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March 21, 2013

Via Email
Original via Mail

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. (FortisBC) Application for a Certificate of Public Convenience and Necessity (CPCN) for the Advanced Metering Infrastructure Project – Revised Responses to Andy Shadrack Information Request No. 3

Please find attached FortisBC's revised responses to Information Request No. 3 from Andy Shadrack.

Sincerely,

Dennis Swanson
Director, Regulatory Affairs

cc: Registered Interveners

4. If so, are there other functional limitations of PLC-AMI that FortisBC believes preclude it from deploying PLC-AMI?

Response:

FortisBC does not believe the features identified in the AMI Alternative Option Functionality Matrix (Table 7.5.d, Exhibit B-1) as having limited functionality related to PLC-AMI would necessarily preclude consideration of the deployment of PLC-AMI (had a PLC-AMI response been received to FortisBC's RFP). FortisBC does not have additional information regarding PLC-AMI not already provided in the Application or in information request responses, particularly with respect to functional limitations (if any) of PLC-AMI that would necessarily preclude consideration of PLC-AMI. Please also refer to the responses to BCUC IR1 Q38.2 and Q38.3.

5. Can FortisBC please state how deployment of PLC-AMI would contravene or fail to support provincial energy objectives?

Response:

FortisBC has not asserted that a PLC system would contravene or fail to support provincial energy objectives. However, as noted in the AMI Alternative Option Functionality Matrix provided as Table 7.5.d (Exhibit B-1), AMI-PLC was identified as having limited functionality with respect to support for provincial energy objectives, and in particular energy objective (d) as defined in the *Clean Energy Act*.

(d) to use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources;

This limited functionality is primarily related to the fact that once load control or pricing signal data is included in a PLC system (as discussed in section 7.3 of the Application), the available bandwidth may be challenged (depending on the number of endpoints and frequency of reading intervals), limiting functional support for provincial energy objectives related to energy conservation and efficiency.

7. In Direct Testimony, Ms Waites is specifically asked:

..Q. What are the O&M benefits associated with the Project?

A. The Company expects quantifiable O&M benefits from the following areas: reduction in labor and transportation costs related to meter reading, regional operations benefit in confirming equipment outage to prevent crew dispatch, regional operations benefits in confirming service restored to prevent prolonged crew time in area, regional operations benefit on detecting overloaded distribution transformers, benefit with regards to the operation of the irrigation peak rewards program, and outage management operation benefits. The O&M benefits identified for the three-year deployment period are shown on Exhibit No.4 (C13-17-1/3-Idaho Power Company-Direct Testimony-C.Waites page 9, line 17 to page 10, line 6).

In light of FortisBC's submission of January 22nd, 2013, as cited in 3 above, can FortisBC please elaborate on how the benefits so described by Ms Waites differ from the benefits described by FortisBC in its own proposed AMI deployment proposal, and will FortisBC be introducing an irrigation peak rewards program for their irrigation ratepayers within the FortisBC service area?

Response:

The quantified O&M benefit related to meter reading, as discussed in the Application, appears to be similar to the benefit identified by Ms. Waites as noted in the preamble to this question. However, FortisBC notes that certain other O&M benefits quantified in section 5.3 of the Application (remote disconnect/reconnect, theft reduction, Measurement Canada compliance, meter exchanges, contact centre) are quantified benefits associated with the Company's proposed system that differ from those quantified benefits identified by Ms. Waites (which include outage management, detection of overloaded transformers, operation of the irrigation peak rewards program).

FortisBC notes it has identified an outage management system as a potential future benefit enabled by the proposed AMI system, as well as possible future conservation rate structures (which could potentially be similar to the irrigation peak rewards program identified by Ms. Waites). It should be noted that the Company does expect some immediate benefit from AMI related to reduced restoration times for customer outages (in absence of an outage management system), however this benefit, and the future benefits discussed in the Application, are not quantified as the Company has adopted a conservative approach to its financial analysis for the purpose of the Application.

10. Can FortisBC please confirm whether its evidence regarding the capabilities of PLC-AMI contained in its application is current, accurate and up-to-date?

Response:

Although FortisBC's information regarding PLC-AMI is limited by the fact that it did not receive any responses from AMI PLC vendors to its RFP, FortisBC confirms that the information provided in the Application regarding PLC-AMI, as supplemented by the January 22, 2013 evidentiary filing (Exhibit B-23), was representative of available PLC technology at the time the Application was prepared, based on discussions with communications counterparts from other utilities, consultants and vendors. Further, FortisBC does not have further information available to it at this point to add to the evidentiary record. To the best of FortisBC's knowledge, its evidence is current, accurate and up-to-date.

