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May 3, 2012

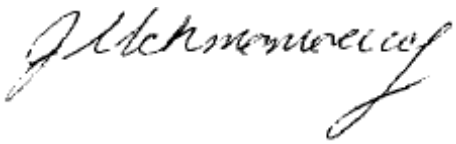
Kirsten Walli, Board Secretary
Ontario Energy Board
P.O. Box 2319, 27th Floor
2300 Yonge Street
Toronto, ON, M4P 1E4

Attention: Ms. Walli

Re: PUC Distribution Inc.'s Smart Meter Final Disposition Application
Responses to Vulnerable Energy Consumer Coalition (VECC) Interrogatories
EB-2012-0084

Please find enclosed PUC Distribution Inc.'s interrogatory responses to VECC in the above noted proceedings. The responses have been electronically filed through the Board's web portal.

Sincerely,



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VECC Question # 1

Reference: Application, Status Meter Program Status, Page 1
Preamble: PUC installed 29,385 residential and 3,239 GS<50 kW smart meters by October 31, 2011 which represents the entire population of mandated smart meters and is 100% complete. PUC installed 158 GS>50 kW meters in 2011 and an additional 183 meter installations are planned for 2012.

a) Please provide the average cost per meter by year and rate class on a total cost basis (capex + opex) and capex only.

b) Please discuss any variances (>10%) in average costs per year.

PUC Response

a) Please see the tables below showing the average costs per meter by year on a total cost basis as well as on a capital expenditure basis. PUC did not track costs separately on a customer class basis, therefore is unable to provide the requested information by customer class.

Average Cost Per Meter By Year on a Total Cost Basis			
	Total Number of Meters Installed	Total Capital and OM&A Costs	Average Cost Per Meter
2007-2009	27,671	$ 3,981,099	$ 143.87
2010	4,592	$ 2,109,618	$ 459.41
2011	519	$ 718,078	$ 1,383.58
2012	183	$ 644,333	$ 3,520.95
Total	32,965	$ 7,453,128	$ 226.09

Average Cost Per Meter By Year on a Capital Cost Basis			
	Total Number of Meters Installed	Total Capital Costs	Average Cost Per Meter
2007-2009	27,671	$ 3,919,013	$ 141.63
2010	4,592	$ 1,997,218	$ 434.94
2011	519	$ 381,188	$ 734.47
2012	183	$ 287,600	$ 1,571.58
Total	32,965	$ 6,585,019	$ 199.76

b) The average costs per year on the total cost basis and a capital cost basis results in significant variances from year to year. Meter purchase prices differ based on the type of meter. Also, meters may be purchased in bulk and the year the cost is recognized in may not correspond with the year the meter was installed. Also there may be one-time capital costs such as project management, AMI capital etc. that do not relate to installed meters by year.

VECC Question # 2
Reference: Application, Status Meter Program Status, Page 1

a) Please summarize the types of meters installed for each rate class.

b) Please complete the following table to show the average installed cost per meter type and total costs for each meter type.

Class	Type of Meter	Quantity	Average Cost	Total Meter Cost per Meter Type
Residential				
GS<50 kW				
GS>50 kW				

PUC Response

Class	Meter Type	Quantity	Average Installed Cost	Cost per Meter Type
RES	A3D	4	$501	$2,003
	A3TL	14	$613	$8,579
	iNA2	580	$183	$106,320
	iSA2	28802	$85	$2,458,827
	KV2C	6	$441	$2,648
Total Residential				**$2,578,377**
GS<50	A3D	660	$504	$332,462
	A3RL	150	$747	$111,977
	A3TL	266	$591	$157,078
	iNA2	147	$183	$26,947
	iSA2	1921	$96	$184,896
	KV2C	139	$462	$64,174
Total GS<50				**$877,533**
GS>50	A3D	33	$521	$17,182
	A3RL	129	$747	$96,300
	A3TL	9	$610	$5,494
	KV2C	2	$462	$923
Total GS>50				**$119,899**

For the meter cost, PUC used the average cost for each of the meter types. For example, the A3D type is used in a few different applications and the cost of the meter (and adapter when required) results in a slightly different cost for each application. PUC calculated an average cost based on the number and cost of each sub-type. For example, the iSA2 type (single-phase meter) is used on both the residential and GS<50 yet the cost is different. For residential, the majority are 200 Amp meters that cost $71 but there are a few 20 Amp type that cost $245 because the meter purchase price is higher for this type and they must be used with an adapter. The same "type" of meter is used in the GS<50 but there are fewer of the $71 variety and more of the $245 variety so the average cost for the same type of meter is higher for the GS<50.

