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January 22, 2013

Via Email
Original via Courier

Ms. Erica Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

Re: FortisBC Inc. Application for a Certificate of Public Convenience and Necessity (CPCN) for the Advanced Metering Infrastructure (AMI) Project – Evidentiary Filing

On December 20, 2012 the Commission issued Order G-198-12 denying a request made by Mr. Shadrack and the Nelson-Creston Green Party Constituency Association to suspend the public hearing of FortisBC's application for a CPCN for the AMI Project (the Application) pending a filing by FortisBC of a comprehensive wired smart meter alternative to the wireless technology proposed in the Application. In its Reasons for Decision provided as Appendix A to Order G-198-12, the Commission invited FortisBC to file any additional information that it considers might provide additional insight on the matter of wireless vs. wired technology and address specific issues and evidence raised by the Interveners. The attachment included with this letter provides further information about the "wired" advanced metering market, and explains the reality that limits FortisBC's ability to provide the further information that Interveners have sought in the absence of a formal PLC-specific RFP process.

If further information is required, please contact the undersigned at (250) 717- 0890.

Sincerely,

Dennis Swanson
Director, Regulatory Affairs

cc: Registered Interveners

AMI COMMUNICATIONS TECHNOLOGIES

Wireless radio frequency technology (RF) is the predominant AMI communications technology in use in North America, representing 95.3% of installed/planned electric AMI deployments in Canada, and 93.6% in the United States. The remaining electric AMI deployments using non-RF communications technologies consist of one small (7,100 meters) deployment using fibre-optic communications technology, two deployments using broadband over power line carrier (BPL) networks, and 13 PLC networks (including FortisAlberta)[1].

In Canada, 2.9 million AMI meters have been installed, with a further 7.2 million installations planned, for a total of 10.1 million. Of these, only FortisAlberta's 480,000 AMI meters (or 4.7% of the total installed/planned AMI meters in Canada) are PLC[2]. There are no planned installations in Canada using PLC AMI[3].

In the United States, 38.3 million AMI meters have been installed, with a further 18.2 million installations planned, for a total of 56.5 million. Of the total planned/installed, only 3.6 million (or 6.4%) are PLC[4].

Pike Research[5] reports that since the beginning of 2011, of the 25 new AMI projects announced for the United States, one was for the small fibre optic deployment noted above, two have been for PLC, and 22 have been for RF AMI. Of the total AMI meters installed or planned to be installed since 2011, 99.6% are RF AMI. Indeed, as noted in a recent report issued by the Texas Public Utilities Commission in December 2012 regarding AMI:

> *Almost all smart meters used in the U.S. communicate by means of wireless technology. Each utility proposes the technology it will deploy and determines how it is to be configured in order to best suit the needs of its service area. The most common method of communication chosen by Texas utilities has been in the form of a wireless mesh network.*[6]

RF meters are also the only form of remote gas and water metering in North America, with over 50 million gas and approximately 50 million water RF AMR/AMI meters shipped in North American as of third-quarter 2012[7].

Certain intervener submissions (i.e. Exhibit C1-2) have cited the use of PLC technology for European AMI deployments as evidence that wired solutions ought to be considered appropriate for use in North America. In this regard, FortisBC notes the following:

From a report titled "Smart Grid Technology Options" prepared by Marc Goldsmith and Associates LLC for the ConnSMART Program dated May 21, 2010:

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[1] PikeResearch Smart Grid Deployment Tracker 2Q12
[2] PikeResearch Smart Grid Deployment Tracker 2Q12
[3] PikeResearch Smart Grid Deployment Tracker 2Q12
[4] PikeResearch Smart Grid Deployment Tracker 2Q12
[5] PikeResearch Smart Grid Deployment Tracker 2Q12
[6] http://www.puc.texas.gov/industry/electric/reports/smartmeter/SmartMeter_RF_EMF_Health_12-14-2012.pdf
[7] 2012 GTM Scott U.S. Utility Handbook

7.2.3 Power Line Carrier (PLC) Networks

Interestingly, the most common AMI communications protocol in the European Union uses the existing distribution power lines as carriers for the network signal. These types of solutions are typically referred to as power line carrier (PLC) or broadband over power line (BPL) networks. AMI solutions of this type have not been as popular in North American markets for several reasons, including infrastructure costs, high latency, bandwidth constraints, and problems with line noise.