11 .. Mr Heintzelman's testimony continues:

...Q. Does the proposed deployment cover the Company's entire service territory?

A. Yes. The deployment covers the entire service territory, and reaches approximately 99 percent of the Company's customers. There are approximately 4,000 customers, who make up approximately 1 percent of total customers, whose electrical service comes from Idaho Power's 53 smallest distribution substations. These customers are typically in the most remote edges of our service territory and are largely low or seasonal energy users. The TWACS technology will work in these locations but the station infrastructure cost per customer is very high and is not offset by the benefits that would be achieved through AMI at this time (Ibid, Heinztelman, page 7, line 13 to page 8, line 2).

Can FortisBC please explain how its deployment assessment differs from that of Idaho Power Ltd, in terms of number of customers covered by its proposed AMI meter deployment, and how FortisBC's cost benefit analysis differs from that of Idaho Power Ltd, as per B-15, RDCK IR2 #10 page 6, lines 9 to 15?

Response:

As noted in section 4.1.3 of the Application, the Company expects that less than one percent of meters will not have an economic WAN option available at the time of deployment, which is

similar to the percentage of customers identified by Idaho Power that will not be served by the TWACS system.

As to the request that FortisBC explain how its cost benefit analysis differs from that of Idaho Power, FortisBC does not have the requisite detailed information regarding the cost/benefit analysis used by Idaho Power to determine what customers will not be served by the TWACS system.

The economic benefit of the RF mesh associated with FortisBC's proposed solution (as opposed to manual meter reading) is related to the number of meters that can be aggregated at a single collector for backhaul, which in turn is related to the RF propagation environment in which the meters are located. Please also refer to the responses to CEC IR1 Q40.4 and Shadrack IR2 Q9.

15. In contrast FortisBC stated in its original application at Power Line Carrier Systems:

Since the collectors are housed in the substations, the cost of the PLC option is, in part, dependent upon the number of endpoints served per substation. The cost of the infrastructure within the substation is the same no matter how many customers are downstream of that particular substation. However, the distance between the metering endpoint and the substation determines how many line devices need to be installed upon the distribution lines to ensure that the data can travel the required distance (B-1, Power Line Carrier Systems, 7.3, page 112, line 1 to 7).

Do all PLC-AMI systems require power line devices installed on the distribution lines to ensure that the data can travel the required distance, or are there some PLC-AMI systems that can operate without those devices?

Response:

Please refer to the response to Shadrack IR3 Q17 below.

16. In Appendix 1 at question 11 Mark Heintzelman states:

Our largest substation serves just over 16,000 customers and we have not seen any issues related to data retrieval. (C13-9, Appendix 1, Question 11)

In earlier testimony he also sates:

The substation control equipment will be installed in our existing distribution substations. A typical installation would consist of a phone line with frame relay service, a phone protection package, a control receiver unit to provide the connection between software system and the station equipment and to control the operation of the station equipment, an outbound modulation unit to convert the data request to be transmitted across the electrical distribution system, a modulation transformer unit to inject the signal on the distribution system, and inbound pickup units to retrieve the data back from the endpoint communications modules (Ibid, Heinztelman, page 9 line 20 to page 10 line 7).

In contrast FortisBC states in response to BCUC IR2 #35.3 that:

The largest driver of the increased cost per customer of the PLC system is the lower customer/PLC injection point ratio at FortisBC (which average 2,100 customers per PLC injector) versus FortisAlberta (which averages 2,900 customers per PLC injector). A PLC injector is needed at each substation, with additional injectors required for split busses or when there are multiple distribution voltages at a substation (B-14, BCUC IR2 #35.3, page 76, lines 3 to 7).

What is the source for FortisBC's response and is more than one injector always required for PLC-AMI systems or are there PLC-AMI systems that do not require more than one injector?

<u>Response:</u>

FortisBC's understanding of PLC technology is that the signal needs to be injected at the low voltage side (secondary) of the distribution transformer. With a split bus configuration or multiple voltages (therefore multiple buses), there is no electrical connection between portions of the bus or with other buses. PLC technology requires electrical continuity for propagation of the signal down the distribution line, therefore the signal would need to be injected on each alternative bus or unconnected portion of the same bus separately.

Some PLC solutions allow a single PLC injector to inject the same signal on multiple buses, whereas some do not and require one injector per bus. The FortisAlberta solution used for comparison is the former, therefore the stated customer to PLC Injector ratios are the same as customers per distribution substation ratios with the exception that two additional injectors were required for the two step down transformers on the FortisBC distribution system.