For the labour component, PUC reviewed contractor install invoices and identified the total number of meters they installed and the total cost and arrived at an average installed cost of $11.23 for the 28,433 iSA2. PUC then calculated the number of meters of the same type that PUC installed by taking the total and backing out 28,433. PUC estimated the cost of PUC installed iSA2 meters based on a labour rate of $43 per hour (including overhead) and an estimated installed rate of .73 hours per install (based on a calculation performed during a previous exercise) and came up with a cost per PUC install that was then averaged with the contractor cost of $11.23 to arrive at an average of $12.75 for this meter type.

The remaining meter types other than iSA2 were all installed by PUC crews. PUC used an average install rate of .73 hours per install for self-contained "plug-in" type meters based on the previous calculation of 11 meter installs on a typical 8 hour day. The transformer type meters are a more time consuming install and PUC used an average rate of 2 hours per install on this sub-type. For meter types that have both self-contained and transformer type (A3D and A3TL for example) PUC calculated a weighted average based on the number of each sub-type.

VECC Question # 3

Reference: Application, Residential and Commercial Deployment of Sensus Smart Meters, Page 3

Preamble: PUC researched the effort required and costs associated with the mass deployment and concluded that the most cost-effective approach to converting the conventional residential meters to smart meters was to utilize a third-party contractor.

a) Please provide a comparison of the two options.

PUC Response

During the planning stages leading up to the smart meter deployment PUC identified that 3 of 9 Meter Department employees were either approaching retirement or were already in a position to retire. It was anticipated that the installation of smart meters and the ability to remotely collect data once the project was complete would change the manpower requirements of the metering area and cast doubt on the need to replace these senior staff members. The costs associated with using a third party contractor was compared to the cost of hiring and training new staff members while considering that the new hires would face layoffs after the deployment was complete.

In the months leading up to the start of deployment in April 2009, the three senior staff members retired and the remaining staff were required to support the installation efforts by the contractor by issuing new meters, receiving the removed meters, coordinating efforts to repair damaged meters bases and to complete installations for difficult to access meters.

VECC Question # 4

Reference: Application, Residential and Commercial Deployment of Sensus Smart Meters, Page 3

Preamble: Given the complexity of installation, PUC decided to install the approximate 3,273 meters, GS<50 kW class, with PUC staff.

a) Please discuss the installation complexities.

b) Please provide the average cost per installed meter (capex + opex) using PUC staff.

c) Please confirm whether or not PUC staff costs have been included in the smart meter costs.

PUC Response

a) The 3,273 meters addressed by PUC Staff were a combination of three phase meters, difficult to access single-phase meters and meters where the infrastructure required repair or upgrading to accept the smart meter.

1. Three Phase metering. Three phase meters typically operate at higher voltage and or current ranges than single-phase meters and require specific training to ensure the meter changes are performed safely and correctly. The third-party installers hadn't received the required training to allow them to address three phase metering.

2. Difficult to access meters. PUC's meter population included a quantity of meters located inside the customers premise. The contract terms required that the contractor make one site visit followed by four telephone calls, attempted at different times during the day, to arrange access for the meter change. Once the site visits and phone calls were exhausted without success, the installation order was returned to PUC to address.

3. Repair or upgrade required. During the deployment the contractor encountered installations where the existing meter base was damaged and the meter exchange could not be completed safely without repairs. These installations were reported to PUC in order to facilitate the repairs and the meter exchange was performed by PUC crews once the repairs were made.

b) The average cost per installed meter (capex + opex) using PUC staff to install the 3,273 meters would have been approximately $287.

c) PUC confirms that PUC staff costs have been included in the smart meter costs.