7.2.4 Other Communications Technologies

There are several other technologies that can be used for AMI communications. Utilties have been using phone lines and fibre optic protocols for many years. Generally speaking, however, these are not well suited for the requirements of field-area networks, which require low cost solutions with sufficient bandwidth.[8]

From a report titled "Smart Meter Backhaul Communications and the Role of Broadband Satellite" prepared by Pike Research and published in the second quarter of 2012:

Power line communications (PLC) NAN technologies, which are limited to operation on the LV (low voltage) part of the electrical network, tend to predominate in the European system since many more meters can be supported per PLC AMI concentrator than in the North American system. Additionally, the concentrators are typically co-located with the transformer station, allowing various monitoring and automation functions to share the AMI backhaul communications. There is typically one AMI backhaul node per 100 to 200 smart meters.

With the lower ratio of meters per MV/LV transformer (~4.5 to 1) in the North American system, PLC NAN technologies are not as cost-effective. Hence, various RF technologies dominate for NAN communications. The number of meters per AMI backhaul node can vary considerably, but averages between 1,000 and 3,000 meters per concentrator. Additionally, the North American system requires much more extensive and distributed MV lines with greater risk of disruptions. This drives greater use of DA equipment for fault location, isolation, and service restoration (FLISR) throughout the MV network. Such equipment increasingly requires communications at each node.[9]

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[8] http://www.mgallc.net/smart_grid_technology_optio.pdf

[9] http://www.pennenergy.com/content/ppg/en/whitepapers/pennenergy-white-papers/2012/08/smart-meter-backhaul.whitepaperpdf.render.pdf

COST PER METER

Andy Shadrack's submission (Exhibit C13-10) included:

- a list of North American utilities;
- the number of AMI meters installed for each utility;
- the total cost of each utility's project; and
- a calculated cost per meter.

FortisBC has attempted to verify the data provided by Mr. Shadrack. However, even in those instances in which customer count and project costs were available for comparison, descriptions of system capabilities were not, making a direct comparison of the cost per meter for the various utilities' AMI installations very difficult based on publicly available information. Mr. Shadrack himself notes that he cannot confirm the "veracity of what is attributed and whether appropriate cost comparisons can be made".

Further, FortisBC notes that the costs provided by other utilities may exclude Provincial Sales Tax, Allowance for Funds Used During Construction, Capitalized Overhead, contingency allowances, revenue protection metering and commercial metering – all of which are included in the forecast costs for FortisBC's AMI implementation. If some or all of these costs were excluded for FortisBC's forecast costs, FortisBC's forecast cost per meter would be lower.

Some instances where FortisBC could not confirm Mr. Shadrack's cost figures:

1. **Rochester Gas & Electric (RG&E).** Mr. Shadrack indicates that RG&E deployed PLC AMI to 673,000 customers at $135 per meter. According to the company's website[10], in 2009 RG&E proposed a basic PLC system (in conjunction with its sister utility New York State Electric and Gas (NYSEG)) to both electric (359,000) and gas (303,000) customers. FortisBC is unable to determine the cost of only the electric PLC AMI meters installed; however, removing the gas meters from the count would drive the cost per meter up. Further, while basic PLC was proposed, documents on the website indicate that final technology decisions were to be made in a later RFP. Finally, it is noted that as of January 2013, for reasons unknown, RG&E has not proceeded with any AMI system.

2. **Sacramento Municipal Utility (SMUD).** Mr. Shadrack indicates that SMUD deployed 600,000 AMI meters at $135 per meter. In fact, conversion to wireless RF AMI began in 2009 for 620,000 customers at a program cost of $308 million, or $496 per meter[11]. SMUD's AMI system included "some" distributed system automation.

3. **Idaho Power.** Mr. Shadrack indicates that Idaho Power deployed 500,000 PLC AMI meters at $142 per meter. Pike Research[12] states that the deployment was a PLC

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[10] http://www.rge.com/
[11] http://en.openei.org/wiki/Sacramento_Municipal_Utility_District_Smart_Grid_Project
[12] PikeResearch Smart Grid Deployment Tracker 2Q2012

system serving 475,000 electric customers. The project cost was $94 million, or $197 per meter[13].

