. It is expected that over the term of the 2011-2014 programs, the program parameters will change as technology evolves, and other elements may be offered in the future.

Our intentions are to take advantage of the existing smart meter infrastructure, including LDC to meter communications channel, along with the Zigbee chip included in all of our smart meters, to expand the use of the IHD beyond the basic customer energy consumption and pricing information required for the CDM initiative as described above. We view this element of the program to be related to smart grid development and not strictly a CDM activity, although we acknowledge that the IHD messaging would be used to support CDM programs, whether electric or water.

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 them CDM-related. As we expect the technology to advance at a fast rate, we believe we need 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. For example, once messaging is functional, if we wind up with a different tiered rate scheme for electric vehicles, perhaps with a set fee for a specific monthly consumption, it may be possible to send alerts to owners of electric vehicles to advise them if they are getting close to reaching their limits.

As previously mentioned, Guelph Hydro has invested in smart meters containing a ZigBee chip. ZigBee is a two-way communications protocol similar to Bluetooth. A variety of devices will be able to use the ZigBee protocol in the home, potentially including smart appliances, electric vehicle charging systems, lighting controls, heating and cooling systems and sources of renewable energy. Guelph Hydro would like to leverage the ZigBee chip investment to enable customers to use their in-home display for a variety of different purposes including activities that are more "smart grid" related that we expect would not be funded through the OPA CDM programs:

- Enabling smart appliances and electric vehicle charging systems to read Time-of-Use rate buckets and adjust consumption according to consumer-selected criteria (i.e. only charge at off-peak times, only dry clothes at off-peak times, etc;
- Lighting will turn off automatically if no one is in the room, and on when people come in;
- Heating and cooling systems will adjust temperatures in rooms according to occupancy and time-of-use rates;

- Renewable sources of energy may kick in or off according to signals received via the ZigBee chip.

b) Please provide an explanation as to why a vital component of this initiative will be financed through "a new 2011 OPA Tier 1 CDM program" yet the back office component costing $ 479,000 of capital in 2011 and $92,000 per year for 5 years is presented as a smart grid project.

Guelph Hydro's Response:

A separate back-office system is required to build, deliver, track and manage the messaging envisioned in this project, with estimated costing detailed in OEB IR # 87a and 87b.

Background: In August 2011 the OPA released the Schedule for the replacement CDM program anticipated to provide the "vital component funding" as part of this project. This "vital component funding" was anticipated to be funding of the In-Home Display (IHD) purchases.

In order to facilitate the Messaging Project, we are relying on the smart meter and its communications infrastructure to send messages to the IHD. A basic IHD will have minimum functionality that will permit the secure display of the customers real-time (or near real-time) energy consumption in kWh, as well as approximate cost of that energy consumption. For this project we envisage a more sophisticated offering, and to provide some guidance, Guelph Hydro is currently undertaking a customer survey to determine the appropriate functionality required in the IHD, and what end-user applications would be needed to support this project, to ensure that the system will provide value to the customer. This survey is expected to be completed November 2011.

d) In the event that IHDs are not included in, and/or not funded through, the OPA CDM Program, please explain whether Guelph Hydro will proceed with the IHD Messaging Project. If Guelph Hydro will proceed, how does Guelph Hydro intend to fund the IHD devices?

Guelph Hydro's Response:

Following release of the OPA Demand Response program schedule, we confirm that IHDs will be funded to a maximum per unit cost as determined by the OPA,

through the CDM program. We note that customers that had previously participated in the 2007-2010 OPA demand response program are also eligible to participate (including receipt of an IHD), provided they sign up for continued demand response activities for their central air conditioning through 2014.

Although for this application this project is designed as a pilot to understand how to best utilize the technology to provide value to the customer, we recognize that for this to truly become a community-wide messaging tool, we will ultimately require the majority of Guelph Hydro customers to participate in the IHD program, and we recognize that it may be difficult to achieve this level of penetration of IHDs through the CDM program enrollment alone.

We expect that as the project unfolds and as learnings are revealed, there will be some modifications required to the technology and/or the customer applications. Should we determine that uptake of OPA CDM program is not at a sufficient pace, we will pursue funding through other potential avenues, such as:

- An OEB Tier 3 CDM project application to fund the IHD, provided that IHDs can demonstrate tangible conservation results that can be applied towards Guelph Hydro's CDM targets;
- Ministry of Energy Smart Grid funding for electric vehicle pilot projects (IHD for two-way communications with charging systems);
- Ministry of Infrastructure, Environment or other ministries - development funding
- Ontario Centres of Excellence - Innovation projects with a university research component.

We note, however, that discussions will be required with the OPA and OEB to understand the implications of the wider roll-out of IHDs that are not delivered through the OPA CDM program. Should there be an energy/demand reduction attributed directly to IHD's, we cannot afford to not have this contribution be reflected towards Guelph Hydro's CDM targets.

e) Please explain whether and how Guelph Hydro's 2011 activities and expenditures for the IHD Messaging Project may be affected by the timing of the roll-out of the OPA CDM Program.

Guelph Hydro's Response:

As Guelph Hydro's GEA Plan we being developed, we did not have information on the design of the replacement residential demand response program. After program schedule was released in August, we started an analysis of its funding mechanism, implementation requirements and various delivery options. As we are already in September, Guelph Hydro's 2011 activities have already been

affected, as the more detailed work to ensure compatibility with the smart metering infrastructure, as well as researching and understanding IHD device functionality is just getting underway. Further delays will result in more delays to beginning the project. In addition, as the proposed project is linked through the IHD to Guelph Hydro's CDM activities, we cannot afford a lengthy delay in offering the IHD through the CDM demand response program to our customer base, as we have aggressive CDM targets to meet.

f) Does Guelph Hydro intend to count energy and demand savings associated with the IHD Messaging Project towards Guelph Hydro's CDM Targets or Performance Incentive?

i) If so, please explain how Guelph Hydro intends to apportion any energy or demand savings as between the IHD Messaging Project and the OPA CDM Program?

Guelph Hydro's Response:

The IHD project will be focused primarily on using messaging to change consumer behaviour. At this time it is unclear whether energy and demand savings will be associated solely to the IHD itself. Please refer to responses to IR#86a, b, c, d and e for more details. We note that discussions will be required with the OPA and OEB to understand the implications of the wider roll-out of IHDs that are not delivered through the OPA CDM program. Should there be an energy/demand reduction attributed directly to IHD's, we cannot afford to have this contribution not reflected towards Guelph Hydro's CDM targets.

g) Please confirm whether only those customers that participate in the OPA CDM Program will be able to participate in the IHD Messaging Project.

Guelph Hydro's Response:

Please refer to responses to IR#86a, b, c, d and e. We propose to expand the project to beyond those customers participating in the OPA Demand Response program, but we note that discussions will be required with the OPA and OEB to understand the implications of the wider roll-out of IHDs that are not delivered through the OPA CDM program. Should there be an energy/demand reduction attributed directly to IHD's, we cannot afford to not have this contribution be reflected towards Guelph Hydro's CDM targets.

Detailed cost information must be provided for any smart grid expenditures for which the distributor is seeking cost recovery. Cost information should be presented separately for each project or activity, and include:

- detailed budgets (capital and OM&A) for the project or activity;
- a clear statement of the costs sought to be recovered through rates in the current application, and cross-references to any other schedules in the application in which these costs appear; and
- if the distributor is seeking a rate rider or funding adder, the dollar amount of, and the basis for calculating the rate rider or funding adder (see section VI "GEA Plan Approval" for a description of these mechanisms); and
- a revenue requirement calculation for the amounts to be recovered in rates beginning in the test year, identifying all assumptions used in the calculation, and the basis for those assumptions.

In addition, the following descriptive information should be provided for all smart grid development activities:

1. Smart grid demonstration projects:

- a discussion of the technology to be demonstrated and the anticipated benefits from a successful application of the technology;
- a discussion of any risks or barriers to the widespread implementation of the technology if the demonstration phase proves successful;
- confirmation that the distributor has undertaken a review of other demonstration projects as reported on the Board's website or elsewhere, to determine what has already been learnt about the technology;
- information on any other demonstration projects that have been conducted using the technology and a discussion of why additional demonstration is necessary;
- a discussion of any joint participation agreements, information sharing arrangements and other efforts that the distributor has made to avoid undertaking projects that unnecessarily duplicate other ongoing or planned demonstration projects so as to avoid redundant demonstration projects; and
- a description of the formal evaluation that will be performed to assess the value of the projects. The evaluation should be suitable for sharing with other distributors.

2. Smart grid studies and planning exercises:

- a statement of the objectives of the study or planning exercise that clearly indicates the information that will be developed and how that information will aid in developing a smart grid;
- a discussion of any joint participation agreements, information sharing arrangements and other efforts that the distributor has made to avoid undertaking studies that unnecessarily duplicate other ongoing or planned studies so as to avoid redundant studies; and
- information on how the distributor has incorporated the results of any previous studies or planning exercises with similar objectives and a clear explanation of the new information that the distributor expects from the study or planning exercise it is proposing.

3. Smart grid education and training:

- 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.

As discussed below with respect to reporting, the Board intends to maintain an on-line repository of smart grid study and demonstration project reports. To maximize the utility of this repository, the Board expects distributors to avoid to the maximum extent possible any restrictions on the disclosure of information. Distributors must in all cases ensure that any information disclosure restrictions that cannot be avoided will not hinder meaningful reporting or replication of the results of the study or demonstration project.

As noted above, the Filing Requirements will be updated as needed to reflect legislative and regulatory developments relating to smart grid planning and expenditures.

VI. GEA Plan Approval

The Board will review each distributor's GEA Plan, generally as part of the distributor's cost of service rate application. The Board and parties to the hearing will subject the

MR. WENINGER: That's correct. What we're hoping to do is leverage off the smart metering infrastructure, including the meter with the ZigBee chip. If you do not have sort of an industry standard protocol like ZigBee, then other LDCs are required to come up essentially with some type of black box or protocol converter so the smart meter can talk directly with the device.

And by virtue of having a fixed amount per display, if you have to spend some of your money on a protocol converter, that means the amount of money you can put into the display will limit its functionality. So the ZigBee chip should let us procure more elaborate in-home displays. So hopefully they will be able to provide that functionality within the threshold provided by the CDM program.

That only holds true to the point of view that the uptake of the in-home display is likely not going to be anywhere near as large as we would like, by virtue of the conservation program on its own. We will come to a point in time where we need to figure out -- to really make this shine, to expand it to a larger customer base, we will need to look at some other mechanism, I believe, to make sure that there's a vehicle to get the displays to a broader reach.