VECC Question # 5

Reference: Application, Integration with MDMR, Page 8

Preamble: With many technical steps and challenges to overcome, PUC`s ability to meet these timelines was to a large extent contingent upon various software systems delivering the promised functionality and suppliers meeting their contractual obligation.

a) Please compare PUC's planned unit testing, system integration testing and qualification testing dates to actual dates and discuss any variances.

PUC Response

a) In comparing PUC's planned unit testing, system integration testing and qualification testing dates to actual dates, PUC completed testing within the planned timeframe. Each set of testing was scheduled with the Meter Data Management and Repository (MDM/R) and was expected to be completed within a set time frame. The qualification testing presented the most structured and time sensitive testing scenarios. After beginning this testing, PUC encountered software issues with the CIS (Customer Information System) which resulted in restarting PUC's testing. In spite of having to restart qualification testing for PUC, the testing scenarios were still completed within the scheduled time frame. Once the testing was completed, PUC was still on target and in compliance with the Meter Data Management and Repository's agenda to integrate and enroll our smart meters to their Live Environment in preparation for Time of Use (TOU) billing.

VECC Question # 6
Reference: Application, Transition to TOU Pricing, Page 8

Preamble: PUC applied to the OEB for an extension to the mandatory TOU pricing data for 1,181 GS<50 kW PPP customers from October 2011 to March 2012. The request was premised on the fact that interval data delivered from certain 3 phase meters is suspect due to the improper time-alignment of the consumption intervals.

a) Please discuss the improper time-alignment is issue further and how it impacted smart meter deployment.

PUC Response

Sensus Metering systems Inc. (Sensus) was selected as the provider of the Advanced Metering Infrastructure for PUC Distribution. PUC was notified by Sensus on June 3, 2011 that it had investigated and confirmed that interval data delivered in the FlexNet Supervisory Message from Elster ALPHA 3 meters running FlexNet communications firmware version 1.2.B is suspect due to improper time-alignment of the consumption intervals. This is caused by delays of metrology register read requests from the Flexnet communications board or by metrology real-time clock adjustments by the network. Sensus recommended that ALPHA A3 meters (w/512k Flash) with Flexboard firmware Version 1.2.B should not be relied on for time alignment and TOU and interval billing of customers.
The Product Information Notice (PIN) also states that “to the extent that these same meters are being used as consumption meters, all reported consumption is accurate and can be used for (RRP) billing purposes.
In the PIN, Sensus also advised that an upgrade to its radio firmware is required and that the new version of the radio firmware would be submitted to Measurement Canada for approval. After Measurement Canada approval is received Sensus will distribute the approved firmware to distributors. Distributors would subsequently be required to install and test the upgraded firmware extensively prior to a commencement of use of these 3 phase meters for TOU billing purposes.
The PIN from Sensus applies to approximately 1,181 meters utilized by PUC Distribution the General Service <50 kW customer class.
Sensus provided a plan in the fall of 2011 that proposed an initial attempt to upgrade the firmware using an over-the-air approach. The over-the-air upgrade process started on December 1, 2011 and required a series of retries. In early spring of 2012 Sensus declared that the over-the-air upgrades had reached all the meters and were able to communicate. PUC began field upgrades using a remote communication device and the Sensus software. PUC has completed the upgrade with the exception of a very small number of meters that were disconnected for the winter season. The TOU pricing for these customers commenced in the first week of April 2012 and is expected to be complete and all customers will be transitioned to TOU by the end of May 2012.

VECC Question # 7

Reference: Smart Meter Recovery Model

Preamble: Sheet 2 provides Total Smart Meter OM&A Costs.

a) Please provide a breakdown of the total number and cost of additional incremental permanent and/or contract staff hired by year for the deployment of smart meters and include the work functions for each position. Please provide all assumptions.

PUC Response

a) PUC used a contractor for installation of the majority of the smart meters. The internal staff that completed the meter installations were PUC's permanent meter department staff.

VECC Question # 8

Reference: Smart Meter Model (V2_17)

Preamble: PUC completed the Smart Meter Model provided by the OEB and used the data to arrive at the proposed Smart Meter Incremental Rate Rider and the proposed Smart Meter Disposition Rate Rider.