4. **Portland General Electric (PGE).** Mr. Shadrack indicates PGE deployed 851,000 wireless AMI meters at $155 per meter. Pike Research states PGE deployed 815,000 wireless AMI meters at a project cost of $135 million, or $165 per meter. No information on system capabilities or inclusions is available.

5. **Oncor, Texas.** Mr. Shadrack indicates that Oncor deployed 3.4 million AMI meters at $203 per meter. Oncor's original system plan called for a hybrid RF/PLC AMI system. However, as noted in a quote from their AMI update report to their regulator, dated 5/2012[14]…."Originally, Oncor planned to use PLC technology in areas where there would be long distances between advanced meters, such as the rural areas of Oncor's service territory. However, an advanced PLC meter that meets the requirements of Commission Substantive Rule 25.130 is still not available. Through its communication system and network design, Oncor has determined that the RF system can be expanded to serve those areas in which Oncor had originally planned to use PLC advanced meters. Therefore, the AMS RF meter deployment footprint has been expanded to cover all of the Oncor service area." Oncor originally applied, and was approved for (in 2008) $686 million to install 3.2 million AMI meters[15] - a cost per meter of $214.

6. **Pacific Gas & Electric.** Mr. Shadrack indicates PG&E deployed 10,440,000 AMI meters at $226 per meter. In summer 2006, the Commission approved PG&E's AMI project with a budget of $1.74 billion[16]. In 2008 PG&E received approval for an additional $472 million to upgrade its electric meters to provide remote disconnect/reconnect and HAN capability, bringing total approved costs to $2.2 billion. This indicates a cost per meter of $236, inclusive of the upgrade cost, and *including* the gas meters which depresses the overall cost per meter associated with the electric system.

Using a report from the Institute for Electric Efficiency (IEE) entitled Utility Scale Smart Meter Deployments, Plans and Proposals, dated May 2012[17], FortisBC was able to calculate cost per meter information on five of the American utilities contained within Mr. Shadrack's submission, as well as 15 other American utilities, with the results shown in Table 1 below. However the report does not provide sufficient information about either the capabilities of the AMI systems referenced, or specifically what is included in their total project costs. It is also unclear what type of communications system is in use – RF or PLC. As such, it is not possible to "normalize" the cost per meter or draw conclusions about the similarities/dissimilarities to FortisBC's proposal. The report does not specify whether the

[13] http://en.openei.org/wiki/Idaho_Power_Company_Smart_Grid_Project
[14] http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/36157_55_725776.PDF
[15] http://interchange.puc.texas.gov/WebApp/Interchange/Documents/35718_102_594645.PDF
[16] http://www.reuters.com/article/2009/03/13/us-pge-smartgrid-idUSTRE52C15720090313
[17] Utility-Scale Smart Meter Deployments, Plans, & Proposals, IEE Report May 2012

AMI deployment is electric-only, or includes gas and/or other smart grid functionality such as volt/VAR optimization.

Table 1

	IEE Report		Shadrack Info	
Company/State	**# of meters**	**Cost/Meter**	**# of meters**	**Cost/Meter**
Minnesota Power, Minnesota	8,000	$275		
Black Hills Energy, Colorado	93,300	$131		
Black Hills Power, South Dakota	69,000	$278		
CenterPoint, Texas	2,190,700	$290	2,400,000	$267
Central Main Power, Maine	607,000	$295		
Cleco Power, Lousiana	277,000	$263		
DTE (Detroit), Michigan	2,100,000	$80	2,600,000	$172
Entergy, Louisiana	7,400	$1,351		
FirtEnergy, MD/OH/PA/WV	2,457,000	$47		
Idaho Power, Idaho/Oregon	496,000	$196	500,000	$142
Indianapolic P&L, IN	10,400	$4,690		
JEA, Florida	40,000	$650		
Madison Gas & Electric, Wisconsin	4,400	$2,500		
NV Energy, Nevada	1,300,000	$232		
Oklahoma Gas & Electric, AR/OK	833,000	$439		
PEPCO Holdings, DC/DE/MD	1,710,000	$175		
Sacramento Muni (SMUD), CA	604,000	$498	600,000	$135
Salt River Project, Arizona	935,000	$122		
San Diego Gas & Electric, CA	1,400,000	$43	2,300,000	$230
Westar Energy, Kansas	48,000	$833		