MS. CAZALET: Thank you. And just going into the demarcation between what is smart grid and what is CDM, and trying to understand the different components of your project, so it seems like you've got the devices, the in-

home display devices, and that's being paid for by the OPA program. So that's CDM, at least for the customers that are participating in the CDM program. And you spoke to you may have to have this wider rollout, but it appears from the application that we're not quite there yet.

And then you've got the back office system part of it that's going to allow this expanded messaging, and that part is what you're calling smart grid; correct?

MR. WENINGER: That's correct.

MS. CAZALET: And then the in-home displays that you might need to install in customers' houses that are not participating in the OPA program, smart grid or CDM?

MR. WENINGER: That depends. If there's an energy conservation target attributed to the in-home display - and that is yet to be determined by the OPA - if there is, then I would characterize a display as a CDM item.

If there is not, then I would characterize it as a smart grid item.

MS. CAZALET: Okay. And what about the back office system, to the extent that the back office system might be facilitating messaging that might be conservation-related messaging?

MR. WENINGER: That is definitely a possibility. In putting together the project, we didn't consider apportioning an element of the back office to CDM versus an element of the back office to smart grid. We're not far enough along to understand what limitations we have, what type of message you can actually send to the display, et

cetera, et cetera. It's very early stages.

MS. CAZALET: And in the event that any savings that might be attributed to the in-home display could not be counted towards the CDM targets - and I'm thinking, in particular, when you get to that stage of the wider rollout and these customers that are getting in-home displays but are not participating in the OPA program -- will Guelph still proceed with the program if the savings can't be attributed towards CDM targets?

MR. WENINGER: We think it's still a very good community-based project that, again, sort of reinforces some of the concepts of smart grid and getting information directly to the customer, and potentially can be used for other community initiatives, whether it's water conservation messaging, lawn watering ban days, whether it's internal for Guelph Hydro, finance needs to send out credit information or delinquency notices, that sort of stuff.

So yes, I think we would still pursue the project regardless of whether or not the in-home display has a CDM component to it.

MS. CAZALET: Thank you.

In your answer to 41(e), there was the list. Our question was in relation to when Guelph was going expand the capabilities beyond the basic energy consumption and pricing information, and provided a list of eight things that have to happen and sort of when they were going to happen.

(b) different qualification requirements to receive customer incentives or services already offered through the OPA-Contracted Province-Wide CDM Programs;
(c) different technology specifications for technologies already incentivized or utilized through the OPA-Contracted Province-Wide CDM Programs;
(d) different marketing approaches for promoting customer incentives or services already offered through the OPA-Contracted Province-Wide CDM Programs; and
(e) different budgets for delivering customer incentives or services already offered through the OPA-Contracted Province-Wide CDM Programs.

3. BOARD-APPROVED CDM PROGRAMS

3.1 Requirements

3.1.1 A distributor shall not apply for Board-Approved CDM Programs until the OPA has established its first set of OPA-Contracted Province-Wide CDM Programs.

3.1.2 Subject to the restrictions in sections 2.3.3 and 3.1.5, a distributor may apply to the Board for approval of CDM programs that are designed to assist the distributor in meeting the CDM Targets set out in its licence.

3.1.3 Board-Approved CDM Programs must end by December 31, 2014.

3.1.4 A distributor's application for a proposed Board-Approved CDM Program must include the following:

(a) a program evaluation plan, based on the OPA's EM&V Protocols, for each program;
(b) a benefit-cost analysis of each program which shall be completed by using the OPA's Cost Effectiveness Tests;
(c) a detailed explanation of the program's objective(s) and method of delivery;
(d) the types of customers targeted by the program;
(e) a forecasted number of participants that the distributor expects will participate in the program;
(e) the total projected peak demand savings (kW) and electricity savings (kWh) per year, or if the program is for less than one year, the total projected peak demand savings (kW) and electricity savings (kWh) for the duration of the program;
(f) a complete projected annual budget for each of the distributor's CDM Programs, including the following information:

(i) projected expenditures incurred on an annual basis, for each year of the CDM Programs, separated into customer incentive costs and program costs;
(ii) a division of program costs into ~~direct~~ Marginal Costs and ~~indirect expenditures~~ Allocable Costs incurred as a result of program implementation;
(iii) information on the allocation of total expenditures incurred by targeted customer types for each direct projected expenditure; and
(iv) total projected expenditures for each program evaluation conducted; and

(g) a statement that confirms that the distributor has used the OPA's Measures and Assumptions Lists or if the distributor has varied from the OPA's Measures and Assumptions Lists, the distributor must: ~~the following information must be provided:~~

(i) ~~a distributor must~~ appropriately justify the reason for varying from the OPA's Measures and Assumptions Lists in the application;
(ii) provide the technical assumptions and substantiating data that the distributor used; and
(iii) provide a statement that the distributor has followed the OPA's EM&V Protocols for custom measures not included in the OPA's Measures and Assumptions Lists.

3.1.5 Distributors shall not apply for CDM Programs that:

(a) relate to a distributor's investment in new infrastructure or replacement of existing infrastructure;
(b) relate to any measures a distributor uses to maximize the efficiency of its new or existing infrastructure; or
(c) are associated with the OPA's Feed-in Tariff Program or the OPA's Micro Feed-in Tariff Program.

Any initiatives that are captured in (a), (b) or (c) above will not be considered CDM initiatives and are therefore not eligible for approval under this Code.

3.2 Re-Allocation of Funding Among Existing Board-Approved CDM Programs

3.2.1 A distributor must apply to the Board for cumulative fund transfers among the distributor's Board-Approved CDM Programs that exceed 30% of an approved budget for an individual CDM Program. An application to transfer more than 30% of a distributor's funds from an approved budget for an individual CDM Program shall include:

(a) current and proposed budgets for programs affected by the re-allocation;

(b) a description of the programs from which, and to which, funds are being re-allocated and the rationale for the re-allocation;
(c) confirmation that CDM Programs will still be offered for all customer types ~~(residential, commercial, institutional, industrial)~~ in a distributor's service area, as far as is appropriate and reasonable having regard to the composition of the distributor's customer base; and
(d) cost effectiveness calculations for all programs where re-allocation of funding has occurred and confirmation that the program receiving the additional funding is still cost effective.

3.3 CDM Programs for Low-Income Customers

3.3.1 A distributor may meet a portion of its CDM Targets through the delivery of CDM Programs targeted to low-income customers.

3.4 Board Approval

3.4.1 The Board will consider any application filed under section 3.1 and make any determinations that it considers appropriate. If the Board approves a CDM program pursuant to an application filed under section 3.1, such approval will include a determination regarding the amount and timing of payments to be made by the IESO under section 78.5 of the Act in relation to the Board-Approved CDM Program.

4. COST EFFECTIVENESS

4.1 Cost Effectiveness Tests

4.1.1 A distributor may only apply to the Board for the approval of CDM programs that are cost effective. Cost effectiveness shall be measured by using the OPA's Cost Effectiveness Tests.

4.1.2 Despite section 4.1.1, a distributor may apply to the Board for approval of CDM programs where cost effectiveness cannot be demonstrated if the program is:

(a) a pilot program; ~~or~~
(b) a low-income program; or
(c) designed for educational purposes.

4.1.3 A distributor shall use the OPA's Measures and Assumptions Lists to conduct the cost effectiveness tests. If the distributor is using custom measures that are not included in the OPA's Measures and Assumptions Lists, the distributor must appropriately justify the reason for varying from the OPA's Measures and Assumptions Lists in the application and provide a statement that the distributor has followed the OPA EM&V Protocols for the custom measures that are not included in the OPA's Measures and Assumptions Lists.

93. Ref: E2/T4/S6 Appendix D,pp.28-32, Filing Requirements: Distribution System Plans – Filing Under Deemed Conditions of Licence, March 25, 2010, and Ministry of Energy Smart Grid Fund – [http://www.mei.gov.on.ca/en/energy]

In the second reference the Filing Requirements on page 19 listed six items for all smart grid demonstration projects.

In the third reference, the Ministry of Energy Smart Grid Fund indicated that one of the two project categories is "Demonstration Projects" and state the following description:

> *Smart Grid Fund investments in eligible demonstration projects will advance the development and design of pilot-scale prototypes of smart grid technologies. In cooperation with local distribution companies, demonstration projects will help identify risks, opportunities and costs associated with integrating smart grid technology into the electricity system and test whether specific technologies can be used on a larger scale.*

a) Please explain what lessons Guelph Hydro expects to learn from this demonstration and how this project will assist Guelph Hydro in smart grid planning and implementing going forward.

Guelph Hydro's Response:

The Smart Home Demonstration Project is expected to teach us:

- How much interest there is in the community in smart technologies;
- How fast we can expect consumers to adopt smart appliances and EVs;
- How much interest there is in residential solar;
- How willing consumers are to sign up for demand management systems that go beyond air conditioners;
- How interested consumers are in whole-home energy management systems;
- How much interest there is in electric vehicle charging systems

This project will assist Guelph Hydro in forecasting consumer adoption of emerging technologies; thereby enabling us to best plan for the upgrading or expansion of our distribution network.

b) Did Guelph Hydro follow up with similar initiatives by other distributors or utilities in Ontario, Canada or the United States to gain knowledge and information from such demonstration projects?

Guelph Hydro's Response:

Guelph Hydro representatives visited two smart home demonstration projects in 2010, one in Chicago and one in Los Angeles (Southern California Edison).

c) If the answer to a) is yes, please provide a summary of such experience addressing the different aspects in the filing requirements set out in the second reference. If the answer to a) is no, please explain why.

Guelph Hydro's Response:

A handout of one demonstration project is attached along with a presentation on Smart Meters and Time-of-Use, using materials and photos collected from these site visits to paint a picture for stakeholders as to how smart meters and time-of-use rates are only the building blocks for smart home technologies.
Please see appendices Guelph_BoardStaff_IRR_#93c_SmartEnergyExperience and Guelph_BoardStaff_IRR_#93c_SmartMeters

d) Did Guelph Hydro apply for eligibility to the Ministry of Energy's Smart Grid Fund outlined in the third reference? If the answer is yes, please provide a summary report outlining the criteria for eligibility, Guelph's application, the amount of contribution to be expected, timing of that contribution.

Guelph Hydro's Response:

Guelph Hydro did not apply to the Minister of Energy's SmartGrid Fund.

e) Given the various other parties involved in this demonstration ("selected companies" will "demonstrate their systems") why does Guelph Hydro believe it is appropriate for this initiative to be undertaken by a regulated entity and paid for by ratepayers?