The source of information for FortisBC's response is based on discussions with communications counterparts from other utilities, consultants and vendors as well as knowledge of the fundamentals of the PLC and other communications technologies.

FortisBC cautions that it cannot definitively comment on the operation of any particular system other than those for which it received responses to its AMI RFP.

17. As cited above, Idaho Power Company testified that:

The only equipment required on the electrical distribution system are the endpoint communications modules. The communications are modulated on the electricity flowing on the system and, therefore, no additional equipment is required between the substation and endpoints. Because of the unique method used by the TWACS system to modulate the electrical sine wave the signal requires no further modulation amplification and remains intact to the end of the electrical distribution system...As we add new customers, the only equipment required to expand the existing communications system will be a communications module in the electric meter or end device (Ibid, Heinztelman, page 10, lines 8 to 16, and 20 to 22).

In contrast FortisBC responded to CEC IR1 #44.2 as follows:

Compared with other utilities, FortisBC has a significant proportion of long rural distribution feeders and a lower number of customers per feeder. This was expected to have an impact on which technologies might be proposed by respondents to the RFP. For example, some technologies such as PLC require equipment to be installed on each feeder and require additional infrastructure to propagate the communications signal along a long feeder. For FortisBC, the costs to deploy this technology would likely not be as economical as it would be for other utilities (B-11, CEC IR1 #44.2, page 62, lines 9 to 15).

Please confirm that all PLC-AMI systems require equipment to be installed on each feeder and additional infrastructure to propagate signals, or are there PLC-AMI systems that do not require equipment to be installed on feeder lines?

<u>Response:</u>

The distance a PLC signal can propagate along a distribution line is a function of the strength of the signal at the injection point, the type of conductor used, and the location and number of taps in the feeder. The distance also decreases with frequency and bandwidth, as discussed in the response to BCSEA IR3 Q108.2.

There are very low bit rate systems that claim to not require repeaters along the feeder, but FortisBC has no way of determining if these claims are true for all distribution systems. The details of each feeder, including length and location of taps, is unique to each utility and the equipment specifications on the manufacturer websites do not provide sufficient information to verify this claim.

For clarity, it should be noted that FortisBC does not consider these systems to be Power Line Carrier systems as they do not modulate and subsequently inject a carrier onto the line, but instead manipulate the characteristics of the 60 Hz sine wave.

All PLC systems require equipment to inject the signal onto the line at the bus or some alternative injection point.

FortisBC cautions that it cannot definitively comment on the operation of any particular system other than those for which it received responses to its AMI RFP.

18. In response to BCUC IR2 #31 FortisBC states:

FortisBC did not indicate that PLC meters would be generally unsuitable for high-density customer service areas. The Company simply pointed out the relative economics of RF mesh and PLC solutions with respect customer density (B-14, BCUC IR2 #31, page 64, lines 18 to 20).

At Power Line Carrier Systems, FortisBC stated:

Depending on the number of endpoints and the frequency of reading intervals, the amount of data travelling between the meters and the collectors can overwhelm the bandwidth of a PLC system. This becomes increasingly challenging once load control or pricing signal data is included for transmission through these same communication channels. The volume of data can impact the speed of transmission and can cause delays in getting the information back to the central computer in a timely fashion (B1, 7.3, page 112, lines 8 to 13) .

Please provide the source for your information on the possibility and consequences of potential bandwidth overwhelm with PLC-AMI systems and state whether FortisBC believes this is the case for all types of currently marketed PLC-AMI systems.

Response:

The source of information for FortisBC's assertions regarding the possibility of overwhelming the bandwidth of PLC systems is general, and is derived from discussions with communications counterparts from other utilities, consultants and vendors as well as knowledge of the fundamentals of the PLC and other communications technologies.

Many systems may claim to facilitate applications such as load control, demand response, 15 minute interval data, multiple registers, remote disconnects/reconnects, Distribution Automation and Conservation Voltage Reduction. Though FortisBC does not dispute that these systems may have these capabilities, the published low bit rates suggest that it would not be possible to support all the applications concurrently for the number of customers typically served by urban and sub-urban distribution feeders, while maintaining sufficient free bandwidth for real time applications.

FortisBC believes that this is the case for all types of currently marketed PLC systems to one degree or another depending on the data requirements of the applications a utility chooses to deploy on its network. Consequently, the low bandwidth of these systems also limits the applications that can be supported by the network in the future.

FortisBC cautions that it cannot definitively comment on the operation of any particular system other than those for which it received responses to its AMI RFP.