Reference 2: Board Guideline G-2011-0001, Smart Meter Funding and Cost Recovery – Final Disposition, dated December 15, 2011, Page 19

Preamble: The Guideline states, "The Board views that, where practical and where data is available, class specific SMDRs should be calculated on full cost causality."

a) Please provide the calculations in the Smart Meter Model by customer class.

b) Please recast the tables on page 2 and 3 of Tab 1 Schedule 5 by customer class based on customer class cost causality as per part (a). Re-calculate the SMDR & SMIRR Rate Riders based on cost causality by customer class.

c) Please provide a table that summarizes the total Smart Meter Rate Adder Revenue collected by customer class.

PUC Response

a) PUC does not have the data available to complete the smart meter revenue requirement model by rate class. In accordance with the G-2008-0002 guidelines, accounts 1555 and 1556 were established to track the capital and OM&A costs associated with the smart meter project. Costs were not set up by the impacted customer classes. Meter change outs to smart meters were determined by the existing metering configuration and service requirement (transformer rated, polyphase etc). Service requirement does not correlate to a specific rate class. For example, there may be GS<50 customers with a "residential" meter configuration and Residential customers with a "GS<50" meter configuration. PUC did not categorize or track the capital and OM&A costs to a service location and installation, therefore, providing costs by rate class is not feasible.

b) See Response to part a)

c) The table below details the smart meter rate adder revenue by rate class including the interest amounts as calculated in the model.

Year	**Total Smart Meter Adder**	**Residential**	**General Service <50kW**	**General Service > 50 kW**
2006	57,945	50,996	6,373	576
2007	105,801	93,785	11,632	1,284
2008	226,830	200,012	24,981	2,337
2009	390,531	347,803	43,136	4,514
2010	562,115	494,661	61,832	5,022
2011	682,819	595,659	74,910	6,528
2012	246,679	217,078	27,135	2,466
Total	2,272,720	1,999,994	249,999	22,727

VECC Question # 9

Reference: Tab 1, Schedule 5, Pages 2-3

a) Please provide the cost allocation methodology used to calculate the rate riders in Table 1 on Page 2 and Table 2 on Page 3.

PUC Response

a) PUC used the following allocators to allocate costs by rate class when calculating the SMIRR and SMDR:

   i. Return (deemed interest plus return on equity) – Number of smart meters installed by rate class.
   ii. Amortization – Smart meter costs by rate class.
   iii. OM&A – Number of smart meters installed by rate class.
   iv. PILs – revenue requirement by rate class before PILs
   v. Smart meter rate adder revenues – actual adders collected by rate class.

VECC Question # 10

Reference: Board Guideline G-2011-0001, Smart Meter Funding and Cost Recovery – Final Disposition, dated December 15, 2011, Page 19

Preamble: The Guidelines state, "The Board also expects that a distributor will provide evidence on any operational efficiencies and cost savings that result from smart meter implementation."

a) Please summarize PUC's operational efficiencies and cost savings.

PUC Response

a) PUC anticipates meter reading expenses to be reduced for half of the 2012 year. The estimated reduction in OM&A costs is $55,000 in 2012. PUC has not accounted for this reduction in costs in the smart meter model. OEB staff has requested an updated model with other changes as a result of the interrogatories. PUC will reduce OM&A costs by $55,000 on line 2.5.6 "Other AMI expenses" in the updated model that will be submitted to the Board.

VECC Question # 11

Reference: General

Preamble: VECC observes that in other Smart Meter Recovery applications, a summary comparison of actual smart meter deployment costs to budget is provided as well as a capital and OM&A cost variance analysis.

a) Please provide this information for PUC.

PUC Response

The smart meter budget was prepared in 2007 with the assistance of consultants and was used for preliminary planning purposes at a high level. The budgeted OM&A expenditures were for the period 2007 to 2012 and included estimated costs for items such as MDM/R IESO fees which are not included in the application. Also, PUC did not start to incur OM&A costs until 2009.A comparison of the budget and the actual smart meter deployment costs are below:

	Budget	Actual
Capital Costs	$6,646,411	$6,585,019
OM&A Expenditures	$2,742,083	$868,109