Guelph Hydro's Response:

Acceptance by the public of rate increases required in order to build a smart grid precludes that the public has some understanding of what a smart grid is and how it will benefit them. In the interests of public service, the regulated utility currently funds public education regarding electricity safety. Efforts to educate the public on smart grid technology not on the distribution system but rather inside the home, along with the technologies that will impact their lives in a variety of ways, is seen as a similar effort.

It is important to start to educate the public on smart grid technologies in the form of a "smart home", and to help educate and encourage customers to adopt energy efficiency and conservation efforts in their daily lives. It can be used to demonstrate how the Zigbee chip in Guelph Hydro smart meters can be used as a foundation for building a home automation system, and educate potential electric vehicle customers on what the EV charging system would look like inside a home, how it would function

and what changes might be required to the home electrical system, and how someone could take advantage of Time-Of-Use electricity rates. This project will assist Guelph Hydro in building a "culture of conservation", and for the promotion of conservation programs needed to meet the LDC's mandated conservation targets.

f) Please provide the details of the cost components for the OM&A, shown on page 32 of the first reference, for each of the four years - $45, 000 for 2011, $130,000 for 2012, $55,000 for 2013, $10,000 for 2014.

Guelph Hydro's Response:

Anticipated Smart Demonstration Home cost components are as follows:

2011: $45,000 includes a microFIT solar panel demonstration system, partial funding for smart appliances, electric vehicle charging station, smart home monitoring system linked to Guelph Hydro's Zigbee smart meter;
2012: $130,000 includes the balance of funding for smart appliances, electric vehicle charging station, smart home monitoring system linked to Guelph Hydro's Zigbee smart meter; creating a link with "Transatlantic Urban Climate Dialogue" in support of CEI & SmartGrid - workshop in Guelph June 2012; part-time staff to coordinate & serve as educational resource (docent) for community education & outreach; and promotion costs;
2013: $55,000 includes part-time staff to coordinate & serve as educational resource (docent) for community education & outreach; and promotion costs; and
2014: $10,000 includes part-time staff to coordinate & serve as educational resource (docent) for community education & outreach; and project wind-down costs.

MS. ARMSTRONG: And then a more general question. The four initiatives that you have included in your smart grid portion of the plan, could you provide us, in your own words, with a little bit more justification of why you feel these initiatives should be smart grid initiatives at this point in time, ahead of further Board guidance?

MR. WENINGER: Sorry, could you repeat the question?

MS. ARMSTRONG: Those four initiatives, going through them one by one, could you provide us, in your own words, further justification of why you feel that this should be a smart grid initiative at this point in time, given that the Board has not provided specific smart grid guidance?

MR. WENINGER: Of the four initiatives, the first one related to the in-home display, the messaging project, we feel it's important to take advantage of the ZigBee chip that's inside the meter to demonstrate that we have the ability to help build a conservation culture in support of the CDM goals, to help the goals of the City of Guelph's community energy initiative, to demonstrate that the technology is viable.

There are a number of reasons why it would be suitable as a smart grid initiative as opposed to a CDM activity. It's not something that's specifically funded by the OPA through the CDM objectives or the CDM funding adder.

It is innovative. It is new. We're not aware that anything like this is being done anywhere in Ontario nor in Canada.

With respect to some of the other initiatives, again,

rate structures whereby the electric vehicle through the technology can, say, fill in the gaps. There's more generation at, obviously, off-peak hours than there is during on-peak hours. And, again, if electric vehicles and the related infrastructure that we hope to demonstrate through these projects can help force the grid for all of Ontario, we think those are important things to do.

And, again, these initiatives have links in, ties in, with the City of Guelph's community energy initiative, which has some very aggressive conservation targets for all forms of energy, not just electricity; also gas transportation, which again has a tie-in with the electric vehicle pilot.

So we feel all of these initiatives sort of help reinforce what we're trying do in Guelph and leverage in on top of some of the investments that have already been made in smart grid and the wireless communication to reinforce that.

So I'm not sure if that answers your question or not?

MS. ARMSTRONG: Yes. There will be some follow-up questions.

--- Brief recess due to technical difficulties at 11:32 a.m.

--- Resuming at 11:35 a.m.

MS. SEBALJ: I believe we are back.

MS. ARMSTRONG: There will be some other follow-up questions from colleagues of mine, but let me just talk a little bit more about the electric vehicle project.

initiative.

MR. WENINGER: The ratepayers are city -- customers of Guelph Hydro and they're City of Guelph and Rockwood residents.

We feel there's -- it's important, again, to encourage the residents.

City of Guelph is relatively a green community. The university has a large number of initiatives. There's a number of solar manufacturers that are in town. There's a number of other companies, auto parts manufacturers that build solar powered lawnmowers, for example. There's a fair number of green elements within Guelph.

We felt it was important to tie in with the community energy initiative for the benefit of the City of Guelph residents.

The vision behind the CEI, the community energy initiative, is for it to become a model that could ultimately be transported, distributed to other municipalities across Ontario. So we're doing what we can to support that effort.

MS. ARMSTRONG: Okay. Thank you. I believe some colleagues of mine have other follow-ups.

MS. AZAIEZ: Good morning. Yeah, I'll just go back a little bit to the smart grid activities that you are planning.

So getting back to that, you indeed filed four different activities under the smart grid part of the GEA plan. And I just wanted to see -- when one matter is a bit

advantage to the use of this data for other purposes (e.g. customer display and control of loads).

3. What is the level, if any, of BTM services should the consumer expect from distributors? Should third parties other than retailers be allowed to provide BTM services? What minimum level of functionality should distributors provide for BTM applications that use distributor meter data?

4.2.4 *Key Issue No. 4: What is the appropriate demarcation point for the development of smart grid by distributors and transmitters? Should the Board's guidance deal with "behind the meter" smart grid solutions?*

As discussed in 4.2.3, above, the demarcation point between activities that fall within the regulated monopoly rate base and competitive activities has not been addressed by the Board. Advice from the SGWG on this matter varied considerably. One view is that the meter is the appropriate demarcation point with regard to cost recovery, access and data. Other views suggest that no demarcation point is needed and a flexible approach with different points for different purposes (e.g. regulatory, such as cost recovery versus data access or functional, e.g. reliability or power quality versus BTM services) would be appropriate.

While there are OPA-approved CDM programs that involve distributor activities "behind the meter" such as PeakSaver and demand response (DR) the question remains whether distributors should become involved in other BTM services.

Tradeoff between greater interoperability and cost

There is a current perceived need to provide for a greater degree of interoperability between existing meters and a variety of BTM products. This need has to be balanced against the costs that may be incurred in order to facilitate the development of the BTM market. For example, if the Board were to require a specific communications protocol for BTM (such as Zigbee) or even a broader standards-based functionality this would require the replacement or modification of over four million meters. By setting a demarcation point at the meter the Board would preclude any need for replacement but it could also preclude the potential benefits of a more widespread public uptake of BTM services.

4. What are the most appropriate considerations in setting a demarcation point or points? Should the Board set one demarcation point for all purposes or different points for different purposes? What should the point(s) be?

4.2.5 Key Issue No.5: How should the Board address cyber-security and privacy in the context of the smart grid

From the SGWG consultations staff learned that while cyber-security and privacy considerations have always been treated as critical aspects of distribution and transmission services the smart grid adds a new level of criticality to the need to provide cyber-security and privacy protection. Threats to privacy and to the security of distribution and transmission grids are unfortunately very real. Nevertheless there are methods for providing protection and for the recovery of breaches when they do occur. As a generalization, the opportunities for security and /or privacy breaches increase as the means of access to data increase. Since many of the anticipated benefits of a smart grid flow from greatly increased data access, vigilance in matters of security and privacy

The following tables provide a summary of the five year spending levels of expenditures resulting from Guelph Hydro's GEA plans, broken down by category and year. Each of these investments is discussed in more detail in the body of the plan.

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

90. Ref: E2/T4/S6 Appendix D,pp.22-24 and Filing Requirements: Distribution System Plans – Filing Under Deemed Conditions of Licence, March 25, 2010

a) Did Guelph Hydro follow up with similar initiatives by other distributors in Ontario (i.e Hydro One Networks Inc. (Distribution), Toronto Hydro-Electric Systems Limited) to gain knowledge and information from other Electric Vehicle ("EV") demonstration projects, experience with charging infrastructure, and home charging units?

Guelph Hydro's Response:

Prior to writing the electric vehicle demonstration project portion of Guelph Hydro's GEA Plan, Guelph Hydro conducted a great deal of research into electric vehicles strategies and plans of other utilities. Research took the form of conversations, face-to-face meetings, site visits to view charging stations, reviews of documentation, case studies, presentations and website content, studying of electric vehicle surveys, and attendance at conferences and workshops.

Activities of the following utilities and suppliers of charging equipment were researched:
- Toronto Hydro
- Hydro One
- Burlington Hydro
- Southern California Edison
- Commonwealth Edison - Chicago
- Madison Gas and Electric
- Hydro Quebec
- Energias de Portugal (EDP)
- RWE, Germany
- E-LAAD, The Netherlands
- Silver Spring Networks, California
- Siemens
- GE - Wattstation
- Coulomb Technologies
- Better Place

Research and Review of Electric Vehicle Surveys Conducted by Other Companies include the following:
Ernst & Young - http://www.ey.com/GL/en/Industries/Automotive/Gauging-interest-for-plug-in-hybrid-and-electric-vehicles-in-select-markets---Consumer-views-on-hybrid-and-electric-vehicles
Pike Research - http://www.pikeresearch.com/
Pollution Probe - http://www.pollutionprobe.org/PDFs/EMMP.pdf
PlugnDriveOntario - http://www.plugndriveontario.ca/
Waterloo Report - http://plugndriveontario.ca/pdf/Waterloo%20PHEV%20Report%20June%202010%20FINAL.pdf

Southern California Edison - http://www.sce.com/PowerandEnvironment/PEV/
BC Hydro - http://www.bchydro.com/about/our_commitment/sustainability/plugin_vehicles.html
Electric Mobility Canada - http://emc-mec.ca/en/about.php

b) If the answer to a) is yes, please provide a summary of such experiences addressing the items in the filing requirements set out in the second reference. If the answer to a) is no, please explain why.

Guelph Hydro's Response:

See response to Board Staff IR #90a for details.

c) Did Guelph Hydro investigate other utilities' experience in Canada or the United States in regard to EV demonstration projects and charging stations? If yes, please provide a summary on each such utility's experience and cover the items as set out in b) above. If the answer to c) is no, please explain why.

