REQUESTOR NAME: **BC Sustainable Energy Association**

INFORMATION REQUEST ROUND NO: **3**

TO: **FortisBC Inc. (FBC)**

DATE: **February 8, 2013 DRAFT**

PROJECT NO: **3698682**

APPLICATION NAME: **Application for a Certificate of Public Convenience and Necessity (CPCN) for the Advanced Metering Infrastructure (AMI) Project**

106.0 Topic:
Reference: Exhibit B-23, cover page

"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."

106.1 Please confirm that Exhibit B-23 is intended to add to, not to replace, FortisBC's already-filed evidence regarding the cost of the proposed wireless metering system compared to the cost of a hypothetical wired metering system.

106.2 Did FortisBC rely on information from the Goldsmith report and/or the PikeResearch reports cited in Exhibit B-23 in making decisions that resulted in FortisBC choosing a wireless, as distinct from PLC, metering system?

107.0 Topic: Cost per meter
Reference: Exhibit B-23, Table 1, page 5; page 4

Table 1 shows "Cost/Meter" for some 20 advanced meter projects in various jurisdictions based on data from a 2012 report by the Institute for Electric Efficiency (IEE). The "Cost/Meter" figures range from a low of $43/meter to a high of $4,690/meter.

107.1 Do you agree that the very wide range of "Cost/Meter" figures indicates that "Cost/Meter" is not a particularly good measure of the actual cost or cost-effectiveness of a particular advanced meter system?

107.2 Please confirm that the AMI projects listed in Table 1 may be wireless or wired systems; the data is unclear.

"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, <u>it is not possible to "normalize" the cost per meter or draw conclusions about the similarities/dissimilarities to FortisBC's proposal</u>." [underline added]

107.3 What does it mean that "it is not possible to "normalize" the cost per meter"?

107.4 If FortisBC was to put out a new request for proposals, say for PLC systems, does FortisBC have any reason to be confident that the actual bids FBC would receive would be for less cost than the proposed system?

107.5 Is it FortisBC's evidence that the only accurate way to know how much an advanced meter system will cost for a particular utility in a particular location at a particular time is to obtain bids in response to a competitive call for proposals.

107.6 Is it reasonable to expect that the wired and wireless metering technologies are new enough that their comparative costs and performance advantages and disadvantages will change significantly in the mid-term (five to ten years)?

108.0 Topic: PLC and BPL
Reference: Exhibit B-23, p1

FortisBC cites PikeResearch Smart Grid Deployment Tracker 2Q12 for the following:
"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]." [underline added]

108.1 Please confirm that the Executive Summary of the PikeResearch Smart Grid Deployment Tracker 2Q12, available at http://www.pikeresearch.com/wordpress/wp-content/uploads/2012/09/SGDT-2Q12-Executive-Summary.pdf, indicates that China accounted for some 73% of the global shipments of 17.9 million units of smart meters in the second quarter of 2012 [pdf p.4]. What proportion of the China market is wireless as distinct from PLC or BPL?

108.2 Please provide a brief description of the difference between broadband over powerline carrier (BPL) metering systems and powerline communication [or powerline carrier] (PLC) metering systems.

109.0 Topic: Planned BPL installations in Canada?
Reference: Exhibit B-23, page 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]." [underline added]

109.1 Are there any planned installations in Canada using broadband over power line (BPL) networks?

110.0 Topic: Gas and water meters
Reference: Exhibit B-23, page 1

"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]."

110.1 In an area where PLC electricity meters are installed and new remote gas or water meters are planned, would it be practical to use the existing PLC "back haul" system to support the new remote gas or water meters?

111.0 Topic: PLC in Europe compared to North America
Reference: Exhibit B-23, page 2

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

> "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, <u>including infrastructure costs, high latency, bandwidth constraints, and problems with line noise</u>." [underline added]

111.1 Why are the "infrastructure costs" of a PLC system higher than those of a wireless system?

111.2 What is "high latency" and why would it be a problem for an advanced metering network? Why would it be different between a PLC system and a wireless system?