Guelph Hydro's Response:

Refer to the links below for various utilities experience utilized as part of our EV pilot research:

- Site visit and discussion with Southern California Edison - http://www.sce.com/PowerandEnvironment/PEV/default.htm
- Hydro Quebec - http://www.hydroquebec.com/transportation-electrification/test-driving.html

We also reviewed literature gathered as part of the research efforts, have listed them in the following table, and included three of the documents as part of this submission. Copies of the other documents can be provided upon request:

Documentation Review:

1. Utilities and Electric Vehicles – Principles and Case Studies - GTA Utilities – Balaieff;
2. Charging systems in Japan - GTA Utilities – Roy;
3. Fleetwise 300 - GTA Utilities – Langer;
4. Electric Mobility Canada - Canadian Municipal priorities for building an integrated Plug-in Electric Vehicle (PEV) Charging Network;
5. DRAFT Canadian Municipal priorities - EV Charging Infrastructure;

6. Proceedings from EC3 Initiative - Electric Vehicle Workshop - Supporting Infrastructure Developments for Electric Vehicles in Ontario;
7. Tipping Point by Steven Andersen - Industry giants start the EV revolution - Public Utilities Fortnightly;
8. Coulomb Technolgies - Providing Public Electric Vehicle Charging Services for Municipalities - *ChargePoint Network Electric Vehicle Charging Infrastructure;*
9. Pollution Probe - Unlocking the Electric Mobility Potential of Toronto: Moving Toward an Electric Mobility Master Plan for the City;
10. Toronto Hydro - Toronto Hydro Smart Experience

Sampling from Documentation Review (please see Appendix Guelph_BoardStaff_IRR_#90c_Utilities experience):

1. Utilities and Electric Vehicles – Principles and Case Studies GTA Utilities - Balaieff.pdf

2. Proceedings from EC3 Initiative - Electric Vehicle Workshop - Supporting Infrastructure Developments for Electric Vehicles in Ontario

3. Pollution Probe - Unlocking the Electric Mobility Potential of Toronto: Moving Toward an Electric Mobility Master Plan for the CityPollution Probe

d) Given the number of EV studies being conducted elsewhere, please list the specific lessons Guelph Hydro anticipates learning from this EV pilot. Also, please identify the factors unique to Guelph Hydro that warrant it conducting its own demonstration project rather than relying on the information gained from others.

Guelph Hydro's Response:

Guelph Hydro conducted an Electric Vehicle Survey in January 2011 to determine the awareness and interest level of Guelph citizens in electric vehicles. Survey and finding are attached (please see the appendix Guelph_BoardStaff_IRR_#90d_ElectricVehicleMarketResearch).
Guelph Hydro conducted an Electric Vehicle Survey in January 2011 to determine the awareness and interest level of Guelph citizens in electric vehicles.

This survey concludes that the Guelph community appears to be an ideal location for an electric vehicle pilot project due to the following factors:

Guelph is considered a "green"community and residents are environmentally concerned so a personal belief system is already in place. For this reason, it is anticipated that residents will be early adopters of EV technologies. Guelph Hydro's

so we do not predict major capacity issues as EVs are added to the grid, unlike some other communities in Ontario;
The community itself has outlined its community vision and goals re: energy in the City of Guelph Community Energy Initiative. Transportation is a large part of the Community Energy Initiative so an electric vehicle project aligns with the municipality's vision and plans;
The population is well educated, reasonably affluent and environmentally concerned so we can expect that residents will be able to afford an electric vehicle, will be able to understand the technology and will likely adopt EVs for environmental reasons;
The city is a university town that values innovation. An EV pilot project fits with community values;
The majority of residents park in their own driveway or garage and own 1-2 cars - which is different to some other urban centres. This will make it easy to design a pilot project for residents in single family homes;
Travel distances tend to be short - ideal for electric vehicles;
There is a high interest level in EVs; and
Many of the businesses in Guelph operate fleets under 10 vehicles - a mix of autos, trucks and both. Fleet turnover is fairly frequent and most travel is in southwest Ontario. The community is therefore an ideal location for an EV pilot project involving fleets.

In addition to the above, other key factors that warrant Guelph Hydro conducting its own EV pilot project are as follows:
Guelph Hydro is the only utility in Ontario to have fully deployed Zigbee chip-enabled smart meters which would make it easy to conduct a pilot to measure consumer behaviour in response to various different rate plans;
Guelph Hydro has strong connections in the community with Chamber of Commerce and large industrial / institutional customers that would likely be interested in participating in an electric vehicle project including a local mall, the University of Guelph as well as large manufacturing organizations.

e) Please explain the rationale of including the price of the vehicle as part of the Pilot project costs even though the vehicle will be used and useful for carrying out normal day-to-day operations.

Guelph Hydro's Response:

To date Guelph Hydro has not included EVs as part of its fleet capital budget. Including the cost of a vehicle in the project will demonstrate direct support of the pilot, will provide Guelph Hydro with first-hand experience related to the ownership and operation of an EV. Our EV vehicle interest would be around a "cube van " style of EV that would expand the scope of EVs in the pilot beyond the traditional passenger vehicle (Volt, Leaf).

f) Please provide the details of the cost components for the OM&A, shown on page 24 of the first reference, for each of the five years - $200, 000 for 2011, $290,000 for 2012, $50,000 for 2013, $30,000 for 2014, and $20,000 for 2015.

Guelph Hydro's Response:

Anticipated EV Pilot Project OM&A cost components are as follows:

2011: $200,000 includes partial costs for charging stations, infrastructure installation; education & promotion around EV, including link to Guelph Community Energy Initiative;
2012: $290,000 includes balance of costs for charging stations and infrastructure installation; education & promotion around EV, including link to Guelph Community Energy Initiative;
2013: $50,000 includes education & promotion around EV, including link to Guelph Community Energy Initiative;
2014: $30,000 includes education & promotion around EV, including link to Guelph Community Energy Initiative; and
2015: $20,000 includes education & promotion around EV, including link to Guelph Community Energy Initiative.

UNDERTAKINGS

EB-2011-0123
Guelph Hydro Electric Systems Inc.
Responses to Board Staff
Undertakings
Delivered November 8, 2011

14. UNDERTAKING NO. JTC1.14: To provide answers to Board Staff TCQ No. 45 (a) and (b).

Board Staff TCQ 45) Ref. Board staff IRR #90, Board staff IRR #91, Exh. 2/Tab 4/Sch. 6 (Appendix D)/pp.22 – 24, and Filing Requirements: Distribution System Plans – Filing Under Deemed Conditions of Licence, March 25, 2010, p. 19

In the fourth reference, on page 19 the Filing Requirements lists a series of six information requirements for a Smart Grit demonstration project., for example,

- *a discussion of the technology to be anticipated benefits from a successful application of the technology.*

The Filing Requirements do not mention "pilot projects" as expenses eligible for inclusion in the Smart Grid deferral accounts. While the evidence in reference 3 describes the electric vehicle project as a "Pilot" project, in reference 1 the IRR indicates that Guelph considers the project to be a demonstration project.

While the evidence and the IR provide much interesting information (e.g. a review of other demonstration projects), there is no systematic discussion of how the project meets the six requirements. For example it is not clear what "technology" is the subject of the demonstration. The evidence (reference 3) lists a number of items: electric vehicles, charging stations, home charging units, "business models", and Zigbee chip functionality. In addition IRR 91 (reference 2) indicates that:

"the purpose in conducting the EV pilot project is to educate residents…"

a) Please provide a direct response to each of six information requirements listed in the Filing Requirements.

Guelph Hydro's response:

First off, Guelph Hydro would like to clarify that in preparing the submitted GEA Plan, Guelph Hydro did not differentiate between the terms "pilot project" and "demonstration project."

UNDERTAKINGS

EB-2011-0123
Guelph Hydro Electric Systems Inc.
Responses to Board Staff
Undertakings
Delivered November 8, 2011

The following is our direct response to each of the six information requirements listed in the Filing Requirements.

1. A discussion of the technology to be demonstrated and the anticipated benefits from a successful application of the technology:

   The EV Demonstration Project will demonstrate electric vehicle charging technologies. Currently, there are a number of manufacturers of various different charging systems (GE Wattstation, Coulomb Technologies/Siemens, Better Life, etc.). The project will evaluate the features and benefits of the charging stations for use in a variety of environments (public space, public/private space, private space).

   Subject to approval of the OEB, the project would enable the testing of various different rate plans for EVs.

   In addition, it may be possible to evaluate software and technologies used for settlement purposes. These may include key fobs, fleet cards, credit card payments, pre-loaded cash cards, payment via hydro bills, etc.

2. A discussion of any risks or barriers to the widespread implementation of the technology if the demonstration phase proves successful:

   Risks and barriers would be minimal since the companies we would be partnering with for the charging stations and back office systems would all be reputable companies with an established track record in implementing EV technology in other countries or jurisdictions.

3. Confirmation that the distributor has undertaken a review of other demonstration projects as reported on the Board's website or elsewhere, to determine what has already been learnt about the technology:

   This item was answered in detail in the GEA Plan Filing and initial IR responses.

4. Information on any other demonstration projects that have been conducted using the technology and a discussion of why additional demonstration is necessary:

This point was answered in detail in the IR. New demonstration projects are being initiated in the US, Europe and other jurisdictions on a frequent basis. Guelph Hydro's reason for proposing a demonstration project to take place in Guelph is to:

- test EV charging station technology in the Canadian environment;
- test EV charging station technology in public, public/private and private spaces;
- include the use of a "cube van" EV, in addition to passenger EVs, and, thereby, serve as a model for fleets considering EVs;
- educate residents on EVs and charging systems / stations;
- educate residents on the impact of TOU rates and other rate plans on EV charging;
- leverage the fact that Guelph is a "green" community well suited to the adoption of EVs and use Guelph as a model of what communities need to be doing to encourage the adoption of EVs.

5. A discussion of any joint participation agreements, information sharing arrangements and other efforts that the distributor has made to avoid undertaking projects that unnecessarily duplicate other ongoing or planned demonstration projects so as to avoid redundant demonstration projects:

- Guelph Hydro is a member of GridSmartCity and, as such, has been able to tap into the network of utilities that are exploring EV demonstration projects;
- Guelph Hydro has initiated discussions with electric vehicle charging systems vendors. During these discussions, Guelph Hydro explored whether these companies are pursuing any other projects in the Ontario market.

6. A description of the formal evaluation that will be performed to assess the value of the projects. The evaluation should be suitable for sharing with other distributors:

Formal evaluation of the EV Demonstration Project will be conducted using data collected from the charging stations. This data will provide information on a variety of points including:

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

- popularity of payment methods
- impact of various rate plans on charging practices

In addition, individuals who view the charging station during information sessions will be asked to fill in a survey in order to collect data, collect questions and concerns as well as determine what they learned, and what other information people will need to understand the functioning and implications of EV charging stations.

b) Please explain how Guelph interprets the Filing Requirements as identifying the education of residents as an eligible Smart Grid expense.

Guelph Hydro's response:

EVs are a new technology that has the potential to have a significant impact on the grid - either positively or negatively. Guelph Hydro believes that the community of Guelph is an ideal municipality to serve as a model for other communities on how the incorporation of EVs can reduce peak load and reduce greenhouse gases. The reasons why Guelph is considered an ideal community for this type of project were outlined in the initial IR responses.

As a first step, Guelph Hydro believes that by installing EV charging stations in key locations, and including an EV cube van in Guelph Hydro's fleet, we will be serving as a catalyst in our community to encourage residents to explore the use of EVs.

An EV Demonstration Project provides a focal point for information sessions, workshops, seminars, conferences, etc. around the topic of EVs and a smart grid. For the average consumer, a discussion about EVs is a lot more palatable and understandable than a discussion about a smart grid. However, using the opportunity to educate consumers about EVs and charging schemes, it is easy to make the connection to other aspects of a smart grid. In particular, Guelph Hydro believes the discussion about how a ZigBee chip enabled smart meter can assist in automating the charging of an EV, will naturally lead to a discussion on other benefits of smart home technologies. Once residents have some foundational knowledge about the potential functions of a smart grid, it will be a lot easier to educate them on more advanced technologies.

GEA Plan: Development of the Smart Grid

The Board is not requiring all distributors to file information pertaining to the development of a smart grid in their GEA Plans at this time, given the Board's understanding that the Government will be providing further direction regarding smart grid development. However, distributors filing a Basic or Detailed GEA Plan:

(a) must include activities and expenditures related to the development of the smart grid in their GEA Plan if they are seeking the recovery of those costs; and

(b) may include such activities and expenditures in their GEA Plan in any other case.

A distributor that includes smart grid development expenditures in a GEA Plan must do so in accordance with these Filing Requirements, and must provide that information in a section of the GEA Plan that is separate from the information related to renewable generation connection.

The Board recognizes that an investment related to renewable generation connection may incorporate what the distributor believes to be smart grid technologies. In such cases, distributors should include the information relating to the smart grid technologies, and any costs associated with those technologies, in the smart grid portion of the GEA Plan, with the balance of the costs included in the renewable generation connection portion of the GEA Plan.

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.

The Board is aware that work has been and is being done in Ontario and in other jurisdictions (most notably the United States) regarding smart grid development. The Board expects that distributors will, prior to making smart grid-related expenditures, familiarize themselves with that work to ensure that efforts are not being unnecessarily duplicated. In addition, the Board does not expect distributors to be engaging in research and development activities related to smart grid development at this time.

Any proposed smart grid activities should be incremental to activities (on-going or planned) currently included in rates or in Board-approved capital budgets. The smart grid section included in a GEA Plan should discuss the method and criteria used by the distributor to prioritize the activities, and show how the application of this methodology led to the selection of the activities as described in the GEA Plan.

Detailed cost information must be provided for any smart grid expenditures for which the distributor is seeking cost recovery. Cost information should be presented separately for each project or activity, and include:

- detailed budgets (capital and OM&A) for the project or activity;
- a clear statement of the costs sought to be recovered through rates in the current application, and cross-references to any other schedules in the application in which these costs appear; and
- if the distributor is seeking a rate rider or funding adder, the dollar amount of, and the basis for calculating the rate rider or funding adder (see section VI "GEA Plan Approval" for a description of these mechanisms); and
- a revenue requirement calculation for the amounts to be recovered in rates beginning in the test year, identifying all assumptions used in the calculation, and the basis for those assumptions.

In addition, the following descriptive information should be provided for all smart grid development activities:

1. Smart grid demonstration projects:

- a discussion of the technology to be demonstrated and the anticipated benefits from a successful application of the technology;
- a discussion of any risks or barriers to the widespread implementation of the technology if the demonstration phase proves successful;
- confirmation that the distributor has undertaken a review of other demonstration projects as reported on the Board's website or elsewhere, to determine what has already been learnt about the technology;
- information on any other demonstration projects that have been conducted using the technology and a discussion of why additional demonstration is necessary;
- a discussion of any joint participation agreements, information sharing arrangements and other efforts that the distributor has made to avoid undertaking projects that unnecessarily duplicate other ongoing or planned demonstration projects so as to avoid redundant demonstration projects; and
- a description of the formal evaluation that will be performed to assess the value of the projects. The evaluation should be suitable for sharing with other distributors.

Are you aware that there are other electric vehicle projects similar to this in Ontario right now?

MR. WENINGER: I am not aware of specifics of other electric vehicle projects.

I know Toronto Hydro was interested in rolling out a number of electric vehicles.

We've had some discussions with Burlington Hydro and the smart electric vehicle projects that they're proposing.

We haven't had detailed discussions. We haven't had any conversations around potentially combining plans or expanding plans.

MS. ARMSTRONG: And Hydro One, any conversations with them? What efforts have been made to sort of co-ordinate -- these are demonstration projects, to educate rather than duplicate. I'm just trying to get a better sense of the effort you've put into making sure that there will be no duplication at the end of, say, 2014, 2015.

MR. WENINGER: No, we haven't had any formal discussions with any other LDCs or entities as far as their detailed plan specifics, what we're proposing, and any sort of co-ordination. We haven't gotten to that stage.

MS. ARMSTRONG: May I ask why not?

MR. WENINGER: As part of the design of the plan, we were focussed on building of the plan and trying to understand how that would link in with local community efforts and the City of Guelph community energy initiative. That was our primary focus, because there's some very large transportation energy reduction targets. So we have had

conversations with the City of Guelph's transportation department. Other entities within Guelph, our conversations have been more around the local logistics, not looking at the broader picture with other LDCs.

MS. ARMSTRONG: Mm-hmm. Okay. In terms of the demonstration home, I'm just trying to get a sense of how the timing relates to the conference you're going to be hosting, I believe, in 2013.

MR. WENINGER: The intent was to have a demonstration home built and fully functional in advance of the conference, and the demonstration home would be included as one of the elements of the conference.

I'm not sure if I would use the terminology "showcase" but definitely one of the elements of the conference, and sort of a tie-in with that.

The conference in 2013, if I remember right, is early in the year, so there's a fair bit of work that would need to go into getting a new building or an existing building retrofitted and prepared in time for the conference.

MS. ARMSTRONG: Out of curiosity, what other funding is available for hosting that conference?

MR. WENINGER: That I'm -- that I couldn't tell you. The City of Guelph is taking the lead on the conference. We're a supporting member.

MS. ARMSTRONG: Have you had any discussions in financing the conference and how this piece would fit in? I'm trying to get a sense of why you feel the ratepayers should be responsible for something that is part of a city

MESSAGE CONT'D

increased accessibility to many of our other service offerings. Traffic to our website increased by approximately 83% over 2009, to 3.7 million page views, resulting in approximately 148,000 telephone calls assumed diverted from our call centre. Many of those website visits are related to our installation of smart meters in support of the province's intention to move to Time-of-Use ("TOU") rates, and our presentation of detailed customer information about the rates on our site. We have installed approximately 674,000 smart meters in homes and commercial buildings across the city as at December 31, 2010, resulting in smart meters for more than 95 per cent of our accounts. Smart meter installations will continue for the remaining customers through 2011. As at December 31, 2010, approximately 509,000 customers were transitioned to TOU rates. We are the first major utility in Ontario to implement these rates on this scale. Many of the remaining residential accounts, which amount to approximately 111,000 customers, are enrolled in fixed-price contracts with various electricity retail companies operating in Toronto. These customers are not on TOU rates at this time.

The Corporation takes an active role in a number of recognized industry associations and coalitions to ensure that the best interests of our customers are advanced to government, consumers groups, and other interested parties. We participate on the board of directors and various operations committees of the Electricity Distributors Association, The Canadian Electricity Association, and the Ontario Energy Network. We are a founding member of the Coalition of Large Distributors ("CLD"), which includes Horizon Utilities Corporation, Hydro Ottawa Limited, PowerStream Inc. and Veridian Connections. In 2010, Hydro One Inc., Union Gas Limited and Enbridge Gas Distribution Inc. joined the CLD, expanding the group's reach to most energy customers in Ontario. Together, we serve almost all of Ontario's electricity and natural gas consumers. The CLD has most recently been engaged in co-ordinating the expansion of Conservation and Demand Management ("CDM") programs across our combined customer base.

Our award-winning CDM programs exceeded targets once again. New in 2010, was the introduction of Canada's first electric vehicle ("EV") pilot program involving retail automobile customers, called the Toronto Hydro smart Experience. This project is being undertaken in co-operation with Mercedes-Benz Canada. Fifteen customers will lease the Mercedes-Benz **smartfortwo** electric vehicle and we will study their charging and driving habits over a four-year period. This project will provide us with valuable information about the impact that typical commuter EVs will have on our distribution grid. Importantly, we have now entered into an agreement with the Ontario Power Authority to deliver ongoing CDM programs through 2014, in the amount of approximately $50 million.

To drive sustainability into our organization and business operations, we have set measurable environmental footprint reduction targets that are contained in our Corporate Responsibility Report. Our goal is to substantially reduce our carbon footprint over the next decade. Toronto Hydro Corporation was again named one of Canada's Top 100 Employers as chosen by the Canada's Top 100 Employers organization. Toronto Hydro Corporation was also named one of Greater Toronto's Top Employers as featured in *The Globe and Mail*, one of Canada's Top Family-Friendly Employers as featured by *Today's Parent Magazine*, and one of

Page 20 THESL 2010 annual report

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED CONT'D

2010 Achievements (cont'd)

- Introduced Toronto Hydro's smart Experience program, the first retail automobile customer electric vehicle pilot project in Canada, to study the driving experience, charging habits and impact of electric vehicles on Toronto Hydro's electricity grid.
- Launched "PowerUp," a public awareness campaign for the company's long-term infrastructure renewal program.
- Provided funding to Ryerson University's Centre for Urban Energy, a national centre for cutting-edge research and innovation in the new field of urban energy.
- Launched an unplanned power outage map on the company's website to provide better service and convenience for customers.
- Expanded online customer services to mobile devices with PowerLens, a new TOU application where customers can keep track of personalized electricity consumption, subscribe for energy alerts and report outages.
- Introduced first hybrid bucket truck to its fleet of vehicles.
- Conducted Workplace Violence Prevention Policy and Program training for all employees.
- Together with the City of Toronto and Enbridge Gas Distribution, launched Home Energy Help, a program designed to assist approximately 100 low-income customers with home improvements.
- Increased web traffic by 83.5% to approximately 3.7 million as a result of new customer self-serve related features.