111.3 What is "bandwidth constraint" and why would it be a problem for an advanced metering network? Why would it be different between a PLC system and a wireless system?

111.4 What is "line noise" and why would it be a problem for an advanced metering network? Why would it be different between a PLC system and a wireless system?

111.5 Does the Goldsmith report confirm PikeResearch's analysis of why the European utilities have tended to opt the PLC metering solution, i.e. that costs of this solution is lower in Europe? Or does Goldsmith offer different reasons?

112.0 Topic: Field-area network
Reference: Exhibit B-23

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

> “There are several other technologies that can be used for AMI communications. Utilities 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.”

112.1 What is a “field-area network”? Does the term apply to the FortisBC situation?

113.0 Topic: PLC in Europe compared to North America
Reference: Exhibit B-23, page 2

FortisBC cites “Smart Meter Backhaul Communications and the Role of Broadband Satellite” prepared by Pike Research and published in the second quarter of 2012. In explaining why PLC metering networks are not as cost-effective in North America than in Europe the author of the Pike report states:

> “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.”

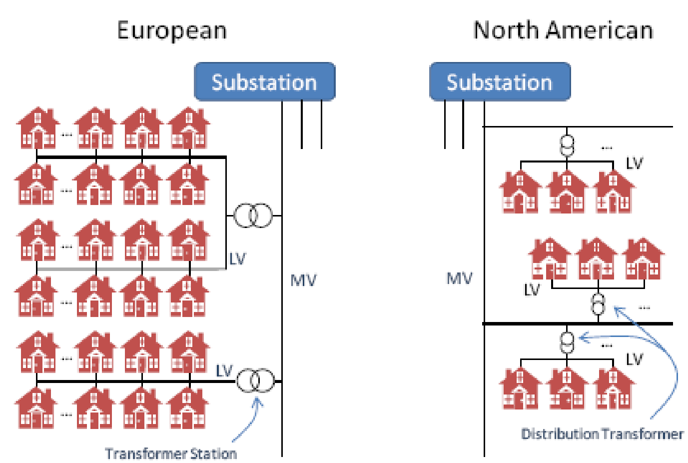
113.1 Please confirm that the following is text and graphic from the PikeResearch report immediately preceding the text quoted in Exhibit B-23 that may clarify how the different power system architecture in Europe compared to North America affects the comparative costs of PLC and wireless metering systems:

3.1 AMI Backhaul (AMI-WAN) Networking Overview

The requirements for the AMI backhaul network are influenced by the chosen NAN technology, which in turn is influenced by the power network architecture itself. Two general architectures exist around the world: the North American system, with a 110V to 120V service voltage; and the European system, usually with a 220V to 240V service voltage. The North American system is used throughout much of the Americas, whereas the European system is generally used throughout the rest of the world.

As illustrated in Figure 3.1, the major difference is the location of the transformers between the medium voltage (MV) network that comes from the distribution substations and the low voltage (LV) networks that feed consumers' homes through the meters. In the North American system, the LV lines are limited in length (a few hundreds of feet), primarily due to the lower service voltage. Therefore, the MV lines are distributed throughout the neighborhoods and the MV/LV conversion is performed by smaller pole-top or pad-mounted distribution transformers serving an average of four to five homes. In the European system, LV line lengths of up to 1 mile may be used, allowing larger, more centralized transformers that support an average of 70 to 100 homes each.

Figure 3.1 Simplified European vs. North American Distribution Network Architectures



(Source: Pike Research)

113.2 Please confirm the following definitions from pdf p.3 of the report:

 AMI neighborhood area network (NAN): A short-range network connecting each smart meter, typically to a neighborhood concentrator node.
 AMI wide area network (AMI-WAN): WAN used to backhaul traffic from the various AMI concentrator nodes to the enterprise control center

113.3 Please explain what the ratio of "~4.5 to 1" means here.