2011 Objectives

- Continue our focus on public safety and provide a safe and healthy work environment.
- Continue to modernize the distribution system.
- Deliver superior customer service and introduce an innovative Customer Experience Program.
- Maintain financial strength.
- Meet Conservation and Demand Management targets under the *Green Energy Act*, 2009.

November 24, 2011 Update [Funding Adder]

GEA Smart Grid - Funding Rate Adder Calculation

	2011	2012	2013	2014	2015
Net Fixed Assets	$ -	$238,050	$ 423,200	$317,400	$211,600
OM&A	$ -	$520,750	$ 638,350	$ 294,650	$ 211,600
WCA	15.0%	15.0%	15.0%	15.0%	15.0%
Rate Base	$ -	$ 78,113	$ 95,753	$ 44,198	$ 31,740
	$ -	$316,163	$ 518,953	$361,598	$243,340
Deemed ST Debt	4%	4%	4%	4%	4%
Deemed LT Debt	56%	56%	56%	56%	56%
Deemed Equity	40%	40%	40%	40%	40%
	$ -	$ 12,647	$ 20,758	$ 14,464	$ 9,734
	$ -	$177,051	$ 290,613	$202,495	$136,270
	$ -	$126,465	$ 207,581	$144,639	$ 97,336
ST Interest	2.08%	2.46%	2.08%	2.08%	2.08%
LT Interest	5.26%	5.26%	5.26%	5.26%	5.26%
ROE	9.42%	9.58%	9.42%	9.42%	9.42%
	$ -	$ 311	$ 432	$ 301	$ 202
	$ -	$ 9,320	$ 15,298	$ 10,659	$ 7,173
	$ -	$ 12,115	$ 19,554	$ 13,625	$ 9,169
	$ -	$ 21,746	$ 35,284	$ 24,585	$ 16,545
OM&A		**$520,750**	**$ 638,350**	**$294,650**	**$211,600**
Amortization	$ -	$ -	$ 31,700	$ 27,800	$ 27,800
Grossed-up PILs	$ -	-$ 27,891	-$ 53,031	-$ 79,612	-$ 84,253
Revenue Requirement	$ -	$514,606	$ 652,302	$267,424	$171,691

Direct Benefit	2011	2012	2013	2014	2015
OM&A	$ -	$520,750	$ 638,350	$294,650	$211,600
Capital	$ -	-$ 6,144	2011 + 2012	-$ 27,226	-$ 39,909
Direct Benefit % on capital	0.00%	6.00%	6.00%	6.00%	6.00%
Direct Benefit on capital	$ -				
Total Direct Benefit	$ -	$520,750	$ 520,750	$ 638,350	$294,650	$211,600
Total # of Customers (excl connections)	52,253	52,253	52,253	52,253	52,253
GEA Rate Adder	$ -	$ 0.83	$ 0.83	$ 1.02	$ 0.47	$ 0.34
Provincial Rate Protection	$ -		$ -		
Monthly Adder Amount Paid by IESO	$ -		$ -		

November 24, 2011 Update [Funding Adder]

For example, based on the provisionally approved methodology and allocation (i.e., dollar amounts) proposed by Hydro One as part of its 2010 and 2011 distribution rates application, those dollar amounts represent 6% for REI investments and 17% for Expansion investments. (pg 15)

	2012	2013	2014	2015
Proposed GEA Funding Rate Adder- Combined Renewable Generation Capital and OM&A Smart Grid	**$ 0.83**	**$ 1.02**	**$ 0.47**	**$ 0.34**

Note (2): Revenue collected to be recorded in Account 1536 Smart Grid Funding Adder Deferral

Note (3): Revenue collected to be recorded in Account 1533 Renewable Generation Connection Funding Adder Deferral - sub-account Revenue Colected from Ratepayers

November 24, 2011 Update [Funding Adder]

PILs Calculation

	2011	2012	2013	2014	2015
INCOME TAX					
Net Income	$ -	$ 12,115	$ 19,554	$ 13,625	$ 9,169
Amortization	$ -	$ -	$ 31,700	$ -	$ 27,800
CCA	$ -	-$ 90,475	-$ 206,189	-$ 252,460	-$ 289,729
Change in taxable income	$ -	-$ 78,360	-$ 154,935	-$ 238,835	-$ 252,760
Tax Rate	28.25%	26.25%	25.50%	25.00%	25.00%
Income Taxes Payable	$ -	-$ 20,569	-$ 39,508	-$ 59,709	-$ 63,190
ONTARIO CAPITAL TAX					
Closing Net Fixed Assets	$ -	$ 476,100	$ 370,300	$ 264,500	$ 158,700
Less: Exemption	$ -	$ -	$ -	$ -	$ -
Deemed Taxable Capital	$ -	$ 476,100	$ 370,300	$ 264,500	$ 158,700
Ontario Capital Tax Rate					
Net Amount (Taxable Capital x Rate)	$ -	$ -	$ -	$ -	$ -

Gross Up

	PILs Payable	PILs Payable	PILs Payable	PILs Payable	PILs Payable
Change in Income Taxes Payable	$ -	-$ 20,569.41	-$ 39,508.33	-$59,708.74	-$ 63,190.11
Change in OCT	$ -	$ -	$ -	$0.00	$ -
PIL's	$ -	-$ 20,569.41	-$ 39,508.33	-$59,708.74	-$ 63,190.11

	2011 Grossed Up PILs	2012 Grossed Up PILs	2013 Grossed Up PILs	2014 Grossed Up PILs	2015 Grossed Up PILs
Change in Income Taxes Payable	$ -	-$ 27,890.72	-$ 53,031.31	-$ 79,611.65	-$ 84,253.47
Change in OCT	$ -	$ -	$ -	$ -	$ -
PIL's	$ -	-$ 27,890.72	-$ 53,031.31	-$ 79,611.65	-$ 84,253.47

Average Net Fixed Assets

Net Fixed Assets 1

		2011	2012	2013	2014	2015
Opening Capital Investment		$ -	$ -	$ 89,000	$ 89,000	$ 89,000
Capital Investment- Computer Hardware			$ 89,000			
Closing Capital Investment		$ -	$ 89,000	$ 89,000	$ 89,000	$ 89,000
Opening Accumulated Amortization		$ -	$ -	$ 8,900	$ 26,700	$ 44,500
Amortization Year One	5 years	$ -	$ 8,900	$ -	$ -	$ -
Amortization Thereafter		$ -	$ 17,800	$ 17,800	$ 17,800	$ 17,800
Closing Accumulated Amortization		$ -	$ 8,900	$ 26,700	$ 44,500	$ 62,300
Opening Net Fixed Assets		$ -	$ -	$ 80,100	$ 62,300	$ 44,500
Closing Net Fixed Assets		$ -	$ 80,100	$ 62,300	$ 44,500	$ 26,700
Average Net Fixed Assets		$ -	$ 40,050	$ 71,200	$ 53,400	$ 35,600

Net Fixed Assets - 2

Electric Vehicles

		2011	2012	2013	2014	2015
Opening Capital Investment		$ -	$ -	$ 50,000	$ 50,000	$ 50,000
Capital Investment - electric vehicles			$ 50,000			
Closing Capital Investment		$ -	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Opening Accumulated Amortization		$ -	$ -	$ 5,000	$ 15,000	$ 25,000
Amortization Year One	5 years	$ -	$ 5,000	$ -	$ -	$ -
Amortization Thereafter		$ -	$ -	$ 10,000	$ 10,000	$ 10,000
Closing Accumulated Amortization		$ -	$ 5,000	$ 15,000	$ 25,000	$ 35,000
Opening Net Fixed Assets		$ -	$ -	$ 45,000	$ 35,000	$ 25,000
Closing Net Fixed Assets		$ -	$ 45,000	$ 35,000	$ 25,000	$ 15,000
Average Net Fixed Assets		$ -	$ 22,500	$ 40,000	$ 30,000	$ 20,000

Net Fixed Assets - 3

Application Software

Opening Capital Investment		$ -	$ -	$ 390,000	$ 390,000	$ 390,000
Capital Investment - electric vehicles			$ 390,000			
Closing Capital Investment		$ -	$ 390,000	$ 390,000	$ 390,000	$ 390,000
Opening Accumulated Amortization		$ -	$ -	$ 39,000	$ 117,000	$ 195,000
Amortization Year One	5 years	$ -	$ 39,000	$ -	$ -	$ -
Amortization Thereafter		$ -	$ -	$ 78,000	$ 78,000	$ 78,000
Closing Accumulated Amortization		$ -	$ 39,000	$ 117,000	$ 195,000	$ 273,000
Opening Net Fixed Assets		$ -	$ -	$ 351,000	$ 273,000	$ 195,000
Closing Net Fixed Assets		$ -	$ 351,000	$ 273,000	$ 195,000	$ 117,000
Average Net Fixed Assets		$ -	$ 175,500	$ 312,000	$ 234,000	$ 156,000

For PILs Calculation

UCC - 1
Computer Hardware

		2011	2012	2013	2014	2015
Opening UCC		$ -	$ -	$ 64,525	$ 29,036	$ 13,066
Capital Additions		$ -	$ 89,000	$ -	$ -	$ -
UCC Before Half Year Rule		$ -	$ 89,000	$ 64,525	$ 29,036	$ 13,066
Half Year Rule (1/2 Additions - Disposals)		$ -	$ 44,500	$ -	$ -	$ -
Reduced UCC		$ -	$ 44,500	$ 64,525	$ 29,036	$ 13,066
CCA Rate Class	50	50	50	50	50	50
CCA Rate	55%	55%	55%	55%	55%	55%
CCA		$ -	$ 24,475	$ 35,489	$ 15,970	$ 7,186
Closing UCC		$ -	$ 64,525	$ 29,036	$ 13,066	$ 5,880

UCC - 2

		2011	2012	2013	2014	2015
Opening UCC		$ -	$ -	$ 42,500	$ 29,750	$ 20,825
Capital Additions		$ -	$ 50,000	$ -	$ -	$ -
UCC Before Half Year Rule		$ -	$ 50,000	$ 42,500	$ 29,750	$ 20,825
Half Year Rule (1/2 Additions - Disposals)		$ -	$ 25,000	$ -	$ -	$ -
Reduced UCC		$ -	$ 25,000	$ 42,500	$ 29,750	$ 20,825
CCA Rate Class	10	10	10	10	10	10
CCA Rate	30%	30%	30%	30%	30%	30%
CCA		$ -	$ 7,500	$ 12,750	$ 8,925	$ 6,248
Closing UCC		$ -	$ 42,500	$ 29,750	$ 20,825	$ 14,578

UCC - 3
Application Software

		2011	2012	2013	2014	2015
Opening UCC		$ -	$ -	$ 331,500	$ 563,550	$ 725,985
Capital Additions		$ -	$ 390,000	$ 390,000	$ 390,000	$ 390,000
UCC Before Half Year Rule		$ -	$ 390,000	$ 721,500	$ 953,550	$ 1,115,985
Half Year Rule (1/2 Additions - Disposals)		$ -	$ 195,000	$ 195,000	$ 195,000	$ 195,000
Reduced UCC		$ -	$ 195,000	$ 526,500	$ 758,550	$ 920,985
CCA Rate Class	12	12	12	12	12	12
CCA Rate	20%	20%	20%	20%	20%	20%
CCA		$ -	$ 58,500	$ 157,950	$ 227,565	$ 276,296
Closing UCC		$ -	$ 331,500	$ 563,550	$ 725,985	$ 839,690

GEA Renewable Connections - Funding Rate Adder Calculation

	2011		2012		2013		2014		2015	
Net Fixed Assets		$ -		$ -		$ 245,000		$504,500		$532,500
OM&A	$ -		$ 65,250		$ 82,650		$ 91,350		$ 104,400	
WCA	15.0%	$ -	15.0%	$ 9,788	15.0%	$ 12,398	15.0%	$ 13,703	15.0%	$ 15,660
Rate Base		$ -		$ 9,788		$ 257,398		$518,203		$548,160
Deemed ST Debt	4%	$ -	4%	$ 392	4%	$ 10,296	4%	$ 20,728	4%	$ 21,926
Deemed LT Debt	56%	$ -	56%	$ 5,481	56%	$ 144,143	56%	$290,193	56%	$306,970
Deemed Equity	40%	$ -	40%	$ 3,915	40%	$ 102,959	40%	$207,281	40%	$219,264
ST Interest	2.08%	$ -	2.46%	$ 10	2.08%	$ 214	2.08%	$ 431	2.08%	$ 456
LT Interest	5.26%	$ -	5.26%	$ 289	5.26%	$ 7,588	5.26%	$ 15,276	5.26%	$ 16,159
ROE	9.42%	$ -	9.58%	$ 375	9.42%	$ 9,699	9.42%	$ 19,526	9.42%	$ 20,655
		$ -		$ 673		$ 17,501		$ 35,233		$ 37,270
OM&A				**$ 65,250**		**$ 82,650**		**$ 91,350**		**$104,400**
Amortization		$ -		$ -		$ 10,000		$ 21,000		$ 23,000
Grossed-up PILs		$ -		$ 133		-$ 103		-$ 6,958		$ 13,885
Revenue Requirement		$ -		$ 66,057		$ 110,047		$140,625		$178,555

Direct Benefit	2011	2012	2013		2014	2015
OM&A	$ -	$ 65,250	**2011 + 2012**	$ 82,650	$ 91,350	$104,400
Capital	$ -	$ 807		$ 27,397	$ 49,275	$ 74,155
Direct Benefit % on capital	0.00%	6.00%		6.00%	6.00%	6.00%
Direct Benefit on capital	$ -	$ 48		$ 1,644	$ 2,956	$ 4,449
Total GEA Recovery	$ -	$ 65,298	$ 65,298	$ 84,294	$ 94,306	$108,849
Total # of Customers (excl connections)	52,253	52,253	52,253	52,253	52,253	52,253
GEA Rate Adder	$ -	$ 0.10	$ 0.10	$ 0.13	$ 0.15	$ 0.17
Provincial Rate Protection	$ -	$ 758	$ 758	$ 25,754	$ 46,318	$ 69,705
Monthly Adder Amount Paid by IESO	$ -	$ 63	$ 63.19	$ 2,146	$ 3,860	$ 5,809

For example, based on the provisionally approved methodology and allocation (i.e., dollar amounts) proposed by Hydro One as part of its 2010 and 2011 distribution rates application, those dollar amounts represent 6% for REI investments and 17% for Expansion investments. (pg 15)

	2012	2013	2014	2015
Proposed GEA Funding Rate Adder- Renewable Generation	**$ 0.10**	**$ 0.13**	**$ 0.15**	**$ 0.17**

Note (1): 2021 GEA Rate Adder includes 2011 and 2012 recovery.

Note (2): Revenue collected to be recorded in Account 1536 Smart Grid Funding Adder Deferral

Note (3): Revenue collected to be recorded in Account 1533 Renewable Generation Connection Funding Adder Deferral - sub-account Revenue Colected from Ratepayers

1.1 Regulation 330/09

As a consequence of the determination of the direct benefits, the cost allocation associated with eligible investments between provincial ratepayers and the ratepayers of the individual distributor making the investment will be determined. There is therefore a relationship between the eligible investment costs and the associated direct benefits. As such, a clear understanding of what constitutes an eligible investment is necessary before discussing the related direct benefits. The Board therefore wishes to set out its interpretation of the following in relation to O. Reg. 330/09.

- "Eligible investment" costs, as set out in O. Reg. 330/09 and section 79.1 (5) of the Act, are not limited to only the initial capital investment costs but also includes the *up-front* OM&A costs necessary for the purpose of "enabling the connection of a qualifying generation facility". However, given that section 79.1 focuses solely on the initial investment, *ongoing* OM&A costs that are incurred by the distributor after the investment has been made will not be eligible for provincial recovery.

- The *Green Energy Act* focused on investments related to both the smart grid and the connection of renewable energy generation. However, O. Reg. 330/09 applies to only investments related to the connection of renewable energy generation in relation to being "eligible investments". As a result, unless a certain smart grid related investment has been identified in the DSC as a Renewable Enabling Improvement, such investments are not "eligible investments" for the purpose of the Act and the regulation.

- Not all investments made by a distributor to accommodate renewable generation will qualify as an "eligible investment". Investments to connect such generation that is contracted under the feed-in tariff ("FIT") program will be treated as an "eligible investment". However, similar investments to connect generation that was contracted under the RESOP program will not be treated as an "eligible investment". The important distinction is not between the two programs of the Ontario Power Authority (OPA). Instead, it is related to the Board's cost responsibility rules under the DSC and the timing of the recent DCCR amendments. RESOP generation was contracted before those DCCR amendments were made. As a consequence, investments to connect a RESOP generator remain the cost responsibility of the generator. In contrast, investments made by a distributor to connect FIT generators will occur after the Board issued its revised cost responsibility rules on October 21, 2009 and are therefore eligible for the provincial recovery mechanism.[4] As such, the "direct benefits" which are the focus of this Board framework only take into consideration

[4] Specifically, the Board's October 21, 2009 Notice of Amendment to the DSC (EB-2009-0077) identified that the new cost responsibility rules apply to investments associated with renewable generation projects for which an application to connect was made on or after October 21, 2009. Further details in relation to the date of application and a specific scenario are provided in that Board Notice.

Pages of Rate Adder

Issue 12.1 Is Guelph Hydro's Green Energy Act Plan, including the Smart Grid component of the plan appropriate?

33) Ref: E 2/T4/S 6/Appendix D/p. 3, and E 2/T 4/S 6/Appendix D/Table 6/p. 14

In the first reference, it is indicated that in 2013, an estimated $ 500,000 is the net cost to Guelph Hydro for connecting a 10 MW ground mounted solar photovoltaic project.

At Table 6 of the second reference, under Hanlon TS, it is indicated that a 10 MW FIT Generation would be connected to Feeder M23.

a) Did the project proponent for the 10 MW obtain a contract from the OPA? If so, what is the date the contract was signed.

Guelph Hydro's Response:

Guelph Hydro does not believe that the 10MW project proponent has yet obtained a contract from the OPA. Guelph Hydro included this project in the forecast based on consultations with the proponent.

b) Did the noted project proponent apply for connection to Guelph Hydro? If so, when is Guelph Hydro expected to complete its Connection Impact Assessment ("CIA") for that project?

Guelph Hydro's Response:

The project proponent has not yet applied for connection to Guelph Hydro.

c) Please confirm that the noted project would be connected as shown in the second reference (at Feeder M23 supplied from Hanlon TS).

Guelph Hydro's Response:

Until firm project details are known, Guelph Hydro cannot confirm if this project will be connected to Hanlon TS or Arlen MTS.

d) Did Guelph Hydro issue an Offer to Connect to that project proponent? If so when is the Connection Agreement expected to be completed?

Guelph Hydro's Response:

Guelph Hydro has not issued an offer to connect to this project proponent.

e) Does the project size require that Guelph Hydro advise Hydro One and the Independent Electricity System Operator ("IESO") of this project including its 10 MW capacity, intended connection point (the feeder designation), and the Hydro One owned transformer station to which this feeder is connected?

Guelph Hydro's Response:

Yes. The size of this project would require Guelph Hydro to advise both Hydro One and the IESO of the connection to Guelph Hydro's distribution system.

1.0 SUMMARY

The following Basic GEA Plan has been revised as of November 23, 2011, to update the plan elements timing and corresponding expenditures into a 2012-2015 timeframe. The original plan anticipated a 2011-2015 plan timeframe with OEB approval obtained early in 2011 in order to commence proposed projects in 2011. The revised plan anticipates OEB approval in late 2011 or early 2012, with an early 2012 plan start.

In accordance with the Ontario Energy Board's (OEB) filing requirements under the *Green Energy and Green Economy Act, 2009* (the Act), Guelph Hydro Electric Systems Inc. (Guelph Hydro) has prepared the following Basic GEA Plan. Guelph Hydro supports the Act and sees it as a proactive and effective means of meeting the objectives of the Province. In the case of connecting renewable generation, proactive work on the part of Local Distribution Companies (LDCs) should reduce or eliminate connection delays and reduce the amount of reactive work that may otherwise occur. Guelph Hydro believes that the OEB's Green Energy Act policies will permit the connection of renewable generation projects to be completed in an accelerated and more cost effective manner than without the support of proactive work on the part of the LDCs.

In preparing this plan, Guelph Hydro has attempted to identify investments that will be necessary to facilitate the connection of renewable generation to its distribution system, and prioritize them based on our understanding of where the highest likelihood of connection requests exist or may exist. As part of this analysis, Guelph Hydro has identified work that will be required to ensure that the interconnection of renewable generation and other distributed resources do not increase either risks or constraints on the distribution system.

Given the geography and primarily urban nature of Guelph Hydro's service territory, we believe that there will limitations on the types of renewable connections that will be sought in our service area. Specifically, we expect to see higher numbers of solar project connection requests, with a small number of bio-gas and very few wind projects.

Overall Guelph Hydro's distribution system is well designed, built and maintained to accept an influx of renewable generation. However, we anticipate that some system expansion and renewable enabling investments will be required to accommodate the forecast renewable generation project connection requests.

The most significant anticipated investment is a 15 kV system expansion in 2013, estimated at $500k net cost to Guelph Hydro, required for the connection of a 10.0 MW ground mounted solar photovoltaic project.

In this plan we have also identified a number of projects we believe are innovative and support the development of a Smart Grid. These initiatives will reinforce the creation of a "culture of conservation" in Ontario, by providing both education and technology to support customers to better understand and manage energy use. These projects also support the City of Guelph's innovative Community Energy Initiative, which has deep per capita energy and water consumption reduction targets.

Page 14 GEA Plan, November 23, 2011

Station	Feeder	Forecasted FIT/microFIT Generation [MW]	Total Forecasted Generation [MW]	Installed Generation [MW]	Feeder Design Rating [amps]	Generation Design Capacity [amps]	Installed Generation [amps]	Total Generation Capacity [amps]	
	M54	0.00	0.00	0.00	520	347	0	347	
	M61	0.00	0.00	0.00	520	347	0	347	
	M62	0.22	0.22	2.81	520	347	117	230	1
	M63	3.51	3.51	0.00	520	347	0	347	
	M64	0.26	0.26	0.00	550	367	0	367	
Cedar TS	M11	0.05	0.05	0.00	550	367	0	367	
	M12	0.35	0.35	0.01	520	347	0	346	
	M13	0.11	0.11	0.01	550	367	0	366	
	M14	0.00	0.00	0.00	520	347	0	347	
	M21	0.42	0.42	0.01	550	367	0	366	
	M22	0.00	0.00	0.01	550	367	0	366	
	M23	0.00	0.00	0.00	520	347	0	347	
	M24	0.01	0.01	0.00	520	347	0	347	2
	M51	0.20	0.20	0.00	520	347	0	347	
	M52	0.00	0.00	0.01	550	367	1	366	
	M53	0.00	0.00	0.00	0	0	0	0	
	M54	0.01	0.01	0.00	550	367	0	367	
	M61	0.01	0.01	0.00	550	367	0	367	
	M62	0.01	0.01	0.00	550	367	0	367	
	M63	0.01	0.01	0.01	520	347	1	346	
	M64	0.00	0.00	0.00	0	0	0	0	
	M71	0.02	0.02	0.00	550	367	0	367	
	M72	0.34	0.34	0.01	520	347	0	346	
	M73	0.00	0.00	0.00	520	347	0	347	
	M74	0.24	1.24	0.00	520	347	0	347	
	M81	0.11	0.11	1.40	550	367	58	308	2
	M82	0.00	0.00	0.00	0	0	0	0	
	M83	0.01	0.01	0.00	520	347	0	347	
	M84	0.25	0.25	0.00	520	347	0	347	
Hanlon TS	M11	1.24	1.24	0.00	550	367	0	367	
	M12	0.00	0.00	0.00	550	367	0	367	
	M13	0.11	0.11	0.00	550	367	0	367	
	M21	0.11	0.11	0.02	550	367	1	366	
	M22	1.60	1.60	0.00	550	367	0	367	
	M23	10.00	10.00	0.00	550	367	0	367	
Rockwood DS	F2	0.00	0.00	0.00	250	167	0	167	
RockwoodMS1	F1	0.00	0.00	0.00	250	167	0	167	
	F2	0.02	0.02	0.00	250	167	0	167	
	F3	0.00	0.00	0.00	250	167	0	167	
RockwoodMS2	F1	0.00	0.00	0.00	250	167	0	167	
	F2	0.00	0.00	0.00	250	167	0	167	
	F3	0.00	0.00	0.00	250	167	0	167	

Notes: 1: Eastview Generator can connect to both M52 & M62
2: OMAFRA Generator can connect to both M81 & M24

35) Ref: E 2/T 4/S 6/Appendix D/pp. 15-16, and E 2/T 4/S 6(Appendix E)/p.3

In the first reference under section 6.2 on page 15, lines 14-18, it is indicated that at the time of writing the plan, Guelph Hydro received requests for and completed over 80 pre-FIT consultations with the following breakdown:

- Generation <= 250 kW (CAE): 90%
- Generation > 250 kW, <= 500 kW: 2%
- Generation > 500 kW, <= 10 MW: 8%

In the first reference under section 6.2, in Table 7, page 16, the number of anticipated renewable generation connections is listed for the years 2011 to 2015, broken down into four category sizes, and the corresponding MW for each of the four categories is listed in Table 8.

In the second reference, page 3, the OPA states in part that:

> "Guelph Hydro did not provide specific information on the FIT and microFit projects received to date.....To date, the OPA has received 23 capacity allocation exempt FIT applications and 148 microFIT applications in Guelph Hydro's system for a total of 5.45 MW of FIT applications and 1.041 MW of microFIT applications
> At this time, 1 capacity allocation exempt FIT contract has expired (leaving a total of 5.25 MW of FIT applications), 30 microFIT applications have already been connected and 9 microFIT applications have been terminated (leaving a total of 0.824 MW of microFIT applications to be connected."

a) Did all 80 completed pre-Fit consultations identified on page 15 of the first reference, have signed contracts from the OPA? If no, please indicate the number of projects that had signed OPA contracts under each of the three categories of generation sizes.

Guelph Hydro's Response:

At the time of the creation of Guelph Hydro's GEA Plan, Guelph Hydro did not have sufficient information confirming how many projects had signed contracts with the OPA.

At this point in time Guelph Hydro can confirm that the following numbers of projects have signed OPA contracts:

- Generation <= 250 kW (CAE): 29 Projects
- Generation > 250 kW, <= 500 kW: 0 Projects

- Generation > 500 kW, <= 10 MW: 0 Projects

b) Please indicate the anticipated in-service year for these 80 projects.

Guelph Hydro's Response:

Guelph Hydro Response:
Of the 29 projects identified in 35 (a) with signed OPA contracts, Guelph Hydro estimates the anticipated in-service dates for these projects as follows:

- 2 Projects connected in 2010
- 4 Projects estimated to be connected by the end of 2011
- 23 Projects estimated to be connected in 2012

c) Please describe in detail the forecast methodology used in producing the numbers in Tables 7 and 8 shown on page 16 of the first reference, and how those numbers reconcile with the project numbers and MW shown in reference 2, and quoted above for convenience.

Guelph Hydro's Response:

The number and size of anticipated renewable generation connections forecasted in Tables 7 and 8 was based on Guelph Hydro's knowledge of the level of interest in the FIT/microFIT programs, Pre-FIT Consultations completed to date, project applications received to date, as well as the knowledge that of the City of Guelph's Community Energy Initiative (CEI) which encourages the implementation of renewal energy projects within the City of Guelph. The forecast was prepared using the assumption that program changes over time were unknown. Guelph Hydro notes that Tables 7 and 8 are estimates of the number and size of completed connections, and do not include the number of applications received, expired, or terminated as summarized by the OPA. It is difficult to reconcile Tables 7 and 8 with the OPA figures without better knowledge of the OPA details including size and timeframes of the applications being referenced. Guelph Hydro notes that to date, 61 microFIT projects and 2 FIT projects have been connected for a total of 0.728 MW.

Table 7, Revised GEA Plan, November 23, 2011

Table 7: NUMBER OF ANTICIPATED RENEWABLE GENERATION CONNECTIONS

Number of Renewables by Year	*2011**	*2012*	*2013*	*2014*	*2015*	*Total*
Micro Generation (<= 10 kW)	40	40	40	40	40	***200***
Small Generation (<= 250 kW)	3	7	7	7	7	***31***
Small Generation (> 250 kW,<= 500 kW)	0	1	0	0	0	***1***
Mid-Size Generation (> 500 kW, <= 10 MW)	0	0	1	1	1	***3***
Total	***43***	***48***	***48***	***48***	***48***	***235***

**2011 FIT Connections: 2 connecting in Q2-2011; 1 completed CIA; 2 more CIAs expected with possible connections in 2011*

44) Ref: Board staff IRR 86a),pp.25 -27, Board staff IRR87a), p.30,

In the third reference, Guelph lists a number of possible education and messaging opportunities, which appear to include messaging related to energy consumption and pricing, conservation messaging, and other utility-related information (i.e. safety, maintenance, power outage). In addition, Guelph indicates that possible education and messaging opportunities include, among others:

- Municipal water conservation messaging and program notification;
- Municipal Emergency Services messaging and notification (ie. "Amber Alert", Smog Day warnings, etc); and
- Other Community messaging (Earth Hour, Snow Days – school closures, road work, etc).

a) Please explain whether the IHD will be used by third parties? Please list the parties.

Guelph Hydro's Response:

It is Guelph Hydro's intent to make the IHD messaging system available for legitimate community use with a not-for-profit model, in order to ensure that Guelph Hydro's brand is not damaged with experiences similar to some door to door energy retailers. Over time as the system is expanded and proven to be reliable, the system may be made accessible to third parties. Third parties originally contemplated for this project include the following:

- City of Guelph – Emergency Services;
- City of Guelph – Municipal Services – Waste & Environment;
- City of Guelph – Waterworks Department;
- City of Guelph – Recreation & Culture;
- Upper Grand District School Board;
- Wellington Catholic District School Board

b) If the answer is yes, at what point in the five year plan will these additional entities make use of the IHD?

Guelph Hydro's Response:

Please refer to response to 41e and 41f for more detail.

c) What is the useful life of the IHD?

Guelph Hydro's Response:

Guelph Hydro has no direct experience with IHD lifespan, but estimates it may be in the 5 year to 10year timeframe, as most IHDs researched to date do offer remote firmware upgrades. Guelph Hydro anticipates that the IHD will last longer than most consumer electronics 3 year lifespan, but not likely as long as the expected 15 year lifespan of the smart meter.

d) If applicable, will Guelph charge other parties for the use of the IHD infrastructure in order to provide notification and messaging?

Guelph Hydro's Response:

At this time Guelph Hydro has conceived of this project as a not for profit community based tool, in order to protect Guelph Hydro's brand. Over time as the system is expanded and can be made available to other agencies, there may be a desire to more closely reviewing the system's operating and maintenance costs with a view to some cost recovery from the agencies using the system.